77-21,731

BOETEL, Norma M., 1934-
A FACTORIAL APPROACH IN THE DEVELOPMENT OF A BASKETBALL RATING SCALE TO EVALUATE PLAYERS IN A GAME SITUATION.

The University of North Carolina at Greensboro, Ed.D., 1977
Education, physical

Xerox University Microfilms, Ann Arbor, Michigan 48106

A FACTORIAL APPROACH IN THE DEVELOPMENT OF A BASKETBALL RATING SCALE TO EVALUATE PLAYERS IN A GAME SITUATION

by

Norma Boetel

A Dissertation Submitted to
the Faculty of the Graduate school at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

Greensboro
1976

Approved by

Dissertation Adviser

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at the University of North Carolina at Greensboro.

Dissertation Adviser Rosemary McGee

Committee Members Gail M. Hennis

Pearl Berlin

Marie Riley

Roland H. Nelson

October 26, 1976

Date of Acceptance by Committee

BOETEL, NORMA. A Factorial Approach in the Development of a Basketball Rating Scale to Evaluate Players in a Game Situation. (1976)
Directed by: Dr. Rosemary McGee. Pp. 155

The primary purpose of this research was to develop a valid and reliable rating scale for use in evaluating the physical performance of female basketball players in a game situation. The secondary problems deriving from the formulation of the scale were (a) the identification of specific factors (items) for evaluating basketball skill in the competitive situation and (b) the feasibility of using factor analysis as a statistical technique for collapsing components of play into a viable rating scale.

A theoretical structure of basketball performance was developed which included seven categories of basketball performance. A 96-item rating scale was designed which purportedly represented the seven categories: shooting ability and offensive moves, defensive moves and tactics, ball handling, rebounding, speed and quickness, body control and balance, and general floor play. The identification of the seven categories was based on an investigation of the literature, interviews with coaches and physical educators, and observation of individual players. The original 96-item rating scale was utilized to evaluate the performance of thirty-eight interscholastic and intercollegiate female basketball players.

Means and standard deviations were calculated for each of the 96 items and a correlation matrix for each category was formed utilizing the SPSS computer programs. From the correlation matrix, each of the

seven categories was factor analyzed independently of the remaining six categories.

Based on the factor structure after rotation, an abbreviated rating scale was developed. The original seven categories were retained and seventeen items were developed and selected to represent the original 96-item scale.

After the original scale had been reduced to the 17-item scale, it was used to evaluate the basketball performance of high school girls in the 1975 South Dakota State "B" Tournament. The results from the evaluation of the thirty-four basketball players were used to provide an interjudge reliability of the scale. Kendall's Coefficient of Concordance was employed to determine the interjudge reliability which was found to be .86, significant at the .01 level.

To determine the criterion-related validity, a coefficient of correlation was calculated by finding the degree of relationship between the total scores of players on the scale and a subjective ranking of the players. The coefficient obtained was .65 which was significant at the .01 level.

ACKNOWLEDGEMENTS

The author wishes to express her sincere gratitude and thanks to her adviser, Dr. Rosemary McGee. Her encouragement and interest were a definite asset to the author in completing this study. Her many questions stimulated continuous pursuit in researching the subject matter.

Additional help of an immeasurable value was provided by Dr. Pearl Berlin. Her advice in the selection of the appropriate statistical tools was invalnable. Her help in interpreting the results was greatly appreciated.

The author also wishes to thank her family and Ginny Hunt for their continued support throughout this endeavor. Their constant encouragement inspired the author to complete this study.

NB

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

The evaluation of many aspects of physical education, or of any physical activity, is a complex process because the performances are multidimensional, thus making it difficult to define specific behaviors and executions. Likewise, to evaluate an individual's performance in a basketball game situation becomes a complex procedure because of the many dependent and interdependent components and factors involved in such an activity. However, the search for better and improved methods of evaluation and measurement must continue.

As Wilson pointed out, "Too frequently, when considering evaluation, the concern of educators has been only with testing and grading students." (61:44) Educators can no longer do a fractional job of measuring, assessing and evaluating students' learning performance and progress, but they must concern themselves with any and all appropriate means available for this most important function. Eckert said,

> Educators are facing increasing pressures for accountability in the learning process. Increased educational budgets are resulting in more emphasis upon productivity which must be justified in terms of facts and figures. (11:1)

True, there has been an increased demand to develop more standardized tests, but standardized tests do not measure all facets of the educational and instructional procedure. In addition, many

standardized tests are often not appropriate for a specific situation. Ammons (64) said evaluation requires adequate samples of student's work. That is, a student must be evaluated many times and in many different ways. Too often, educators have been concerned with evaluating only the cognitive domain. This is only one facet of the total scope of evaluation. It is necessary to develop techniques which will evaluate the complete scope of student behaviors.

Physical educators have developed different methods of measuring and evaluating such as written tests, skills tests, and rating scales. However, many of these methods only measure and evaluate certain portions of the entire educational process and product. Also, many of the methods which have been developed and are being utilized are incomplete, invalid, unreliable, ambiguous and time-consuming to administer and use.

"The physical educator evaluates to determine whether or not he is meeting the educational objectives of his course." (31:14) Measurement, as a part of the total evaluation program, can assist the physical educator and/or coach in assessing the student and program. Many authors (5,7,11,30,31) concur on the purposes of measurement and evaluation: classifying students, measuring the progress of individual students, providing motivation for teacher and student improvement, improving learning experiences, acquiring knowledge of student status, and grading. Assuming the purposes of measurement and evaluation are as specified above, many methods or tools can be utilized in the measurement and evaluation process. Written tests have been employed

as an objective assessment of the cognitive domain; skill tests have been used as an objective, partial evaluation of the psychomotor domain; and rating scales have been developed to incompletely, subjectively evaluate the affective and psychomotor domains. Other methods, such as check lists, anecdotal records, motor ability tests, and fitness tests have also been used. Once a decision has been determined concerning the purpose of measurement and evaluation, the appropriate tool(s) must be selected to accommodate the process.

Rating scales have been designed in many disciplines for specific purposes. For example, psychologists have used rating scales to measure personality variables; store managers have adopted rating scales to assess the performance of their departmental managers; and supervisors have utilized rating scales to appraise the work accomplished by workers. In physical education and coaching arenas, rating scales have been designed to evaluate character, personality, and behavior traits; rating scales have also been developed as supplements to objective measures (skill tests) to analyze <u>how</u> skills are performed.

Traditionally, the use of rating scales, in any discipline, has been subjected to criticism. The reasons are understandably clear. Smith and Kendall (58:149) said that individuals who have developed rating scales have tended to impose their own values, interpretations, and beliefs about some behaviors. They have used a language of their own. Therefore, other raters attempting to use the scales have become confused and the interpretation of the word or statement varied

from rater to rater. Generally, there is a lack of definitions resulting in a vague interpretation of the rating scale. Smith and Kendall (58:149) stated reasons for misinterpretation of rating scales: raters are not consulted about their interpretation of various forms of behavior in relation to the traits involved and the raters are not informed of the usefulness of the scales. "Without consensus among the raters, . . . the raters cannot be expected to utilize the scales offered to them with any conviction or agreement." (58:149) Kerlinger pointed out that, "Rating scales are perhaps the most ubiquitous of measuring instruments probably because they are seemingly easy to construct and more important, easy and quick to use." (20:547) However, as he said, this ease of constructing rating scales is deceiving because the scales lack validity due to a number of sources of bias.

