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The primary purpose of this study was to determine whether there were differences in selected personality traits between female U. S. V. B. A. players, as measured by the Cattell Sixteen Personality Factor Questionnaire, and the general population; to determine if there were any differences in selected personality traits of female U. S. V. B. A. players who were categorized primarily as hitters or setters.

Sixty-eight female U. S. V. B. A. players agreed to participate in this study. The subjects represented a selected sample of teams from the following states: California, Connecticut, Florida, Maryland, New Jersey, New York, and Pennsylvania. The subjects were placed in one of two groups: hitters or setters. Forty-five subjects indicated that they were hitters and twenty subjects indicated that they were setters. Three subjects classified themselves as both hitters and setters. For the purpose of this study these subjects could not be categorized, therefore, they were dropped from the study.

A t-test was used in the statistical treatment of the raw data, to test the null hypothesis of no significant differences in selected personality traits, as measured by the Cattell Sixteen Personality Factor Questionnaire, between the general population and selected female U. S. V. B. A. players. The selected volleyball sample was found to be significantly more intelligent, happy-go-lucky, and suspicious than the general population. The general

population was found to be significantly more outgoing, conscientious, tender-minded, shrewd, apprehensive and self-sufficient than the selected volleyball sample.

A simple one-way analysis of variance was used to test the second null hypothesis of no differences in selected personality traits between volleyball players who were categorized primarily as hitters or setters. Hitters were found to be significantly more venturesome than setters while setters were found to be significantly more intelligent than hitters.

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of the Requirements for the Degree
Master of Science in Physical Chemistry

Greensboro
August, 1971

Approved by
Harold Matthews
Chairman

PERSONALITY TRAITS OF SELECTED FEMALE
//

UNITED STATES VOLLEYBALL

ASSOCIATION PLAYERS

by

Deborah Chin

'''

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the Faculty of the Graduate School at
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CHAPTER I

INTRODUCTIONS

The discipline of sports psychology is a growing field in today's society. Researchers of sport psychology are seeking a better understanding of human behavior and its relationship to physical activity. Specific attempts have been made by such contemporary leaders in the field as Bruce Ogilvie, Thomas A. Tutko, Bryant Cratty and Miroslav Vanek (13, 15) to seek the determinants of success and to attempt to understand behavioral control as it relates to athletic performance.

The study of personality has been one means of attaining valuable insight into the behavior of participants of physical activity. Rushall has suggested that through the utilization of various personality assessment instruments and techniques, the coach and athlete can be afforded valuable information. He has suggested the following possibilities as uses of personality information:

1. It may provide a provision for a better understanding of an individual's behavioral tendencies. This information can be used to predict behaviors and to eliminate situations that will produce undesirable behaviors.
2. Coach-player interactions can be better affected by producing situations which will eliminate undesirable consequences.
3. Player manipulation may be improved to the extent of trying to maximize training and competitive performance. This would lead to a rise in efficiency of the training system or program.

4. If a relationship between personality and physical performance exists, one could differentiate, for selective purposes, between players of equal skill.
5. Repeated testing of players gives an indication of change in the behavior of athletes. The coach can then readjust player control procedures to these changes.
6. Knowledge of individual motivation and disposition to act can bring individuality into one's program which will help develop each individual player's potential for performance. (41:np)

Through the study of personality, the uniqueness of the individual is revealed. Success or failure of that individual as a highly skilled athlete may depend upon his unique behavioral patterns, his attitude toward self-realization, self-understanding, self-control, and competition.

CHAPTER III

STATEMENT OF PROBLEM

Purpose of Study

The primary purpose of this study was to investigate the differences in selected personality traits between female United States Volleyball Association players, as measured by the Cattrell Sixteen Personality Factor Questionnaire, and the general population.

The secondary purpose was to determine if there were any distinct differences in selected personality traits of the female United States Volleyball Association players included in this study, who were categorized primarily as hitters or setters.

Null Hypotheses

There is no significant differences in selected personality traits, as measured by the Cattrell Sixteen Personality Factor Questionnaire, between the following groups:

1. The general population and female United States Volleyball Association players.
2. Volleyball players categorized primarily as hitters or setters.

Definition of Terms

For the purpose of this study the following terms were defined:

Personality. Personality designates the patterns of behavior and predispositions that determine how a person will think, feel, and act. (11:xxiii)

United States Volleyball Association. The U.S.V.B.A. was organized in 1928 for the basic purpose of promoting the sport. The Association has jurisdiction over formal open volleyball competition in the U. S., conducts annual national championships, and is the sport's governing group designated by the International Volleyball Federation. (23:72)

United States Volleyball Association Player. This is a volleyball player who is a member of the United States Volleyball Association, holds an Amateur Athletic Union card and competes in tournaments conducted by the United States Volleyball Association.

Setter. A setter is a volleyball player whose responsibility is to receive the pass and then place the ball in the air close to the net to the advantage of the spiker.

Hitter. A hitter is a volleyball player who places the ball into the opponent's court with such force that it is difficult or impossible to return.

Limitations of the Study

Age, skill level, and experience are three variables that have not been considered in assessing the personality profiles of volleyball players. These variables are assumed to be an integral part of the individual personality.

The Cattell Sixteen Personality Factor Questionnaire, as all paper-pencil tests of its type, measures only primary personality traits. Individual results reflect a large but selected number of traits; they do not indicate an individual's total personality. Therefore, this study is limited to the primary personality traits measured by the Cattell Sixteen Personality Factor Questionnaire.

The tests were administered by the coaches of the teams being studied. Standardized administrative instructions accompanied each test booklet; however, it is not known whether uniformity in test taking and administrative procedures resulted. It also may be assumed that the subjects, due to their different geographical locations, may not have taken the Cattell Sixteen Personality Factor Questionnaire under similar conditions of place, time, and social setting.

The study is further limited by the sample which is a selected purposeful sample of female United States Volleyball Association players. The author subjectively selected subjects who appeared to be highly skilled volleyball players. These players were chosen from a limited geographical area.

CHAPTER III

REVIEW OF LITERATURE

A growing interest in sports psychology has augmented the amount of research relating human behavior to physical activity. Considerable evidence has already indicated a relationship between personality variables and athletic achievement. Literature relating to personality and athletic achievement was reviewed and organized as follows: early personality studies of participants in physical activity; recent studies categorized according to instrument used: projective technique, Omnibus Personality Inventory, Minnesota Multiphasic Personality Inventory, California Psychological Inventory, Edwards Personal Preference Schedule, and Cattell Sixteen Personality Factor Questionnaire.

Early Personality Studies

In 1942 Sperling (34:539-45) in dealing with college males found statistically reliable differences in personality patterns of varsity and intramural groups as distinguished from those of the non-athlete group. Though slight, significant differences were found to exist between varsity team sports participants and varsity individual sports participants. No significant personality trait difference between varsity and intramural groups was found. Sperling selected Smith's Human Behavior Inventory,

Guilford's Introversion-Extroversion Scale, Allport's Ascendence-Submission Reaction Scale, two scales of Harper's Social Study and Allport's and Vernon's Study of Values as his personality assessment tools.

Thune (35:296-306) in 1949, compared personality traits of YMCA weightlifters to non-weightlifters. Results showed that there was group differentiation between weightlifters and non-weightlifters. The weightlifters appeared to be more shy, less self-confident, and more desirous of being healthy and dominant. Thune used Nelson's Questionnaire, Henry's Interest and Attitude Inventory and several standard personality inventories for his measuring instruments.

In 1951 Flannagan (19:312-323) used the masculinity scale from the Guilford-Martin Inventory, Allport's Ascendence-Submission Scale, Guilford's Introversion-Extroversion Scale and the emotional stability section of Smith's Human Behavior Inventory to assess personality traits of college males grouped into six different physical activities. An investigation of differences between activity groups (fencing, badminton, basketball, volleyball, boxing, and swimming) was conducted. Statistically significant differences were found. Fencers were more ascendent than basketball players, volleyball players and boxers. Fencers professed to be more feminine than basketball players. Badminton players were more extroverted than volleyball players and volleyball players were shown to be less stable than basketball players. Flannagan's study appeared to demonstrate that personality is a

factor in making activity selections because the subjects were free to select the activity of their choice.

Projective Techniques

In the area of personality assessment, projective tests have been found to be more valid than subjective tests or objective paper-pencil tests but more difficult to evaluate. The evaluation often requires the service of a psychologist or psychiatrist. (3:564)

Johnson, Hutton and Johnson (22:484-485) assessed the personality traits of champion athletes as measured by two projective tests. Twelve National champions or All-Americans in their respective sports were given the Rorschach Ink Blot Test and the House-Tree-Person Test. It was reported that champion athletes scored significantly higher in the areas of extreme aggression, uncontrolled emotions, high generalized anxiety, high intellectual aspiration and exceptional feelings of self-assurance as compared to the non-champion subjects examined.

Johnson and Hutton (21:49-53) again used the House-Tree-Person test to evaluate personality traits of eight collegiate wrestlers before the wrestling season, 4-5 hours before the first intercollegiate match and again the morning after the competition. Test interpretation revealed several group tendencies from condition to condition; outstanding among which were: decrement of functioning intelligence, increased aggressive feelings and increased neurotic signs in the before match condition; return to

approximately the status of condition I except for considerably less aggressive feelings in condition III.

Omnibus Personality Inventory

Lakie (26:566-573) utilized five scales from the Omnibus Personality Inventory to form an attitude inventory for assessing personality characteristics of certain groups of intercollegiate athletes. Two hundred and thirty male athletes from a state university, private university, and two state colleges were tested. For additional comparative purposes, the athletes were then grouped according to their sport (basketball, N = 37; football, N = 67; tennis-golf, N = 38; track, N = 55; and wrestling, N = 33). Scores on the personality scales differentiated among sports groups within the state university and private university but not within the state college; between athletes attending the private university and those attending each of the other three schools. No significant differences were found when all 230 athletes were categorized according to sport group.

Minnesota Multiphasic Personality Inventory

The Minnesota Multiphasic Personality Inventory is a personality assessment instrument used to measure a person's tendency to fit into psychiatric categories; a fact that shows widespread faith in the continuity of the normal and abnormal. (2:435) The Minnesota Multiphasic Personality Inventory is not

designed for general survey of personality traits, but rather trait assessment of abnormal individuals.

La Place (27:313-319) used the Minnesota Multiphasic Personality Inventory to examine personality and its relationship to success in professional baseball. Forty-nine (successful) major league players and sixty-four (unsuccessful) minor league players were tested. Results showed that major league players were better able than minor league players to: (a) apply their strong "drive" towards a definite objective by exercising self-discipline, (b) adjust to occupations, as professional baseball, requiring social contact or the ability to get along well with others, and (c) exercise initiative. From his results, La Place concluded that certain specific personality traits were associated with success in professional baseball.

In using the Minnesota Multiphasic Personality Inventory, Booth (17:127-138) compared personality traits of college students categorized into specific groups: (a) freshmen and upperclass athletes and non-athletes, (b) freshmen and varsity athletes who participated in only team, individual, or a team and individual sport, and (c) athletes who were rated as poor or good competitors.

It appeared that athletes differed significantly from non-athletes with non-athletes scoring significantly higher on both the interest and anxiety scales than athletes. Other results indicated that varsity athletes and upperclass non-athletes scored higher than freshmen athletes and non-athletes

on the dominance scale while both poor and good varsity competitors scored significantly higher than freshmen poor competitors on the same dominance scale. Upperclass non-athletes scored significantly higher on the social responsibility variable than freshmen athletes and non-athletes and varsity athletes. Varsity individual sports participants were marked by more anxiety and fear than athletes who participated in both team and individual varsity sports. Varsity athletes in only individual sports scored higher on the depression scale than those who participated only in team sports. Differences in personality as measured by the Minnesota Multiphasic Personality Inventory were indicated between athletes and non-athletes and between participants in individual sports, in team sports and in team-individual sports.

Slusher (33:539-545) used the Minnesota Multiphasic Personality Inventory and the Lorge-Thorndike Intelligence Test to study the personality and intelligence characteristics of high school athletes and non-athletes (males). Generalizations were made from a series of t-tests comparing the athletic group and the normative group on each of the ten components of the Minnesota Multiphasic Personality Inventory. The athletic group scored significantly lower on the femininity and intelligence scale than the non-athletic group. Except for the swimmers, all athletes scored higher on the hypochondriasis scale. There was no differentiation between athletes and non-athletes on the hypomania scale. Wrestlers showed a dominate neurotic profile; higher psychasthenia scale than non-athletes. Basketball players

showed the most marked deviation with an over concern with physical symptoms and relative lack of repression. Slusher's results are generalizations derived from comparisons between the athletic group and a normative group on each of the ten components of the Minnesota Multiphasic Personality Inventory. No profile analysis was made of a specific athletic group.

California Psychological Inventory

The scales of the California Psychological Inventory are based largely on the scales of the Minnesota Multiphasic Personality Inventory, however, they are applicable to normal individuals.

Schendel (30:52-67) evaluated the psychological differences between athletes and non-participants in athletics at three educational levels. Statistically significant differences were found on eight scales of the California Psychological Inventory for ninth grade subjects between athletes and non-participants. For twelfth grade subjects, differences were found on four scales while differences for college subjects were found on nine scales of the California Psychological Inventory. College non-participants in athletics generally possessed desirable personal-social psychological characteristics to a greater extent than college athletes.

The California Psychological Inventory was used by Berger and Littlefield (16:663-665) to compare football athletes with non-athletes on specific personality variables. No significant differences were found among outstanding football athletes,

non-athletes and non-outstanding athletes after controlling for scholastic aptitude as measured by the Scholastic Aptitude Test. The results suggest that participation in varsity football may not develop more favorable characteristics of social interaction and social living than non-participation.

Edwards Personal Preference Schedule

Singer (32:582-588) used the Edwards Personal Preference Schedule to examine personality differences between and within college baseball players and college tennis players. No significant differences in personality profiles were observed between the baseball and tennis groups or between the twenty highest skilled and the twenty lowest skilled baseball players. Singer's results suggest that there is no relationship between the personality profiles of individuals and their participation in selected activities.

The Edwards Personal Preference Schedule has also been used to assess the personality variables of highly competitive individuals. Johnsgard and Ogilvie (20:87-95) found that competitive racing drivers exhibited specific personality traits. They were found to be highly stable individuals, low in anxiety and extremely independent. The nature of their competition may account for the reflection of specific traits such as self-assurance, self-sufficiency, and self-discipline in their personality profiles.

Neal (38) used the Edwards Personal Preference Schedule to compare the personality traits of champion women athletes

who participated in the 1959 Pan American games to a normative group. Results showed that United States women athletes were highly aggressive, independent, and more reserved than the normative group. It seems that on the basis of this study that outstanding women athletes do possess certain personality traits that tend to contribute to their athletic success.

The Edwards Personal Preference Schedule was also used by Owens (39) to determine whether there were similar personality patterns among women amateur golfers. Results showed that there seems to be similar personality patterns among the amateur golfers on the achievement, autonomy, defense, intraception, endurance, aggression, and change variables. There were no significant differences among the amateur golfers when grouped on a handicap basis.