Ratings made by psychologists, supervisors, teachers, and managerial personnel often require evaluation of complex behaviors. Because these areas are multidimensional and often difficult to define, they then become difficult to quantify. Abeles said, "One of the main difficulties in the evaluation of complex behaviors is that the measures employed are typically subjective judgments based on irregular and uncontrolled observations." (36:145) As pointed out previously, critics of some evaluation procedures have indicated that more objective measures are needed in many instances and performance measurement should be more sophisticated. "The replacement of judges'

general impressions by ratings arrived at by more systematic procedures is one method which may improve evaluation." (36:145)

If educators are going to evaluate the total scope of their objectives and programs, it seems that rating scales must be utilized as adjuncts to other methods in the evaluative process. And, if rating scales are to be used for this purpose, the newly developed scales must meet the needs of the raters and be functional for them to interpret. In her book, Safrit remarked about the construction of rating scales and said, "Each category of the scale should be described in such detail that raters can be trained to use the scale objectively and students can receive meaningful feedback about their scores." (30:173) It was the aim of this study to investigate a technique for the development of a rating scale for use in evaluating achievement and performance in a basketball game situation which cannot always be measured by other methods.

Statement of the Problem

The primary purpose of this research was to develop a valid and reliable rating scale for use in evaluating the physical performance of female basketball players in a game situation. The secondary problems deriving from the formulation of the scale were (a) the identification of specific factors (items) for evaluating basketball skill in the competitive situation and (b) the feasibility of using factor analysis as a statistical technique for collapsing components of play into a viable rating scale.

Definition of Terms

EVALUATION (Use of the rating scale in this study) - The process of judging the value of a basketball player's behavior on a described set of observations.

FACTOR ANALYSIS - The author has adopted the definition from Jackson and Messick to be used in this study. "Factor analysis is a mathematical procedure which resolves a set of descriptive variables into a smaller number of categories, components, or factors." (17:298)

RATING SCALE - A list of statements descriptive of physical characteristics involved in basketball performance which were assigned a designated value by the rater.

Assumptions

A basic assumption of this study was that basketball coaches generally agree upon performance standards of a good basketball player. It was assumed that the judges, who were coaches, were experts qualified for the task of evaluating the physical performance of female basketball players.

Secondly, it was assumed that different categories of basketball performance have many facets.

Scope

This study was limited to the evaluation of the physical performance of selected college women and high school female basketball players who had played in competitive game situations. There was no attempt

to evaluate factors such as attitude, sportsmanship, desire and other such characteristics.

An original rating scale of 96 items was used to evaluate (a) basketball players who had been asked to participate at the United States Collegiate Sports Council Camp held at Maryville College, Maryville, Tennessee, June 16-23, 1974 and (b) selected high school female basketball players who participated in the 1975 regular season games played in South Dakota. A reduced rating scale was utilized to evaluate the performance of basketball players at the South Dakota State "B" girls' tournament held December 4-6, 1975 in Huron, South Dakota. Seven teams were selected for this purpose.

This study did not concern the evaluation of position play, such as forwards, guards or centers. The scale was used to evaluate the players as individual performers.

The scores acquired on the rating scale were relative to the performance of the players at a specified time and to the skill level of the players in the different rating situations.

Significance of the Study

The purpose of this study was to develop a rating scale as an aid and supplement in the measurement and assessment process when evaluating the proficiency of basketball players in a game situation.

Many basketball skills tests (57,63,69,70,73,74) are found in the literature. However, these tests generally measure isolated skills and are not applicable to assessing the overall performance of a

player in a game situation. Points made, fouls committed, free throws made and attempted are a few of the statistics that have been acquired to analyze individuals' performances, but they do not give enough information. Elbel and Forrest stated, "There is quite general agreement that the box score does not give a very complete statistical picture of the game and is consequently of little value to coach or player from the standpoint of game analysis." (41:538)

Perhaps, in most instances, objective measures are better than subjective measures. But, as Baumgartner and Jackson (7:232) said, there are times when important objectives cannot always be measured with an objective tool. Therefore, a supplement or another tool must be utilized to aid in the complete evaluation of objectives. "A highly desirable method of measuring playing ability is through the use of well developed rating scales that can be used during the game." (30:173)

An objective, reliable, and valid rating scale could be used for many purposes. Some of these purposes are adding to the dimension of proficiency examinations, analyzing skill performance in a game situation, aiding in detecting individual errors and problem areas, supplementing other procedures for placing students at a specific level of skill, and giving students a device by which they can rate their own and peers' performances.

Evaluation procedures need to become more sophisticated; evaluation procedures need to be more complete; and evaluation procedures need to be more objective. Few rating scales have been constructed to

evaluate the performance of basketball players. Teachers and coaches have developed and used their own rating scales, but few are found in the literature. Often, the rating scales which have been developed for any activity have been constructed rapidly, serving only the constructor's immediate purpose. Many times, the rating scales which have been reported in the literature lack validity and/or reliability. Mathews indicated that "Rating scales suffer from lack of validity and reliability." (23:350) Because many people concur with Mathews, as does this researcher, it seems plausible to use a technique in attempting to develop a rating scale which could result in higher validity and reliability. Also, the development of a rating scale using a different technique to construct the scale could contribute to the overall sophistication of creating an instrument.

"Very little experimentation has been done on the measurement of playing ability." (30:171) The significance of this study was to determine if a subjective tool, the rating scale, could be developed to be a reliable, valid and objective measuring device of playing ability. This study may lend support to the functional endeavors of those people interested in the total scope of the evaluation process.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this study was to develop a rating scale for use in evaluating the physical performances of basketball players in a game situation. Since the inclusion of game activities into the physical education curriculum and the beginning of structured competitive programs, there has been and continues to be an aspiration, perhaps sometimes a requirement, to measure and evaluate achievements and the ability to play in competitive game situations. Different types of techniques have been used in an effort to measure these aspects of performance.

A perusal of the literature indicated that rating scales have been developed for many different reasons and in many different ways. Even in the selection of items for the rating scale, distinctive methods had been employed.

The review of literature has been presented in four parts. In the first part, two studies comparing different strategies for rating scale construction have been reviewed. Examples of studies concerning the development of scales that had been constructed in areas such as music, industry, nursing and therapy have been presented in the second section. In the third section scales that had been developed for evaluating physical performances in sport activities other than basketball were reviewed. Finally, studies which had evaluated

basketball performances in game situations utilizing different types of rating scales were described.

Strategies of Scale Construction

The purpose of Hase and Goldberg's (45) study was to examine the differential validity of personality inventory scales using six different strategies. These strategies were factor analytic, empirical group discriminative, intuitive-theoretical, intuitive-rational, stylistic-psychometric and random. Using a common item pool (items from the California Psychological Inventory), eleven scales were constructed for each of the six strategies. The sample included two hundred freshman women from the University of Oregon. The results of this study indicated that the first four primary strategies did not differ from one another in overall validity. However, these four methods were significantly more valid than the last two strategies (stylistic-psychometric and random) for personality assessment.