Cattell Sixteen Personality Factor Questionnaire

The Cattell Sixteen Personality Factor Questionnaire is considered the most reliable instrument available today in the field of personality assessment. It has been used most frequently in the personality assessment studies of male and female athletes, coaches, and physical educators. (28:781-782)

Peterson (29:686-690) used the Cattell Sixteen Personality Factor Questionnaire to compare the personality traits of women participants in team sports to women participants in individual sports. Subjects were selected from a group of 156 A. A. U. women athletes and the 1964 Olympic Team. Results concluded that

women athletes who competed in individual sports rated higher on the personality factors of dominance, adventurousness, sensitivity, introversion, radicalism, and self-sufficiency, and lower on the factor of sophistication when compared to women athletes who competed in team sports.

Kroll (24:49-57) utilized the Cattell Sixteen Personality Factor Questionnaire and the L scale of the Minnesota Multiphasic Personality Inventory to assess the personality profiles of collegiate wrestlers at different levels of demonstrated achievement in wrestling. He found no significant difference in the personality profiles of the champion wrestlers as compared with excellent collegiate wrestlers or the average and below average collegiate wrestlers. Kroll and Carlson (25:405-411) also concluded on the basis of the Sixteen Personality Factor Questionnaire that there were no significant differences among personality profile components of karate participants at various levels of proficiency.

Lopiano (37) administered the Cattell Sixteen Personality Factor Questionnaire to high school girls to investigate the relationship between personality traits and playing position in high school six-player basketball. She found forwards and guards to be more polished, experienced, worldly, and shrewd than rovers.

As measured by the Cattell Sixteen Personality Factor Questionnaire, Reilly (40) found no significant differences between women field hockey players who played an entire season

without sustaining an injury and women players who played an entire season and sustained at least one or more injuries. Both groups, however, were found to be slightly more reserved, tough-minded, trusting, forthright, and self-assured than the general population.

Williams, Hoepner, Moody, and Ogilvie (36:446-453) used the Cattell Sixteen Personality Factor Questionnaire and the Edwards Personal Preference Schedule to determine if there were distinct personality traits characteristic of champion level female fencers and if there was any correlation between personality traits and level of achievement in the 1968 National Championship. Interpretation of the results revealed a definite fencer's personality when compared to national norms. The competitive fencer was described as a very reserved, self-sufficient, autonomous individual with a below average desire for affiliation and nurturance. She has a strong need to be the very best and is an intelligent, creative, experimenting, and imaginative person. She tends to be assertive and aggressive. Only one personality factor differentiated levels of achievement. The top level competitor was significantly more dominating than the low level competitor. From the results of this study, the authors have suggested that a "Sportswomen's" personality may exist in high levels of competition.

Summary

The literature has been reviewed with respect to the relationship between personality structure as measured by reliable

standardized personality measures and athletic participation and non-participation, participation in selected physical activities and participation of athletes at various levels of achievement with an emphasis on the highly skilled participant. Sufficient evidence emerged to permit the conclusion that certain general sports personalities do exist. Certain combinations of personality traits have been shown to be predictive of superior performance in various athletic endeavors as well as in certain skills within the experimental laboratory. (8:20)

The findings seem to suggest several generalizations. First, the Cattell Sixteen Personality Factor Questionnaire appeared to be the most frequently used personality assessment instrument for both male and female athletes. Evidence also indicated that personality differences existed between sport participants and non-sport participants, and individual sport participants and team sport participants. The studies reviewed seem to indicate that individual sport participants were more extroverted, resourceful, aggressive, and sensitive than team sport participants who were more sociable, thoughtful, and introverted.

It also seems justifiable to say that outstanding athletes do possess certain personality traits that distinguish them from the general population. Reviewed studies indicated that selected champion athletes were more aggressive, independent, and reserved than the general population. Other studies have shown that there were highly successful selected athletic groups that exhibited

distinguishing personality variables from a normative population. Some of these personality variables included tough-mindedness, more reserved, trusting, forthright, and self-assurance. Such evidence suggests that a "Sportswomen's" personality may exist in high levels of competition.

In application of these generalizations, one should keep in mind several important facts. A variety of selected personality assessment instruments have been used to examine personality variables of participants and non-participants in various physical activities. In order to validate the findings of different studies, the same tool should be used with varying subject populations. Most studies have dealt with male subjects. Few studies have concerned themselves with the highly skilled female athlete. Also, one must consider whether or not individuals select sports because of their personality or do they change because of participation in these sports. Possibly, both of these factors are operating. (31:169-171)

CHAPTER IV

METHOD OF PROCEDURE

Introduction

This chapter describes the procedures followed in determining whether there were differences in selected personality traits between female United States Volleyball Association players, as measured by the Cattell Sixteen Personality Factor Questionnaire, and the general population; and secondly, to determine if there were any differences in selected personality traits of female United States Volleyball Association players who were categorized primarily as hitters or setters.

Subjects

Sixty-eight female subjects were administered the Cattell Sixteen Personality Factor Questionnaire. The subjects were all registered members of the United States Volleyball Association (hereafter referred to as U. S. V. B. A.) and were participating in U. S. V. B. A. regional competition during the 1970-71 season. The average practice time per subject was two days a week, three hours per day. There were no requirements with respect to age or years of playing experience.

The teams were selected on the basis of availability of female U. S. V. B. A. teams for testing purposes. The subjects represented a selected sample of teams from the following states:

California, Connecticut, Florida, Maryland, New Jersey, New York, and Pennsylvania. The author was able to personally contact teams from Connecticut, Maryland, New Jersey, New York, and Pennsylvania. Through personal friends in California and Florida, teams from these states were also contacted for testing purposes.

The subjects were placed in one of two groups: hitters or setters. A hitter was defined as a volleyball player whose primary objective was to place the ball into the opponent's court with such force that it was difficult or impossible to return. A setter was defined as a volleyball player whose primary responsibility was to receive a pass and then place the ball in the air close to the net to the advantage of the hitter. Each subject indicated on a personal data sheet (Appendix A) whether or not she categorized herself as a hitter or a setter. Forty-five subjects indicated that they were hitters and twenty subjects indicated that they were setters. Three subjects categorized themselves as both hitters and setters. For the purpose of this study, these players could not be categorized, therefore, they were dropped from the study.

The Instrument

The Cattell Sixteen Personality Factor Questionnaire, Form A, is a comprehensive objective device which measures sixteen dimensions of the total personality. These dimensions are unitary, independent, and practically important traits which affect a large portion of the overt personality. (6:1) The

questionnaire attempts to give the fullest information in the shortest time about "all the main dimensions along which people can differ, according to basic factor analytic research." (6:1)

The general design of the test is such that,

. . . the results of the test differ between cooperative and uncooperative, well-educated and poorly educated, honestly and ulteriorly-motivated subjects. The questionnaire is most valid with students or cooperative, anonymous subjects under research conditions. (6:3)

The administration of the questionnaire is intended for both group and individual situations. The majority of questions are indirect, ". . . asking about interests which the subject would not necessarily perceive to be related to the trait in question, so that it escapes some of the distortions," characteristic of paper-pencil tests. (6:3)

The subjects make their responses on an answer sheet. Three alternative responses to each item are provided for the subject. With the testing of adults,

. . . it has been found that the pseudo 'forced choice,' forbidding use of a middle category, frustrated genuine attempts to give accurate answers and may produce poor test morale and a general disinclination to respond to the test. (6:3)

Therefore, the subject has a choice of three responses: positive, negative, or undecided.