The purpose of a paper submitted by Butt and Fiske (37) was to compare the rational facet, factorial facet, rational trait, and factorial trait approaches in the development of scales for evaluating dominance. The instruments used for each measurement approach were either published tests or tests constructed for the purpose of the study. Seventy-seven male and sixty-one female students from the University of Illinois, Chicago Circle were two of three groups used for the study. The third group was composed of 372 airmen in basic training at Lackland Air Force Base.

The results of this study indicated that both facet approaches would produce scales with better homogeneity indices. The facet strategy assumed that each trait had several facets, whereas, in the trait strategy, the construct was identified by a label. With both facet approaches, the results showed that cleaner subscales were developed by limiting and defining item content.

The factorial scales tended to be broader in content and freer from the researcher's biases than the rational scales. In addition, the rational scales did not show much relationship to variables which were theoretically related to dominance, whereas the factorial approaches showed a widespread relationship with variables related to dominance.

The authors concluded by indicating that, for basic research, the facet approaches were predominantly better than the trait approaches. "The rational facet approach is most promising in theory development while the factorial facet approach is most efficient in exploring the associations of the dominance variable with life descriptions." (37:519)

Development of Scales Evaluating Performance in Non-Physical Education Areas

In a number of studies completed by Lawshe and others (48,49,50,51) studying job evaluation, factor analytic techniques were utilized to determine the applicability and reliability of different rating methods to answer specific questions concerning types of systems, scale items needed, lengths of scales needed and the numbers of factors needed to effectively evaluate jobs. In a study (48) dealing with a modified

system to evaluate salary paid jobs, Lawshe and Maleski computed the intercorrelations between point ratings on each of eleven items and total point ratings for each job. The correlation matrix was factor analyzed by Thurstone's centroid method and rotated by the Peters and VanVoorhis method. The Wherry-Doolittle shrinkage method was used to determine an abbreviated scale. Three primary factors were found and they accounted for nearly all the variability in total point ratings. Three items were extracted for the shorter rating scale. The combined effect of the three items selected accounted for about 96% of the variance in "total points". The authors concluded by saying that the shorter scale would give practically identical results to those of the longer eleven-item scale. Also, the use of the shorter scale would reduce the time required to do the rating.

Lawshe and Wilson (49) used the Factor Comparison System of job evaluation to further study the nature of basic job evaluation factors as identified in the judgment process. This system involved the comparison of jobs being rated with a scale of "key" jobs. The key jobs were ranked by a job evaluation committee in order of difficulty on mental requirements, physical requirements, skill requirements, working conditions and responsibility. Each different job was compared with the key jobs on each one of the factors listed above. Each analyst had five amounts which, added together, equaled the indicated salary.

Data were acquired on one hundred and seventy-six job classifications. The intercorrelations between ratings on the five factors

and total points were computed. Thurstone's centroid method was used to factor analyze the matrix yielding two factors. Rotation was done by the graphical method. The Wherry-Doolittle shrinkage selection method was applied and three items were selected for the abbreviated scale. The three items selected for the abbreviated scale, when combined, correlated .99 with the original scale. The authors concluded that although the reliability was not known, "the abbreviated scale can be considered as valid and as usable as the original scale." (49:434)

The purpose of Lawshe's and Wilson's study (50) was to answer the reliability questions of the total point ratings of job evaluations utilizing the longer rating scales and the shorter scales. In addition, they attempted to determine the reliability of each of the items in the two systems.

The National Electric Manufacturers Association System of job evaluation provided for the rating of jobs on eleven items. The sum of the number of points assigned each of the eleven items, on a five-degree scale, was the total point rating for each job. From results of previous studies, a Simplified Job Evaluation System had been developed with four items. The total point rating using the Simplified Job Evaluation System was obtained in the same manner as the NEMA System.

Ten analysts rated jobs using the NEMA System and ten rated jobs using the Simplified System. Each analyst rated twenty of the forty jobs selected for the study. The average intercorrelation of the

ratings of five men on forty jobs was obtained as the reliability coefficient for the total point rating under each one of the plans and for each of the individual items in the two plans. The average intercorrelations of one rater with another rater were stepped up by use of the Spearman-Brown formula to estimate the increased reliabilities which would result from using five pooled ratings.

The results from this study indicated that a system using more items was not necessarily more reliable than a plan with fewer items. The reliability coefficients obtained were .89 (one rater) and .98 (five raters) for the Simplified System; for the NEMA System, the coefficients were .77 (one rater) and .94 (five raters).

In a follow-up study of job evaluation, Lawshe and others (51) wanted to determine to what extent basic factors were involved in two different point-rating scales. The two systems mentioned in the other studies, namely the NEMA System (eleven items) and Simplified System (four items), were utilized for this study.

The ratings used were the ones acquired in a previous study (50). A composite rating on each item and the total rating for each job was acquired from the item ratings made by five independent analysts. The intercorrelation matrix was factor analyzed using the centroid method and the five factors were rotated using the graphic method. Five factors were found which seemed to account for the elements considered in the two systems. The authors concluded from the evidence in this study that five factors could be used to satisfactorily complete job evaluations. However, the authors also indicated that

other factors, not identified in this study, may be isolated in future studies which may be unique to other jobs.

Ryans (56) used a factor analytic technique to aid in the construction of the Classroom Observation Scale. The data for his study were acquired by having trained observers assess teachers' performances. The purpose of his study was to attempt to describe the personal qualities of teachers. After an intensive review of the literature using a "critical incidents" approach, he identified specific behaviors (considered to be dimensions) of effective and ineffective teachers. The dimensions were described in terms of opposite meanings. For example, one dimension was partial to fair. A unique feature of Ryans' scale was a glossary attached to describe each dimension as fully and clearly as possible. He found that the specific behaviors fell into two categories: those relating to teacher behavior and those relating to pupil behavior, but reflecting teacher behavior.

The subjects (ratees) were 275 third-and-fourth grade teachers. The raters were three, and on one occasion four, judges trained in assessing teacher behavior. Observer intercorrelations were obtained ranging from .68 to .84. Intercorrelations were also obtained between the traits on the scale. The factor analytic process utilized was the centroid method with both orthogonal and oblique rotations attempted. Five centroid factors were extracted and the oblique rotation provided a solution that met the criteria of simple structure. Ryans concluded that the findings of this research and an analysis of the criterion

data suggested that teachers' personal qualities could be described in terms of several major dimensions. Also, he did note that some of the factors tended to overlap and were positively correlated.

The purpose of the study by Lorr et al. (53) was to identify fundamental variables "underlying behavior, symptoms, and inferred motivation of mental hygiene clinic patients." (53:511) Seventy-three variables were selected from a wide range of psychological and psychiatric reports to define the fifteen hypothesized factors. A minimum of four variables was included to define each factor.

Experienced therapists rated 184 veteran patients using a detailed rating guide. Each patient had been seen for a minimum of four psychotherapeutic sessions. To secure a reliability check, ten patients were rerated after a two-week interval. The computed average product moment reliability correlation was .77. Positively correlated traits were segregated into nonoverlapping clusters to make the factorial reduction of the correlation table easier. A centroid analysis and oblique rotations were employed to achieve simple structure. Eight identifiable oblique factors were obtained from two centroid analyses.

Smith and Kendall (58) constructed rating scales to be used by head nurses to rate the performance of staff nurses. Their procedures involved the use of a series of graphic rating scales arranged vertically. Behavioral descriptions indicating various degrees of each dimension were printed beside the line at different heights. Judges rated each item from 0 to 2. Examples of their statements did

not represent actual behaviors but inferences or predictions from observations. A unique feature of their study included head nurses participating in the listing of dimensions or characteristics which they thought were important in evaluating the performance of staff nurses. In addition, after listing the categories, the head nurses formulated general statements representing high, low and acceptable performance. The final rating scales which were developed by the nurses described expectations of specific behaviors. The researchers indicated that, in general this procedure showed excellent discrimination and high scale reliability (above .97). However, they also indicated that because of the use of trait names and general statements concerning levels of performance, the ratings may be ambiguous. They also said that there were too many scales for easy handling.

The purpose of a study done by Campbell et al. (38) was similar to Smith's and Kendall's. However, their ratees were 537 department store managers and the raters were two store managers. The intent of their study was not only to develop behavioral rating scales, but in addition, to compare these scales with a summated ratings technique. Twenty store managers were asked to write specific behaviors (critical incidents) of department manager performance. These specific behaviors were then submitted to a qualitative cluster and sorted into definable homogeneous categories. The participants were again asked to write more behavioral incidents eventually sorting each incident into the dimension that it most closely represented. The completed rating scales consisted of nine dimensions defined by specific

behavioral incidents with appropriate scale values. An alternative rating method (summated rating scales) was developed from the definitions produced in the first method. Each individual was evaluated on a Likert-type scale with a 4-point response. An individual's rating for a dimension was the average item response for that dimension. The difference between the two methods was that the first approach used scaled behavioral anchors and the second did not. The correlation matrices of four sets of ratings were factor analyzed by the principal factors technique. Each solution was rotated to simple structure by the varimax procedure. The clearer solution was obtained from the ratings using the scaled expectations technique. All the entries in the validity diagonal were significantly different from zero at alpha = .001 indicating convergent validity was achieved. Of the two scales, the scaled expectations method indicated higher validity entries in the validity diagonal. The authors concluded that the scaled expectations procedure was less subject to leniency and halo errors than the summated ratings method. They indicated that these scales could be very useful for selection and promotion decisions and could be incorporated in performance appraisal and review systems.

Using a facet-factorial approach to rating scale construction, Abeles (36) developed a scale to measure and evaluate clarinet music performance. His original item pool, consisting of 94 items, was used by teachers rating clarinet performances. Two different music performances were evaluated by fifty teachers using the 94-item scale. A factor analysis was performed on the results of the ratings using

the item pool. Six factors were chosen for the final scale and thirty items were selected which had high factor loadings on the respective factors. After the selection of factors and items, judges evaluated performances employing the abbreviated scale. The results of this evaluation were used to estimate the interjudge reliability for the rating scale. Criterion validity was determined by the paired-comparison method. Interjudge reliability resulted in a .90 coefficient for the total score and a .60 coefficient for the scale scores. The criterion-related validity coefficients were greater than .80 for each of the sets of performances. The author concluded that the technique used in this study was an effective method of constructing scales to measure music performance.

Development of Scales to Evaluate Performance in Sport Activities Other Than Basketball

An interesting and unique analytical method was used by Durrant (39) for the development of a rating scale to evaluate synchronized swimming performers. She did not consider the degree of difficulty of a stunt, but assigned point values to component parts of each stunt. The number of points awarded to specific movements of each stunt was based upon the difficulty of the movement and upon its importance in the total stunt. The score sheets showed each component part and its point value. A score was given for degree of control in moving from one position to the next based upon the accuracy of reaching the next position.

Six judges rated 24 subjects (beginners to advanced swimmers) on a set of seven selected stunts. Two judging sessions were held and the same judges were used for both of these sessions. The correlations between judges' ratings for all the stunts ranged from .47 to .94. It was found that the stunts with the higher point values also produced a higher correlation between the judges.

After the second judging session, the author met with the judges to discuss the utilization of such an instrument. A number of points were discussed, but they did agree that the analytical method used here in this study was an objective method for evaluating performance in synchronized swimming. Also, they felt this method could be used as a teaching device and as an aid in the training of judges. The author concluded that the judges were consistent in their use of the scale, but some judges tended to use a broader range of the scale. The high correlations both between judges' ratings and between each judge's rating indicates that all judges were rating on the same basis.

Edwards (68) devised a rating scale for use as a measure of the process aspect of tennis serving skill. Another purpose of her study was to study the reliability and statistical concurrent validity of the scale. Three judges (tennis instructors at the University of Wisconsin, Madison) rated 45 women tennis players on 20 serves. A score was recorded after every five serves. The subjects were rated on the height and position of the ball toss, the racket arm position, weight change, body rotation, solid contact, appropriate tension, and illustrating continuous motion throughout the serve. No points were

given if the behavior was not present; if the behavior was present, but not effective, .5 was awarded; and one point was given if the behavior was present and effective.

To determine concurrent validity, a "t" test was applied to the data acquired from a beginning group of tennis players and an advanced group. All correlations were above .829. The analysis of variance method was used to determine reliability of the test. The results indicated the rating form was reliable (day-to-day, .945; trial-to-trial, .998). The interjudge objectivity correlation was .867.

The purpose of Jackson's (72) study was to develop a rating scale that would be valid, objective and practical for discriminating relative volleyball performance in a competitive game situation for skilled female volleyball players. She identified the following factors as important aspects for evaluating individual performance: serve, pass, spike, set, block, recovery, return, and violation and/or errors. One point was awarded for a good (by her definition) execution of any specific factor; no points were given for a poor execution. An ace or a good serve received one point. If a violation or an error were committed, one point was subtracted. A total was computed by summing all points and dividing this number by the number of contacts made during the game.

One hundred and sixteen players were rated by two sets of two judges during seventeen matches. They observed players for an entire match. At the conclusion of the match, the judges were asked to rank the players on the basis of their overall performance and contribution

to the team. Face validity was shown by demonstrating that the items included were important in skilled volleyball competitions. Results of the rating scale were correlated with the averaged rankings of the judges to determine statistical validity. The correlations (.109 and .470) indicated that the volleyball rating scale was not a valid instrument with which to discriminate relative volleyball playing performance.

Utilizing the rating scale, each judge rated each player during two different games. A total score was computed for each player after each game. The total scores for each player were ranked and the Spearman rho method was used to determine the reliability (.395) of the scale which was not significant at .05. The averaged objectivity coefficient (.876) was significant beyond .01.

In her conclusions, the author indicated that this scale had two advantages over a conventional method of evaluating performance. She said the scale measured realistic competitive situations and was diagnostic.

The purpose of the study done by McCatty, et al. (54) was to discover the extent of agreement in scoring the crawl, breast and side stroke by qualified raters. Each one of the 25 subjects (male and female) was to be scored on how they performed each one of the strokes mentioned above. The 22 raters were to score each swimmer according to the following scale: poor, 1-2 points; deficient, 3-4; fair to good, 5-6; very good, 7-8; and excellent, 9-10. Each swimmer swam three

lengths of a 25-yard pool executing each one of the strokes each lap. The spacing interval between swimmers was approximately 15 seconds.