The items of the Cattell Sixteen Personality Factor Questionnaire were derived "from several thousand items originally tried and constitute only those which continue to have significant validity against factors after three successive factor analyses." (7:8)

TABLE I

16 PF VALIDITY COEFFICIENTS
OF INDIVIDUAL SCALES

A = 0.77	F = 0.75	L = 0.63	Q1 = 0.66
B = 0.62	G = 0.63	M = 0.58	Q2 = 0.62
C = 0.71	H = 0.87	N = 0.59	Q3 = 0.58
E = 0.66	I = 0.71	O = 0.75	Q4 = 0.75

(7:8)

The reliability coefficient (Table II) for each of the sixteen items takes three major forms: consistency, equivalence, and stability coefficient. No data is given on the stability coefficients because they do not express the quality of the test as a degree of function fluctuation but rather personality fluctuations due to situational changes. Equivalency coefficients are only stated when Forms A and B are used in conjunction with one another. The consistency coefficients were determined by the split-half method and corrected to full length by applying the Spearman Brown Prophecy Formula. (6:4)

TABLE II

16 PF CONSISTENCY COEFFICIENTS: RELIABILITY

A = 0.81	F = 0.79	L = 0.75	Q1 = 0.73
B = ----*	G = 0.81	M = 0.70	Q2 = 0.73
C = 0.78	H = 0.83	N = 0.61	Q3 = 0.73
E = 0.80	I = 0.77	O = 0.79	Q4 = 0.81

*Cannot be calculated. (7:6)

The sixteen dimensions or traits, as measured by the Cattell Sixteen Personality Factor Questionnaire, Form A, are as follows: (7:13-18)

<u>Low Score</u>	<u>Factor</u>	<u>High Score</u>
Reserved <u>Sizothymia</u> Critical	<u>A</u>	Outgoing <u>Affectothymia</u> Warm-hearted
Less Intelligent <u>Lower scholastic mental capacity</u>	<u>B</u>	More Intelligent <u>Higher scholastic mental capacity</u>
Affected by Feelings <u>Lower Ego Strength</u> Easily Upset	<u>C</u>	Emotionally Stable <u>High Ego Strength</u> Mature
Humble <u>Submissiveness</u> Conforming	<u>E</u>	Assertive <u>Dominance</u> Aggressive
Sober <u>Desurgency</u> Serious	<u>F</u>	Happy-Go-Lucky <u>Surgency</u> Enthusiastic
Expedient <u>Weaker Superego Strength</u> Evades Rules	<u>G</u>	Conscientious <u>Stronger Superego Strength</u> Persevering
Shy <u>Threctia</u> Restrained	<u>H</u>	Venturesome <u>Parmia</u> Uninhibited
Tough-minded <u>Harria</u> Self-reliant	<u>I</u>	Tender-minded <u>Premisia</u> Dependent
Trusting <u>Alaxia</u> Adaptable	<u>L</u>	Suspicious <u>Protension</u> Self-opinionated
Practical <u>Praxernia</u> Careful	<u>M</u>	Imaginative <u>Autia</u> Bohemian

<u>Low Score</u>	<u>Factor</u>	<u>High Score</u>
Forthright <u>Artlessness</u> Natural	<u>N</u>	Shrewd <u>Shrewdness</u> Worldly
Placid <u>Untroubled adequacy</u> Self-assured	<u>O</u>	Apprehensive <u>Guilt proneness</u> Depressive
Conservative <u>Conservatism</u> Tolerant of Tradition	Q1	Expeimenting <u>Radicalism</u> Liberal
Group-dependent <u>Group Adherence</u> A "Joiner"	Q2	Self-sufficient <u>Self-sufficiency</u> Resourceful
Undisciplined Self Conflict <u>Low Integration</u> Careless of Protocol	Q3	Controlled <u>High Self-concept</u> <u>Control</u> Socially Precise
Relaxed <u>Low Ergic Tension</u> Unfrustrated	Q4	Tense <u>High Ergic Tension</u> Frustrated

Administration

During the months of November through January at U. S. V. B. A. sanctioned tournaments, the author personally contacted the coaches of women's teams in U. S. V. B. A. regions 1, 2, and 3. These regions include the Northeastern and Middle Atlantic states. The coaches were asked to cooperate in this study. Eight teams promised cooperation. At the same time, through the assistance of personal friends in Florida and California, coaches of teams from these states were also contacted and asked to cooperate. The total number of teams willing to participate was ten.

The coaches of participating teams were given a questionnaire booklet and an answer sheet for each member of their team. Since

the questionnaires were administered on an individual basis, each booklet was accompanied with a letter explaining the administrative instructions (Appendix B). This was done in an attempt to standardize the administrative procedures for all subjects. Also attached to the answer sheet was a personal data sheet to be completed by each subject participating in the study. A copy of the personal data sheet is presented in Appendix A. The information obtained helped to categorize the subjects into one of two groups: hitter or setter; determined the norms to be used for comparative purposes; and supplied specific data relative to the amount of practice per week.

The subjects were urged to return the questionnaire booklets and answer sheets as soon as possible. As stated in the administrative instructions, a deadline was set for April 1, 1971. A self-addressed, stamped envelope was provided for the return of the material to the author.

Treatment of the Data

Raw scores were calculated for all subjects according to instructions contained in the Cattell Sixteen Personality Factor Questionnaire Handbook.

A t test was used in the statistical treatment of the raw data, to test the null hypothesis of no significant differences in selected personality traits, as measured by the Cattell Sixteen Personality Factor Questionnaire, between the general population and the selected female U. S. V. B. A. players.

A simple one-way analysis of variance was used to test the second null hypothesis of no differences in selected personality traits between volleyball players who were primarily categorized as hitters or setters. For the testing of both null hypotheses the level of confidence was set at .05.

CHAPTER V

ANALYSIS OF DATA

Introduction

The purpose of this study was to determine whether there were differences in selected personality traits between female United States Volleyball Association players, as measured by the Cattell Sixteen Personality Factor Questionnaire, and the general population; and to determine if there were any differences in selected personality traits of these same female United States Volleyball Association players who were categorized as either hitters or setters.

Sixty-eight subjects completed and returned the Cattell Sixteen Personality Factor Questionnaire. Forty-five of the subjects categorized themselves as hitters and twenty categorized themselves as setters. Three of the subjects classified themselves as both setters and hitters. Since these subjects could not be placed in either category, the data from their questionnaires were not included in the study.

Raw scores were determined for all subjects on each of the sixteen personality dimensions. The procedure for calculating the raw scores was carried out according to the instructions in the Cattell Sixteen Personality Factor Questionnaire Handbook. The raw scores for each subject are presented in Appendix C.

Analysis

The null hypotheses stated that there would be no significant differences in selected personality traits, as measured by the Cattell Sixteen Personality Factor Questionnaire, between the following groups:

1. The general population and female United States Volleyball Association players.
2. Volleyball players categorized primarily as hitters or setters.

To test the null hypotheses of no differences in selected personality traits between the general population and the U.S.V. B.A. players used as subjects in this study, a t test was used. A statistical analysis was conducted to determine if there were significant differences between the means of the groups on each of the sixteen personality factors. Alpha was set at .05 level of confidence.

The use of z scores was rejected because a large sample size and a good approximation to a normal curve is required. (9:114) The data for the study did not meet this requirement. A t test was used because it utilized degrees of freedom in estimating its distribution, and the approximation of a normal curve was not needed.

The true means and standard deviations for the general population and the volleyball population were not known. Therefore, in order to accurately calculate the t ratio, a pooled variance for the two populations was used in the t formula.

To test the second null hypothesis of no differences in selected personality traits between volleyball players who were categorized as hitters or setters, a simple one-way analysis of variance was conducted between the two groups on each of the sixteen factors.

The basic principle of such a test is to determine whether the sample means vary further from the population mean more than we should expect, in view of the variations of single cases from the same mean. (10:269)

Alpha was set at .05 level of confidence.