After collecting the data, the authors found that the scoring was not discriminatory in distinguishing between the original five categories. Therefore, the cells were collapsed into three categories, namely, "failure," 1-4 points; "superior," 7-10; and "weak," 5-6. It was found that, in all three strokes, the examiners differed considerably in rating the subjects' performances. The rating scale utilized by the raters proved to be a highly unreliable instrument. The authors made some possible recommendations for developing a more reliable scale, such as defining more precisely the points used in evaluating a stroke. Secondly, they suggested listing controversial points and obtaining experts' opinions as to whether or not "there is legitimate room for difference of opinion." (54:14)

Development of Scales to Evaluate Performance in Basketball

Many objective systems of evaluating basketball skill(s) have been reported in the literature. Generally, these systems have been termed "skill tests," "achievement tests" or "ability tests." Some systems have isolated a skill or an element to be measured outside the game situation. Some researchers have combined these separate tests attempting to measure the skill of an individual's performance in a game situation.

As early as 1932, Edgren (40) developed an instrument to test ability and progress in basketball. Since that time, many others

(1,2,57,63,67,69,70,72,73,74) have constructed "skill tests" to evaluate certain aspects of performance in basketball. Each one of these skills tests evaluates certain elements used in a basketball game such as dribbling, shooting, jumping and passing. Also, these skill tests are administered to evaluate performance in a structured situation. None of them is constructed to evaluate how a student performs skills in a game situation.

Authors (5,6,13,14,23,30) who have written texts in measurement and evaluation of physical education briefly commented on the use of rating scales. Franks and Deutsch (13) gave two examples of basketball subjective grading sheets which are a form of a rating scale. Each scale is very general without any descriptions accompanying the scales. Also, no validity or reliability coefficients was reported.

Howard's (16) study involved the development and evaluation of a technique to measure achievement of a basketball player while he was actively participating in a game situation. Howard's technique involved simply the recording of performances, such as different types of shots, passing, dribbling, and blocking shots. The observer recorded these performances as either a success or a failure. For each of the thirteen specific skills, he had an objective definition to aid the observer in recording the skills that were performed by a player during the game. The final scores of the observational test were based on the sum of successes and failures or successes alone performed in six periods of observation. Three different weighted

formulas were used to yield an achievement score, dependent on whether successes and failures or just successes were used.

The data collected were acquired from observing 211 players during 865 complete periods of observation. Four different types of groups were used. One group included eight teams in the first round of the 1936 Olympic tryouts; another group consisted of 16 teams involved in intercollegiate and interclub competition during 1935-36. The third group of observations were made on basketball classes at Seth Low Junior College; and the fourth group observed was the Varsity and Freshman teams at Ohio State University.

Four different methods of weighting the observed scores were tried. The two methods which proved to be useful were weighting the successful and unsuccessful performances and weighing the successes alone. The criterion used to establish validity was the average of nine rankings made by three judges on sixty-nine students of Seth Low Junior College. To determine validity, the scores of eleven skills were intercorrelated and correlated with the criterion. Regression equations based upon the successes and failures and successes alone were computed. The multiple coefficient of correlation was found to be .81 for both methods. The reliability coefficient was secured by correlating random halves of the observation scores, then computing the coefficient for the whole series by using the Spearman formula. The scores based on successes and failures were weighted with a regression equation, correlated, then stepped up to give a coefficient of .716. The scores based on only successful performances were not

weighted, but based on actual scores giving a reliability coefficient of .701. In comparing the validity and reliability of his observational test with isolated skill types of tests to measure ability and achievement in games, Howard concluded that his observational test was superior to other tests concerning factors of validity and reliability. To determine the objectivity of the observation technique, the author determined the number of skills per period of disagreement among the observers. He found the average error per period to be approximately one skill; therefore, he concluded, the test was not objective.

Voltmer and Watts (59) developed a method of rating basketball players to aid coaches in evaluating different aspects of the game. The purpose for developing their method was to introduce a system that: "(1) requires comparatively few scorers, (2) relies relatively little on the opinions of the scorers, and (3) still presents adequate evidence on performance of skills under game conditions." (59:94)

The authors chose five positive and five negative factors of performance which they considered important for evaluating individual performers. If a player exhibited a positive performance, he scored a certain number of points; if a player exhibited a negative performance, he would lose a designated number of points. A summary chart was prepared for each player which indicated the positive score, the negative score and the number of points made.

The authors' conclusions indicated that this chart did present important information concerning the execution of specific skills during a game. Secondly, the authors of this study felt the scale did

provide incentive for the players to make improvements. Thirdly, they indicated it did rule out the bias factor in player evaluation.

A type of a rating scale was developed by Elbel and Forrest (41) to be used as a supplement in evaluating team and individual performance in a basketball game situation. During the first year it was used, only offensive efficiency was calculated; during the next two years, defensive efficiency was computed as well as offensive efficiency. A weighted point system was devised for nineteen offensive (ten were positive, nine negative) and ten defensive statements (eight positive, two negative). For example, if an individual scored a field goal, he would receive ten points on the scale; if a player executed a good pass, he received one point. If an individual player would commit a violation or a personal foul, he would receive a negative five or negative eight points respectively. The defensive efficiency rating chart was developed in a similar manner.

Twelve men, working in pairs, acquired the necessary data during each competitive home game situation. After each game, the sum of the positive and negative points was computed. The algebraic sum of the positive and negative factors represented the offensive and defensive efficiency of each individual player. The authors stated, "This study shows rather well that scoring ability in itself, important as it is, can be readily offset by personal fouls and mistakes in ball handling." (41:555) In addition, as the authors pointed out, the results indicated that certain factors were apparently important to the winning success

of a team. They also felt the players were motivated to improve their ratings after they had seen the results of the data from each game.

In 1956, the Athletic Journal published a study conducted by Vroom and Nixon (60) on "Fundamental Basketball Skills of College Freshmen." A type of a rating scale or questionnaire was developed to provide information and opinions for high school and college coaches as a guide to improve coaching practices. After a thorough discussion with coaches at both levels, twenty-six fundamental basketball skills, classified as defensive and offensive, were selected. Factors such as attitude, sportsmanship, desire, etc. were not considered for use in the questionnaire.

Forty-two basketball coaches from four-year colleges and universities west of the Rocky Mountains were chosen for the study. The college coaches were asked to express their opinions of players coming from high school concerning their fundamental basketball abilities. The coaches were to rate each one of these players on a five-to-one point (excellent to poor) rating scale on each of the twenty-six items. If a player showed maximum effort and if the coach felt the player was ready for college level play, he gave the player an excellent rating or five points; if the player showed little exposure to high school playing experience and needed a very concentrated coaching effort, he was given one point or a rating of poor.

After 35 of the 42 questionnaires had been returned, the skills were ranked in order of excellence according to the point values assigned. Four offensive skills topped the list with jump shooting

receiving the most points. "Talking on defense" received the smallest number of points. The authors found that offensive skills far surpassed defensive skills. They concluded by saying there was a definite need for defensive coaching on the high school level.

Wright and Wright (62) developed a set of rating scales to be used for grading purposes in women's physical education classes. The purpose of their study was to devise a scale which would help provide a valid, reliable, and objective instrument to aid in assessing grades. Not only did they develop a scale to be used for basketball, but also one for field hockey, volleyball and softball. Their instruments were forced-choice rating scales composed of paired items, that is, the rater was forced to make a selection of the items which best described the ratee or player.