Results

Table III shows the means, standard deviations, pooled variances, and the t values for the general population and the volleyball sample on each of Cattell's sixteen personality variables. A t value of 1.645 was needed for significance at the .05 level of confidence. (9:464)

Results showed (see Table III) that there were significant differences between the means of the general population and the volleyball sample on nine of the sixteen personality factors. The volleyball sample had significantly higher means in three of the nine variables: Factor B (less intelligent vs. more intelligent), Factor F (sober vs. happy-go-lucky), and Factor L (trusting vs. suspicious). The general population had significantly higher means in Factor A (reserved vs. outgoing), Factor G (expedient vs. conscientious), Factor I (tough-minded vs. tender-minded), Factor N (forthright vs. shrewd), Factor O (placid vs. apprehensive), and Factor Q₂ (group dependent vs. self-sufficient). The null hypothesis of no significant

TABLE III

t-TEST RESULTS FOR COMPARISON OF PERSONALITY FACTORS BETWEEN
GENERAL POPULATION AND U.S.V.B.A. VOLLEYBALL PLAYERS

Personality Factors	General Population N = 365		Volleyball Sample N = 65		$S_p^{2^1}$	t Value
	Mean	S. D.	Mean	S. D.		
A (Reserved vs. Outgoing)	10.98	3.11	9.90	2.80	9.39	2.617*
B (Less intelligent vs. More intelligent)	7.62	2.01	9.07	1.83	3.93	-5.428*
C (Affected by feelings vs. Emotionally stable)	15.16	3.75	15.98	4.14	14.52	-1.598
E (Humble vs. Assertive)	11.47	4.56	12.43	4.36	20.52	-1.574
F (Sober vs. Happy-go-lucky)	13.65	4.28	15.16	5.18	19.59	-2.534*
G (Expedient vs. Conscientious)	13.04	3.00	12.32	4.13	10.20	1.674*
H (Shy vs. Venturesome)	12.77	5.45	13.06	5.81	30.30	-.391
I (Tough-minded vs. Tender-minded)	12.69	3.21	11.87	3.04	10.14	1.912*
L (Trusting vs. Suspicious)	6.39	3.17	8.21	2.95	9.84	-4.308*
M (Practical vs. Imaginative)	12.17	3.60	12.10	3.55	12.90	.145
N (Forthright vs. Shrewd)	10.44	2.80	8.29	2.46	7.57	5.803*
O (Placid vs. Apprehensive)	11.36	3.78	10.33	3.99	14.53	2.007*
Q ₁ (Conservative vs. Experimenting)	7.61	2.88	7.93	3.44	8.82	-.800

TABLE III (continued)

Personality Factors	<u>General Population</u>		<u>Volleyball Sample</u>		$S_p^{2\ 1}$	<u>t</u> Value
	N = 365		N = 65			
	Mean	S. D.	Mean	S. D.		
Q ₂ (Group dependent vs. Self-sufficient)	10.14	3.41	9.12	3.00	11.23	2.260*
Q ₃ (Undisciplined self-conflict vs. Controlled)	12.08	3.25	12.32	3.30	10.61	-.547
Q ₄ (Relaxed vs. Tense)	12.87	4.56	13.90	5.20	21.72	-1.641

t Value of 1.645 needed for significance.

* Significant at .05 level of confidence.

$S_p^{2\ 1}$ = pooled variance

differences in selected personality traits between the general population and female U.S.V.B.A. players was rejected at the .05 level of confidence.

Table IV indicates the results of the analysis of variance between volleyball players who categorized themselves primarily as hitters or setters. Significant differences were found between the two groups on two of Cattell's sixteen personality variables. The F ratio for Factor B (less intelligent vs. more intelligent) was 6.257. With 1 df between sets, 63 df within groups, and alpha set at .05 level of confidence, an F ratio of 3.996 was needed for significance. Factor B was found to be significant.

Table V shows the means and standard deviations for the group of hitters and the group of setters on each of the sixteen personality variables. The mean scores were used to indicate the direction of any differences in two groups. As Table V indicates for Factor B, the mean score for the setters was significantly higher than the mean score for the hitters; therefore, setters were found to be significantly more intelligent than hitters.

Factor H (shy vs. venturesome) has an F ratio of 11.603 (see Table IV, page 34). With 1 df between sets, 63 df within groups, and alpha set at .05 level of confidence, an F ratio of 3.996 was needed for significance. Factor H was found to be significant. Table V shows that the mean score for hitters was significantly higher than the mean score for setters in Factor H.

TABLE IV
SIMPLE ONE-WAY ANALYSIS OF VARIANCE
HITTERS AND SETTERS

Factor		Sum of Squares	df	Mean Square	F Ratio
A	BM	1.068	1	1.068	0.133
	WG	502.377	63	7.974	
	T	503.446	64		
B	BM	19.570	1	19.570	6.257*
	WG	197.044	63	3.127	
	T	216.615	64		
C	BM	19.206	1	19.206	1.120
	WG	1079.777	63	17.139	
	T	1098.984	64		
E	BM	55.077	1	55.077	2.983
	WG	1162.861	63	18.458	
	T	1217.938	64		
F	BM	17.094	1	17.094	0.631
	WG	1706.044	63	27.080	
	T	1723.138	64		
G	BM	8.020	1	8.020	0.464
	WG	1088.194	63	17.272	
	T	1096.215	64		
H	BM	336.226	1	336.226	11.603*
	WG	1825.527	63	28.976	
	T	2161.753	64		

TABLE IV (continued)

Factor		Sum of Squares	df	Mean Square	F Ratio
I	BM	30.465	1	30.465	3.399
	WG	564.550	63	8.961	
	T	595.015	64		
L	BM	1.340	1	1.340	0.151
	WG	557.644	63	8.851	
	T	558.984	64		
M	BM	21.251	1	21.251	1.701
	WG	786.994	63	12.491	
	T	808.246	64		
N	BM	1.696	1	1.696	0.275
	WG	387.750	63	6.154	
	T	389.446	64		
O	BM	34.226	1	34.226	2.186
	WG	986.327	63	15.655	
	T	1020.553	64		
Q ₁	BM	3.309	1	3.309	0.276
	WG	754.444	63	11.975	
	T	757.753	64		
Q ₂	BM	5.265	1	5.265	0.578
	WG	573.750	63	9.107	
	T	579.015	64		

TABLE IV (continued)

Factor		Sum of Squares	df	Mean Square	F Ratio
Q ₃	BM	6.570	1	6.570	0.598
	WG	691.644	63	10.978	
	T	698.215	64		
Q ₄	BM	99.696	1	99.696	3.844
	WG	1633.750	63	25.932	
	T	1733.446	64		

BM = Between Means

WG = Within Groups

T = Total

* = Significant at .05 level of confidence.

TABLE V
 MEAN SCORES AND STANDARD DEVIATIONS FOR
 HITTERS-SETTERS ON CATTELL'S 16
 PERSONALITY FACTORS

Group	Number	Mean	S. D.
Factor A (reserved vs. outgoing)			
Hitters	45	9.82	2.27
Setters	20	10.10	3.79
Factor B (less intelligent vs. more intelligent)			
Hitters	45	8.71	1.86
Setters	20	9.90	1.51
Factor C (affected by feelings vs. emotionally stable)			
Hitters	45	15.62	4.12
Setters	20	16.80	4.17
Factor E (humble vs. assertive)			
Hitters	45	13.04	4.16
Setters	20	11.05	4.58
Factor F (sober vs. happy-go-lucky)			
Hitters	45	15.51	5.52
Setters	20	14.40	4.35
Factor G (expedient vs. conscientious)			
Hitters	45	12.08	3.94
Setters	20	12.85	4.61
Factor H (shy vs. venturesome)			
Hitters	45	14.57	5.42
Setters	20	9.65	5.27
Factor I (tough-minded vs. tender-minded)			
Hitters	45	12.33	3.14
Setters	20	10.85	2.60
Factor L (trusting vs. suspicious)			
Hitters	45	8.31	3.18
Setters	20	8.00	2.40
Factor M (practical vs. imaginative)			
Hitters	45	12.48	3.48
Setters	20	11.25	3.64
Factor N (forthright vs. shrewd)			
Hitters	45	8.40	2.56
Setters	20	8.05	2.28

TABLE V (continued)

Group	Number	Mean	S. D.
Factor O (placid vs. apprehensive)			
Hitters	45	10.82	4.11
Setters	20	9.25	3.55
Factor Q ₁ (conservative vs. experimenting)			
Hitters	45	8.08	3.16
Setters	20	7.60	4.07
Factor Q ₂ (group dependent vs. self-sufficient)			
Hitters	45	8.93	2.82
Setters	20	9.55	3.42
Factor Q ₃ (undisciplined self-conflict vs. controlled)			
Hitters	45	12.11	2.91
Setters	20	12.80	4.08
Factor Q ₄ (relaxed vs. tense)			
Hitters	45	14.73	5.13
Setters	20	12.05	4.99

Therefore, it would appear that hitters tended to be significantly more venturesome and bold than setters.

Interpretation

Table III, page 30, shows that the general population and the volleyball sample differed significantly on nine of the sixteen variables. The significant differences were found in the following variables: Factor A (reserved vs. outgoing), Factor B (less intelligent vs. more intelligent), Factor F (sober vs. happy-go-lucky), Factor G (expedient vs. conscientious), Factor I (tough-minded vs. tender-minded), Factor L (trusting vs. suspicious), Factor N (forthright vs. shrewd), Factor O (placid vs. apprehensive), Factor Q₂ (group dependent vs. self-sufficient). The findings of this study substantiate those of studies revealed in the review of literature. The literature reviewed indicated that in most studies involving participants and non-participants, there were significant differences between the groups. (28, 30, 33, 35, 36, 38, 40)

Factor A (reserved vs. outgoing). The general population scored significantly higher in Factor A. This group was more outgoing, warm-hearted, and easy-going while the volleyball sample evidenced characteristics which could be described as more reserved, detached, critical, and cool. In literature reviewed, both Neal (38) and Williams (36) found champion athletes to be more reserved and independent than a normative group. In high levels of competition, it is necessary for the athlete to assume rigid training schedules and to faithfully abide by a fixed

schedule. He must avoid compromises between social engagements and practice periods, if these engagements interfere with the training schedule. He must detach himself from spontaneous whims and oftentimes be hard and inflexible with regard to training. In his striving for perfection and strict adherence to training schedules, the athlete may oftentimes appear to be reserved, detached or cool. The data from this study would seem to substantiate these findings.

Factor B (less intelligent vs. more intelligent). The subjects in the volleyball sample scored significantly higher in the intelligence variable than the general population. It must be understood that Cattell has included this variable as an indicator of general mental capacity, a main dimension of the total personality, and not as a sole indicator of intelligence quotient. (7:11) As in most athletic contests, the object of the game is to outsmart your opponent. Volleyball, played by the highly skilled, is a fast game. Players are constantly switching from offensive patterns to defensive patterns. In order to cope with these rapid changes, players must be alert, quick to grasp ideas, and flexible enough to make adjustments in patterns. Volleyball players must be clear, creative, and abstract thinkers who can anticipate plays and can establish offensive and defensive patterns to these plays. One could assume that volleyball players who should be clear, creative thinkers, would exhibit a significantly higher general mental capacity than the general population. The findings of this study support that assumption.

Factor F (sober vs. happy-go-lucky). The volleyball sample scored significantly higher on Factor F. This would indicate, according to Cattell's interpretation, that they were gayer, more enthusiastic, happy-go-lucky, and impulsively lively. In most instances, the volleyball player chooses to participate. He is not forced or coerced into playing. This self-interest stimulates enthusiasm for the game. It creates a feeling of self-contentment which should result in a lively, cheerful, happy individual. As the findings indicate, the volleyball players used in this study would support this conclusion.

Factor G (expedient vs. conscientious). The general population was significantly more conscientious, persevering, and rule bound than the volleyball sample which was more expedient and casual. It would not be expected that any athletic group would be unconscientious or unpersevering in their work. During the sports season, athletes must abide by strict rules and regulations, which is an important aspect of training. Their expediency or casualness may be the result of societal pressures. Society has a tendency to frown upon the woman who participates in team sports after her formal education has been completed. For this reason, these young female athletes may find it necessary to be expedient and casual in their actions and attitudes.

Factor I (tough-minded vs. tender-minded). The general population scored significantly higher in this variable than did the volleyball sample. The lower score of the volleyball players indicates that they were more tough-minded, realistic, no-nonsense,

and responsible individuals than the general population. The reviewed literature showed athletic competitors to be motivated toward achievement. (27, 28, 39) One could assume, therefore, that as athletic competitors, volleyball players would be motivated toward achievement. Many hours are spent diligently practicing skills to improve performance. The athlete accepts the responsibility of determining his limitations and capabilities and sets up experiences that will improve his performance. The volleyball player as a competitor is continually striving for perfection through hard work and dedication. Data from this study supports that assumption.

Factor L (trusting vs. suspicious). The volleyball sample scored significantly higher in this variable than the general population. It might be expected that the volleyball players, as team sport participants, would be more trusting, easy to get along with, and a good team member. However, it was not expected that they would be suspicious, self-opinionated, and a poor team member.

The findings in Factor L may appear to be in conflict with the findings in Factor Q_2 which indicated that the volleyball sample was more group dependent than the general population. However, one must be reminded that each of Cattell's sixteen personality variables are independent of one another; they do not overlap in meaning, or waste scores by partially repeating the same measure under a new name. The sixteen items represent clear functional unities. (6:2) Factor L describes individual personality

characteristics as they relate to the individual's ego. Factor Q_2 describes personality characteristics of the individual as he relates to others.

Factor N (forthright vs. shrewd). The general population scored significantly higher on Factor N than the volleyball sample. It might not be expected that volleyball competitors would be forthright, natural, artless, and sentimental as opposed to being shrewd, calculating, polished, and experienced. It would be expected that competitors would constantly be calculating, and scheming to outsmart their opponents. Frequently, the female who participates in vigorous physical activity is stereotyped as being masculine and overaggressive. To counteract society's imposed stigmas, many female competitors may tend to suppress any overt actions that may mar society's image of the female. The findings of this study may be a reflection of the fact that the volleyball sample used in this study was composed of all female competitors.

Factor O (placid vs. apprehensive). The general population was significantly more apprehensive, worrying, depressive, and troubled than the volleyball sample which was more placid, self-assured, and confident. This substantiates the findings of studies in the review of literature which showed the highly skilled to be more confident and self-assured than the general population. (36, 39, 40) The highly skilled volleyball player, through hard work and dedication, should have developed a mature, unanxious confidence in himself and his capacity to deal with

things. One would assume that in order to perform well under the pressures of competition, the athlete would be self-assured and confident of his abilities. The data from this study would support that assumption.

Factor Q₂ (group dependent vs. self-sufficient). As expected, the volleyball sample was more group dependent than the general population. A team sport requires players who can work with other people and make decisions with other people. The ultimate goal of winning is an effort put forth by the whole team. It requires group interaction. As the findings substantiate, it would be most desirable for team sport participants to score high in group dependency.