The basketball form was used to assess playing skill in an actual game situation. Though many of the items in this scale appeared to measure knowledge of rules, attitudes, and personality characteristics, it was not designed for these purposes, but instead designed to measure skill and/or improvement in game play. In addition, it was developed to be used by peers evaluating the performance of individuals in a game situation. The basketball scale consisted of ten forced-choice pairs.

The original item pool was developed by having students list items they felt were characteristic of a good player. Seventy-five items were obtained from this list. Using the 75-item scale, seventy-two students were asked to rate these same items on a one to seven

Likert-type scale according to how willing they would be to rate a team member as being like the item. Only the items with a relatively low variance were chosen for the final scale which included ten paired forced-choice statements.

The same subjects were asked to rate fellow members by ranking them on their value to the team. These rankings became the criterion. The students were asked later to rate their team members by ranking them on the original seventy-five items. The Pearson product moment method of computing correlations was utilized to find the coefficients between each item and the criterion. The correlations ranged from .07 to .97.

The validity was found by computing rank order correlations between the criterion and scores from 110 subjects on the final form of the scale. The validity criterion was a rating of subjects done on a one-to-seven Likert scale by two instructors. The validity correlations for sixteen teams ranged from .56 to .98. The mean validity correlation was .81 and the median validity correlation was .85. In order to determine the optimal number of ratings that should be used, each rater judged each person a total of eight times. It was found that six ratings gave nearly maximum results (.72).

The authors concluded that when six ratings were used, their rating scales gave higher validity coefficients than skill tests. They also indicated less time was necessary to administer the rating scale than a skills test. The authors thought that the resulting scales

represent valuable, objective instruments for use in evaluating performances in game situations.

Hosinshi (71) developed four rating scales to be used as a criterion in determining if a computer instructed program was a more effective teaching method than the traditional method of teaching the shuffle offense in basketball. His scales were developed to evaluate each individual player in each series of the offense for each position, relative to his effectiveness concerning positioning, receiving the ball, getting open, using screens, passing to a teammate, faking, cutting, and filling a vacated spot in the shuffle offense. Each item in the scale was scored on a five-to-one point basis; if a player performed well, he received five points; and if the player failed to perform, he received one point.

Five players performed at the same time but only one subject was evaluated at one time on the above aspects. Three raters rated the players one by one as they executed the shuffle offense. Each group and individual was rated four times, one time for each series of the shuffle offense. No validity or reliability of the scale was reported.

Kalich's (18) book, The Basketball Rating Handbook, explains a system for rating college and professional basketball players. He identified fifteen factors or categories for rating the performance of individual players. The scoring of his system was 10 points, maximum proficiency; 8-9, excellent achievement; 6-7, very good ability; 4-5, average ability; 2-3, very poor performance; and, 0-1,

total failing. In addition to identifying each factor, he also described or defined each factor with a word, a group of words or a short statement. For example, he described "play making" as being creative, giving others an opportunity to score easily, seeing the entire court, executing good passes and dribbling well. The author did not report any statistical evidence of reliability, validity or objectivity.

CHAPTER III

PROCEDURES

The purpose of this study was to develop a rating scale for use in evaluating individual physical skill performance in a basketball game situation. There were three phases to this study. The first phase of the study consisted of the development of an evaluation tool, a rating scale, and the utilization of the scale by independent judges to rate actual performance in basketball game situations. The second phase consisted of the treatment of the data from the original 96-item scale, the reduction of the items in the original scale to a number which would be practical, and the utilization of the shortened scale. The third phase ascertained the reliability and validity factors of the collapsed scale.

Development of the Original Item Pool

The initial task of this portion of the study was to acquire items and concepts related to the different aspects of basketball physical skill performance. From these ideas and concepts, descriptive statements indicative of basketball physical skill performance were developed.

One method used to gather information consisted of talking to basketball coaches, basketball players, and physical education teachers. These people were asked to describe and list the physical skills of a good and/or poor basketball performance.

Secondly, the investigator watched and observed individual players in competitive basketball games. During these observation periods, the physical skill components of basketball performance were described.

Finally, basketball literature was examined. Basketball books (4,6,8,10,24,25,27,35) written by both men and women during the past decade were examined for ideas and concepts descriptive of good and poor basketball performances. Rating scales (16,18,41,60,62,71,76) which had been developed to evaluate basketball performance were examined and skill tests (1,2,40,63,67,69,70,73,74) were reviewed to determine important skills in evaluating basketball performance.

The descriptions and concepts gleaned from all the sources were subjected to content analysis. It was found that specific behaviors fell into seven general categories: (a) shooting ability and offensive moves, (b) defensive moves and tactics, (c) ball handling, (d) rebounding (offensive and defensive), (e) speed and quickness, (f) body control and balance, and (g) general floor play.

Descriptive statements were developed and inserted in the appropriate categories. The items were phrased both in a positive and negative way to prevent judges developing a set type of response when evaluating individual basketball performance. After these items were developed, the completed instrument was given to two basketball coaches (one male and one female) for additional suggestions and for clarification purposes. After corrections, the rating scale was sent to the researcher's doctoral committee for further suggestions and approval. Editorial and clarification suggestions were given by this committee.

Final editorial approval was given by the researcher's advisor. Ninety-six items were retained for the rating scale. A five-point Likert-type response scale was developed. Responses ranged from "highly agree" to "highly disagree." If the player exhibited the behavior all of the time, the rater would check "highly agree"; if a player exhibited the behavior most of the time, the rater would check "agree"; if a player exhibited the behavior occasionally, the rater would check "disagree"; if the player did not exhibit the behavior, the rater would check "highly disagree"; and if the rater could not agree or disagree that the statement was descriptive of the player, the middle category (NN) would be checked. The following are examples of the statements which are found in the 96-item rating scale: (a) She keeps her head level, straight over the center of gravity and base of support, (b) She avoids losing sight of the ball when guarding an opponent without the ball, and (c) She jumps and reaches to receive a rebound. The 96-item rating scale is found in Appendix A.

Utilization of the Original Rating Scale

Permission was granted, by written notification from Betty Westmoreland (Chairperson of the Women's Basketball Games Committee of the USCSC), to use the rating scale to evaluate basketball players participating in the selection camp for the World University Games held at Maryville College, Maryville, Tennessee, June 16-23, 1974. Three persons on the United States Collegiate Sports Council basketball committee, who were at the selection camp, were independent judges

utilizing the rating scale. The data acquired from the ratings by the judges were used in the statistical analysis to reduce the original rating scale to a smaller, more practical scale. The judges were: Barbara (Sue) Ross, Mississippi Gulf Coast Junior College; Jeanne Rowlands, Northeastern University; and Betty Westmoreland, Western Carolina University. One judge had been a varsity collegiate coach for nine years; the other two judges had coached for ten years at the college level.

The first part of the selection camp was for the purpose of reducing the number of participants (approximately 40) to a select few for concentrated basketball practice the following week. The judges were given the rating scale during the first part of the selection camp so they could become familiar with the statements. Specific instructions were given concerning the use of the rating scale. They are found in Appendix B. During this first period, the judges were asked to look at the statements in the scale and to tentatively evaluate players in their own minds.

After the selection of the final fourteen basketball players, the judges met with the investigator to determine if there were statements in the rating scale which were unclear. For each statement in which the judges had a question, a discussion followed to clarify the intent of the statement. The judges were also asked if there were any questions concerning the use of the scale and the categories to be marked. The attempt was made to explain how each category should be checked to enable the judges to be as consistent as possible.

During the final week of the camp, the judges were asked to evaluate the individual players in game situations utilizing the rating scale. The players ranged in age from 18-21 with a mean age of 19.5 years. The number of years they had competed on an intercollegiate team ranged from one year to three years with a mean of 1.82 years of competition. The players were representatives of different areas of the country and were chosen because of their high level of skill in basketball. The results of the judges' ratings for the fourteen basketball players appear in Appendix C.

Means and standard deviations were calculated for each of the 96 items by using the Statistical Package for the Social Sciences (SPSS) system of computer programming.

A correlation matrix between each pair of the ninety-six variables was calculated by using the SPSS PEARSON CORR (28:276-288) procedure. After the correlation matrix had been developed, a factor-analytic (principal factoring with iterations) technique was used to determine if a pattern of relationships did exist within each category. The purpose for utilizing the factor-analytic technique was to determine if one could reduce the original 96-item scale to a rating scale with fewer statements which would be easier and less time-consuming for the rater. As Jae-On Kim and the authors stated, "The single most distinctive characteristic of factor analysis is its data-reduction capability." (28:469)

The orthogonal rotational method was selected for this study and each factor matrix was rotated to a simple factor structure by using

the varimax and quartimax forms of rotation. The initial factor solution (unrotated) when applied to any set of data tends to be difficult to interpret.

> The first factor so extracted tends to be a general factor, that is it tends to load significantly on every variable. However, the second factor tends to be bipolar, that is, approximately half of the variables have positive loadings and the other half negative loadings. The remaining factors also tend to be bipolar, and it is often hard to interpret such factors. Furthermore, every variable tends to be decomposed into positive as well as negative factors, and the complexity of each variable is usually greater than 1. (21:482)

Therefore, to simplify the factor structure and to effectuate a meaningful interpretation, the varimax and the quartimax solutions were selected for this purpose. Both of these solutions were chosen to ascertain if one scheme yielded a simpler structure for interpretation.

Subsequently, there was only one factor shown for the categories "rebounding," "body control and balance," and "general floor play." Therefore, the rotation did not accomplish simplification. Nevertheless, rotation did yield structures in the remaining four categories.

After studying each rotation carefully, the varimax rotation was accepted because it seemed to be more realistic than the quartimax. The latter rotation, quartimax, tended to yield one general factor and the other factors seemed only vaguely concerned with simplifying the content of the factor matrix.

It was determined to use a factor loading of at least .65 for the acceptance or rejection of individual items. Kerlinger (19:654) indicated that there is generally no accepted standard for a "significant" factor loading. In addition, Cooley and Lohnes (9:144)

denoted that high and low factor loadings are easily interpreted, but the middle-sized loadings give the researcher trouble. Kerlinger (19:654) suggests using the r that is significant for the N of the study. With an N of 14, a correlation of .623 was significant at the .01 level.

Although categories A, B, C, and E did produce more than one factor, some of the rotated factors were difficult to interpret. The categories which produced only one factor could not be rotated. These categories producing the one factor did not have any interpretable meaning. Therefore, the decision was made to collect more data by increasing the number of basketball players to be evaluated in game situations. It was speculated that a greater number of persons might effect a clearer picture of the factor structure of physical performance in basketball.

To acquire more data for the statistical analysis, the original rating scale was used to evaluate varsity high school basketball players in a selected area in South Dakota during the fall of 1975. The three judges chosen for this part of the study were the women's varsity basketball coach and two assistant coaches of the South Dakota State University intercollegiate team. The head coach had ten years of coaching experience at the collegiate level; one assistant coach had played four years of high school basketball, four years of collegiate basketball and had coached at the high school level for one year; and the other assistant coach had played at the high school level and at the collegiate level for four years.

The judges were given the rating scale to become familiar with the statements on the rating scale. After they had studied the statements, a discussion followed for purposes of clarifying statements, and for instructing the judges as to how the categories should be checked. They were given the same instructions as the previous raters.

The scale was used during the first two games observed. These first two games were designated as practice sessions for the judges. During the first game, the judges were asked to evaluate one starting player using the rating scale. During the second practice session, the judges rated two starting players. After each practice session, a discussion was held with the judges to resolve any problems they had encountered with the use of the rating scale. At that point, it was decided that a player must play at least three quarters in the ball game to be evaluated efficiently. If a player did not play for that length of time, the rating was discarded. It was also decided at this time that no more than two players could be evaluated efficiently using the 96-item rating scale.

During the girls' basketball season, twenty-four varsity interscholastic players were rated by the three judges. Two starting players were evaluated during each game that individual players were observed. Two players from the same team were chosen during each game. Thirteen seniors, eight juniors, two sophomores and one freshman from twelve different school were the players who were rated. The scores for each individual player by each individual judge can be found in Appendix D.

The data acquired by using the rating scale for both groups (highly skilled collegiate players and varsity high school players) were combined into one set of scores. The total number of players evaluated was thirty-eight by two different sets of three judges.

For the combined group of thirty-eight basketball players, the means and standard deviations were calculated for each of the 96 items and a correlation matrix for each category was found utilizing the same SPSS computer programs. From the correlation matrix, which is found in Appendix E, each of the seven categories was factor analyzed independently of the remaining six categories. Factors were extracted by utilizing the method of principal factoring with iteration. The factors were rotated analytically using three orthogonal methods (varimax, quadrimax and equimax). The SPSS factor procedure was employed for these procedures. After an examination of the factor structures for each one of the seven categories, the varimax rotation was chosen because it appeared to give the best solution for the reduction of items. Because of the larger N (38) for this segment of the study, a correlation of .60 was adopted for use as a significant loading on a specific factor.

For the shortened rating scale, seven categories were retained and seventeen items were developed. The seven categories were retained based on the original theoretical structure of evaluating an all-around basketball physical performance.

The seventeen items chosen for the revised scale were based on the factor loadings of each item, the content of the items and the interitem

correlations. For each category which yielded more than one factor, items were chosen which had high (.60 and above) loadings on each factor and comparatively lower loadings on the remaining factors. Secondly, if many items met this criterion, a content analysis was performed to determine the similarity and diversity of meanings of the specific items. If the items were similar in content, they were combined into one statement to eliminate two or more items with corresponding meanings and an attempt was made to preserve the concept of reducing the number of items to the smallest quantity possible. Thirdly, for categories which yielded only one factor, items were selected or combined on the basis of their interitem correlations with the remaining statements and/or the homogeneity of the items composition.

Because of the factor structure which emerged within each independent category, a different number of items was selected and developed to represent each specific grouping. For example, three factors were produced in category A (shooting ability and offensive moves). Therefore, based on the factor loadings, the interitem correlations and the content, six items were chosen to represent this category in the revised scale. A complete discussion of the selection and development of items for the shortened scale is found in the fourth chapter. The reduced scale appears in Appendix F.

Utilization of the Reduced Rating Scale

After the reduced scale had been approved by the researcher's adviser, it was used to rate the basketball performance of high school girls in the 1975 South Dakota State "B" Tournament. This tournament

was played December 4-6, 1975 in Huron, South Dakota. Thirty-four players from seven different teams were rated.