The review of literature showed that most studies involving athletes indicated differences between groups involved in different sports (17, 19, 22, 29, 32, 33, 38), but all showed many more similarities than differences in personality characteristics within each of these sports. It would be logical to expect that the volleyball sample used in this study would have more similarities in personalities than differences. The results (see Table IV, page 33), however, did show that volleyball players who were categorized primarily as hitters or setters were significantly different in two of Cattell's personality variables: Factor B (less intelligent vs. more intelligent) and Factor H (shy vs. venture-some).

Factor B (less intelligent vs. more intelligent). It must be remembered that Cattell includes this variable as an indicator of general mental capacity and not as a sole indicator of

intelligent quotient. (7:11) Findings showed that setters were significantly more intelligent than hitters. This would be expected in that the setter is the play-maker of the team. He is the quarterback of volleyball. A successful volleyball team is one that can develop a multiple offense; the setter enables a team to do this. The setter makes the judgements of who to set, where to set, and why. These judgements must be instantaneous and accurate. The setter evaluates the opposition and gives the attack players the best opportunity to score. He sets to the opposition's weaknesses. (14:45-46) As one might conclude from the findings of this study, it is the setter who is definitely the central figure of the volleyball team.

Factor H (shy vs. venturesome). Hitters scored significantly higher than setters on Factor H. As attacking players, it might be expected that hitters would be venturesome and bold. It is generally the hitters who make the final play on the ball before the series of play is terminated with either a side-out or a point. It is the hitter who must be spontaneously bold in challenging the opposition with a variety of attacks from a very passive dink to a violent spike.

Summary

On the basis of the findings in this study, it may be concluded that it is possible to identify personality variables characteristic of a selected sample of female U.S.V.B.A. players. It may also be concluded that hitters are significantly different from setters in certain personality traits.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Summary

The primary purpose of this study was to determine whether there were differences in selected personality traits between female U.S.V.B.A. players, as measured by the Cattell Sixteen Personality Factor Questionnaire, and the general population; and to determine if there were any differences in selected personality traits of female U.S.V.B.A. players who were categorized primarily as hitters or setters.

Sixty-eight female subjects, all registered members of the U.S.V.B.A. and participating in U.S.V.B.A. regional competition during the 1970-71 season, completed and returned the Cattell Sixteen Personality Factor Questionnaire. Forty-five of the subjects categorized themselves as hitters and twenty categorized themselves as setters. Three subjects classified themselves as both hitters and setters. For the purposes of this study, the subjects who could not be categorized were dropped from the study. The subjects did not have to meet any requirements as to age, skill level, or experience.

A t test between the means of the general population and the volleyball population on each of the sixteen personality factors was utilized to statistically treat the raw data derived from the personality questionnaire. Significant differences at

the .05 level of confidence were indicated in nine of the sixteen selected personality factors. The volleyball population tested in this study had significantly higher mean scores for Factor B (less intelligent vs. more intelligent), Factor F (sober vs. happy-go-lucky), and Factor L (trusting vs. suspicious). The general population had significantly higher means for Factor A (reserved vs. outgoing), Factor G (expedient vs. conscientious), Factor I (tough-minded vs. tender-minded), Factor N (forthright vs. shrewd), Factor O (placid vs. apprehensive), and Factor Q_2 (group dependent vs. self-sufficient).

A one-way analysis of variance was the statistical tool used to test the null hypothesis of no differences in selected personality traits between volleyball players categorized primarily as hitters or setters. Significant differences at the .05 level of confidence were indicated in two of Cattell's personality variables. On Factor B (less intelligent vs. more intelligent), the mean score for the setters was significantly higher than the mean score for the hitters. On Factor H (shy vs. venturesome), the mean score for the hitters was significantly higher than the mean score for the setters.

The null hypotheses of this study that there would be no significant differences in selected personality traits as measured by the Cattell Sixteen Personality Factor Questionnaire between the following groups were rejected:

1. The general population and female United States Volleyball Association players.

2. Volleyball players categorized primarily as hitters or setters.

Conclusions

Within the scope of this study, the following conclusions were drawn:

1. Volleyball players were found to be significantly more intelligent, happy-go-lucky, and suspicious than the general population.
2. The general population was found to be significantly more outgoing, conscientious, tender-minded, shrewd, apprehensive, and self-sufficient than volleyball players.
3. Setters were found to be significantly more intelligent than hitters.
4. Hitters were found to be significantly more venturesome than setters.

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PERSONAL DATA SHEET

1. Test Number _____
2. Age _____
3. Educational background (check appropriate boxes)
- _____ High School
- _____ Coll. 1 year _____ 2 years _____
- _____ Business school (beyond high school)
- _____ Coll. 1 year _____ 2 years _____
- _____ 3 years _____ 4 years _____

APPENDIX A

Personal Data Sheet Used

1. Number of years as a player _____
2. Number of practices per week _____
3. Length of practice per session _____
4. Are you a starter? _____ or starter _____?
5. Have you ever participated in a National USTA Tournament? Yes _____ No _____
6. If yes, how many tournaments have you participated in _____?

PERSONAL DATA SHEET

1. Test Number _____
2. Age _____
3. Educational background (check appropriate items)
_____ High School
_____ Jr. College 1 year ____ 2 years ____
_____ Business school (beyond high school)
_____ College 1 year ____ 2 years ____
3 years ____ 4 years ____
4. Number of years registered as a USVBA player _____.
5. Number of practices per week _____.
6. Length of practice per session _____.
7. Are you a hitter _____ or setter _____?
8. Have you ever participated in a National USVBA
Tournament? Yes _____ No _____
9. If yes, how many tournaments have you participated
in _____?

APPENDIX B

December, 1970

Dear Valued Player:

- 1. This book is a part of a study being conducted by the National Football League to determine the best way to play the game.
- 2. The book should only take you about 30-45 minutes to read.
- 3. You are encouraged to read this book to the best of your ability. It is not intended to be a test. It is intended to be a guide for you as an individual, but look at it as a group.
- 4. Please let us know what you think of this book. We will be glad to hear from you. We will be glad to hear from you.

APPENDIX B

Administrative Instructions

- 1. The book is a part of a study being conducted by the National Football League to determine the best way to play the game.
- 2. The book should only take you about 30-45 minutes to read.
- 3. You are encouraged to read this book to the best of your ability. It is not intended to be a test. It is intended to be a guide for you as an individual, but look at it as a group.
- 4. Please let us know what you think of this book. We will be glad to hear from you. We will be glad to hear from you.
- 5. The book is a part of a study being conducted by the National Football League to determine the best way to play the game.
- 6. The book should only take you about 30-45 minutes to read.
- 7. You are encouraged to read this book to the best of your ability. It is not intended to be a test. It is intended to be a guide for you as an individual, but look at it as a group.
- 8. Please let us know what you think of this book. We will be glad to hear from you. We will be glad to hear from you.
- 9. The book is a part of a study being conducted by the National Football League to determine the best way to play the game.
- 10. The book should only take you about 30-45 minutes to read.
- 11. You are encouraged to read this book to the best of your ability. It is not intended to be a test. It is intended to be a guide for you as an individual, but look at it as a group.
- 12. Please let us know what you think of this book. We will be glad to hear from you. We will be glad to hear from you.
- 13. The book is a part of a study being conducted by the National Football League to determine the best way to play the game.
- 14. The book should only take you about 30-45 minutes to read.
- 15. You are encouraged to read this book to the best of your ability. It is not intended to be a test. It is intended to be a guide for you as an individual, but look at it as a group.
- 16. Please let us know what you think of this book. We will be glad to hear from you. We will be glad to hear from you.

IMPORTANT - READ FIRST

December, 1970

Dear Volleyball Player:

1. This test is a part of a study being conducted to find out how female USVBA players feel about certain things.
2. The test should only take you about 30-40 minutes.
3. You are requested not to put your name on any portion of the materials. The study is not concerned with you as an individual, but with all players as a group.
4. There is no way that anyone will be able to tell how you answered each question.
5. It is very important that you give your first honest answer to each question. Do not spend a lot of time on each question.
6. Do not use the in-between responses more than you have to.
7. At no time should you make any marks in your test booklet.
8. All responses should be indicated on the answer sheet. Now pull out your answer sheet which is slipped in between the cover and the first page of your test booklet.
9. Do not put your name on the answer sheet. On that line you are requested to write in the name of your volleyball team.
10. Now fill in the personal data sheet which is attached to your answer sheet.
11. Check to see that the number in the upper right-hand corner of your answer sheet matches the number in the upper right-hand corner of your test booklet and the number you have written on the personal data sheet.
12. Now READ CAREFULLY the top cover of your test booklet.
13. Be sure to answer every question. Do not leave any items blank.
14. TURN THE PAGE AND BEGIN.

15. After 10 minutes you should be on item 50 or beyond. If you have not reached item 50, answer more quickly.
16. After 20 minutes you should be at about item 90-100. Give the first answer that comes to you.
17. After about 30 minutes you should have only a page and a half left.
18. When you are through, check to see that all questions are marked with an answer.
19. Now be sure to gather up all the materials and put it all in the self-addressed, stamped envelope and please RETURN BY _____.

Your cooperation with this research is GREATLY APPRECIATED.

Sincerely,

APPENDIX C

Raw Data

TABLE VI
RAW SCORES - HITTERS

Sub- ject	A	B	C	E	F	G	H	I	L	M	N	O	Q ₁	Q ₂	Q ₃	Q ₄
1	10	10	17	9	20	4	7	8	8	12	8	8	9	7	13	7
2	11	7	16	6	14	9	16	13	12	12	12	10	10	6	14	14
3	9	10	12	16	9	10	19	14	11	12	7	7	9	8	10	13
4	11	11	20	19	24	12	19	16	9	15	7	9	9	10	11	7
5	10	7	14	6	10	11	10	9	8	10	12	15	6	14	8	20
6	13	8	13	15	20	17	22	11	11	13	5	6	12	5	16	12
7	13	8	16	8	26	16	18	18	10	6	12	17	5	3	12	21
8	10	11	11	22	16	3	11	17	7	19	1	13	12	10	5	14
9	9	11	10	5	6	9	6	15	5	11	12	11	8	10	11	15
10	7	7	15	17	15	13	17	11	5	14	14	15	5	13	15	24
11	11	8	21	11	14	13	14	12	7	11	8	2	6	10	16	15
12	6	10	14	11	21	10	12	16	12	8	8	13	8	8	8	19
13	13	8	18	13	12	14	9	17	16	14	7	14	6	11	11	21
14	7	9	17	13	18	12	17	15	15	16	10	7	3	10	14	19
15	10	3	16	11	19	16	16	12	8	9	7	7	7	8	12	8
16	10	9	23	9	10	19	9	10	6	6	11	11	3	8	15	14
17	11	8	19	11	20	18	22	8	9	13	6	12	7	5	13	16
18	14	5	23	17	20	15	26	14	5	12	10	8	1	6	16	4
19	10	9	14	13	11	13	19	12	8	17	7	11	9	9	13	13
20	12	7	19	10	18	18	19	10	6	18	8	13	5	4	14	14
21	9	8	16	18	12	17	12	8	11	10	9	20	7	16	13	22
22	9	10	22	20	22	12	29	13	11	15	10	5	14	9	10	11
23	10	8	10	9	18	11	12	10	4	13	10	17	14	11	10	14
24	10	7	23	9	19	12	19	13	5	14	10	7	13	10	16	5
25	3	8	13	12	5	17	11	5	7	9	7	8	6	11	14	10

TABLE VI (continued)

Sub- ject	A	B	C	E	F	G	H	I	L	M	N	O	Q ₁	Q ₂	Q ₃	Q ₄
26	9	7	15	13	15	4	13	12	9	19	7	8	10	8	9	7
27	12	7	20	12	16	11	17	12	10	11	9	7	11	9	11	18
28	11	9	15	18	16	13	14	16	8	16	3	13	11	10	12	19
29	11	9	13	18	12	10	13	15	9	10	7	11	13	10	14	17
30	9	8	7	14	7	18	1	9	9	7	10	16	4	8	15	22
31	11	11	11	19	14	9	13	16	8	10	11	12	7	10	9	20
32	15	10	18	15	22	8	21	15	9	12	8	3	11	10	11	10
33	11	12	19	10	15	9	10	16	4	12	8	11	6	8	15	11
34	8	8	20	11	6	16	12	10	3	14	10	6	10	17	16	15
35	8	10	8	10	9	10	10	16	4	8	10	12	4	11	16	19
36	7	12	10	18	23	10	15	15	14	18	6	22	11	9	7	24
37	9	10	13	15	22	12	15	11	8	15	5	7	13	12	7	17
38	13	12	20	13	14	16	16	13	3	19	7	9	8	6	16	8
39	10	7	12	12	21	10	15	16	12	15	8	14	6	6	15	18
40	8	9	17	12	21	5	13	10	10	11	5	11	8	8	10	13
41	8	8	17	20	21	12	17	10	6	15	7	11	10	5	9	17
42	6	6	14	7	12	13	9	9	9	11	7	13	9	8	10	17
43	8	10	15	11	4	10	15	9	3	7	10	13	5	9	11	8
44	9	10	18	12	12	10	5	11	7	14	10	11	5	7	9	13
45	11	10	9	17	17	17	21	7	13	9	12	11	8	9	13	18

TABLE VII
RAW SCORES - SETTERS

Sub- ject	A	B	C	E	F	G	H	I	L	M	N	O	Q ₁	Q ₂	Q ₃	Q ₄
1	13	9	20	14	21	8	5	11	9	14	8	10	5	11	17	15
2	12	8	16	8	14	13	10	8	10	10	10	2	8	6	14	13
3	9	9	17	9	12	10	9	10	5	18	4	8	10	14	18	9
4	4	9	14	21	12	2	6	9	11	13	7	12	15	10	5	15
5	3	11	18	13	7	7	2	12	8	16	6	9	13	15	7	4
6	10	11	18	6	15	20	15	15	12	14	9	14	9	10	14	19
7	13	7	25	2	14	16	11	12	6	8	6	8	6	8	15	9
8	16	11	19	16	20	17	23	9	7	8	6	7	7	7	13	11
9	15	10	18	9	15	12	19	14	9	13	10	4	0	7	13	10
10	9	12	9	7	10	17	8	14	7	7	8	9	1	6	19	12
11	13	12	16	6	20	18	7	8	12	10	7	11	8	12	14	20
12	8	10	18	13	17	10	9	9	6	8	6	10	14	12	14	5
13	12	9	7	12	12	9	5	6	6	9	4	16	9	3	6	14
14	13	13	19	15	14	12	7	12	8	7	12	6	8	10	12	10
15	5	10	22	11	9	20	12	9	6	9	8	8	6	12	14	10
16	14	10	15	10	16	14	14	14	8	10	9	5	7	6	20	5
17	9	8	21	18	21	14	14	13	12	19	11	10	13	13	10	9
18	4	9	16	7	9	15	4	14	4	10	9	12	3	15	11	16
19	10	11	12	10	10	14	5	8	8	8	10	15	6	8	11	12
20	10	9	16	14	20	9	8	10	6	14	11	9	4	6	9	23