Verbal permission to execute the ratings was given to the investigator by the Assistant Executive Secretary of the South Dakota High School Activities Association. The judges chosen to evaluate the basketball performances of the players were the same three who rated the high school players using the original scale. They were chosen because they were familiar with the scale and they were available when the scale was going to be used.

The reduced scale was given to the three judges shortly after it had been developed. At this time, the judges were asked to study the statements and were then given an opportunity to ask questions about any difficulty in the interpretation of the statements. One week before the actual use of the scale, the three judges rated high school basketball players participating in a sectional tournament. The team winning this tournament went on to participate in the State "A" Tournament. This rating was used as a practice session to determine how many players could be rated at one time. After observing the girls in a game situation, utilizing the scale, the judges decided they could rate five players. Also, each player had to compete at least three quarters to be evaluated effectively. If a player had not participated this length of time, the rating was eliminated.

During the playing of the games at the South Dakota State "B" girls' tournament, thirty-four players were rated. One rating was discarded because one of the starting five players from the Canova

team did not play a sufficient amount of time to be rated. The starting five players on one team for each game were the persons selected to be rated by the three judges. The members of the teams that were rated were from Kadoka, Springfield, Canova, James Valley, Jefferson, and Clear Lake High Schools in South Dakota. The players rated were ten seniors, thirteen juniors, ten sophomores and one freshman; their ages ranged from 14-18 years with a mean age of 16.12. The results of the judges ratings appear in Appendix G.

Reliability and Validity of Reduced Scale

The results from the evaluation of the thirty-four basketball players utilizing the shortened rating scale were used to provide an interjudge reliability of the scale. Kendall's (12:312-315) Coefficient of Concordance was the statistical technique employed to determine the interjudge reliability. The nonparametric method was chosen because the assumptions of the ANOVA could not be met adequately. The precise statements in the original scale were collapsed to generalized items in the reduced scale; therefore, the accuracy of the judgments was decreased. The exactness of the integers used to place a numerical value on each category did not warrant the use of the ANOVA. The repeated measures design was violated because repeated observations were not made.

There were some missing data in the rating of the individual players. This was minimal; approximately ten items were missed of the more than 1000 observations made. Therefore, a method developed by Yates as reported by Steele and Torrie (32:139-140) was used to

estimate these missing values. The reason for utilizing this process was to facilitate the calculations of the total scores and means of each judge for each individual player on the rating scale.

After the missing values had been approximated, the total scores were computed for each player from the results of each one of the judges' evaluations. The total scores of all players were ranked according to the evaluations given by each judge. The lowest score was given a ranking of 1 and the second lowest was given a ranking of 2.

To determine the criterion-referenced validity of the finalized scale, the scores of the judges for each player were summed to acquire one total score for each person who had been evaluated. These total scores were ranked and correlated with a subjective ranking of all the players who had been rated. The statistical method used for determining this coefficient was Spearman's Coefficient of Rank Correlation (12: 305-308).

The subjective criterion was acquired by having two judges (working together) rank all of the players from the best all-around basketball player to the poorest all-around player. This ranking was completed after the completion of the tournament and the rating of the players, using the rating scale.

To calculate the sum of the three total scores of each judge for every player, missing data were estimated by the Yates method. The total scores, the rankings of the total scores and the rankings of the two judges are found in Appendix H.

CHAPTER IV

ANALYSIS OF DATA

A 96-item rating scale was first developed to evaluate the physical performance of basketball players in a game situation. A five-point Likert-type response scale was used to rate each individual player on each of the 96 items. The judges were asked to rate each person according to whether, in their judgments, the behavior exhibited high agreement with the specific items all of the time (5 points), agreement with the items most of the time (4 points), occasional agreement with each item (2 points) or agreement that the player did not execute the behavior (1 point). If the judges could make no decision, they were to check the "neither agree or disagree" column (3 points).

The results of the data were reported in three different phases. The first phase concerned the analysis of the data after fourteen players were evaluated. The second phase reported the results of the data after twenty-four more players had been evaluated and the process of collapsing the original scale had been completed. The third phase included an analysis of the results after the reduced scale had been utilized rating basketball players in a competitive situation.

First Phase

The sample of the initial phase included fourteen highly skilled collegiate basketball players who had been invited to remain after the

selection camp for the World University Games. This camp was held at Maryville College, Maryville, Tennessee, June 16-23, 1974.

Descriptive Statistics

Three judges rated each player on each of the 96 items. Means and standard deviations were calculated for each of the 96 items by using the Statistical Package for the Social Sciences (SPSS) system of computer programming. The results of the item means and standard deviations are presented in Table 1.

Product-moment correlation coefficients were found between each pair of variables on the 96-item rating scale by using the SPSS system. In some cases, there were missing data because the judges felt the items were not appropriate to specific players. For example, one judge felt that a player playing the guard position never had an opportunity to rebound; therefore, she did not rate the individual player on this aspect of the game. The pairwise deletion of missing data option was utilized in the process of computing the simple correlations. The intercorrelations were used in the first phase of the study. However, after collecting more data, the first group of intercorrelations was not used. Therefore, the correlation matrix is not included in this paper.

In the following discussion, category A referred to "shooting ability and offensive moves," category B was "defensive moves and tactics," category C was labeled "ball handling," category D was "rebounding," "speed and quickness" was category E, "body control and balance" was category F, and category G was "general floor play."

TABLE 1

MEANS AND STANDARD DEVIATIONS OF THE
RATINGS OF COLLEGIATE PLAYERS
N = 14

Category A (Shooting Ability and Offensive Moves)

Items	Means	St. Dev.	Items	Means	St. Dev.
1	4.02	.74	13	3.95	.98
2	4.12	.84	14	3.50	.69
3	4.07	.69	15	3.95	.94
4	4.29	.55	16	3.93	.99
5	4.40	.60	17	3.60	.94
6	4.00	.78	18	3.45	1.00
7	3.86	.71	19	3.71	.64
8	4.10	.63	20	3.83	.64
9	3.64	1.09	21	3.48	.86
10	3.62	.98	22	4.02	.63
11	3.19	.64	23	3.81	.79
12	4.17	.73			

Category B (Defensive Moves and Tactics)

1	4.10	.67	11	3.31	.72
2	3.88	.89	12	3.69	.61
3	3.98	.50	13	3.29	.87
4	4.21	.58	14	3.74	.53
5	3.60	.74	15	3.93	.68
6	4.31	.58	16	3.71	.69
7	4.02	.56	17	3.76	.61
8	3.98	.73	18	3.31	.73
9	3.43	1.00	19	3.36	.70
10	3.93	.79	20	3.79	.78

Category C (Ball Handling)

1	4.05	.74	9	4.05	.26
2	4.18	.61	10	3.38	.63
3	3.95	.49	11	3.21	.98
4	3.45	1.13	12	3.81	.58
5	4.29	.80	13	3.31	.85
6	4.57	.28	14	3.29	.90
7	3.81	.68	15	3.38	.78
8	4.19	.61			

TABLE 1 (Con't.)

Category D (Rebounding)

Items	Means	St. Dev.	Items	Means	St. Dev.
1	3.90	.84	7	3.95	.82
2	3.88	.92	8	4.00	.82
3	3.71	1.00	9	3.93	.68
4	3.79	.92	10	4.19	.74
5	3.86	.90	11	3.88	.76
6	4.07	.89	12	3.79	.61

Category E (Speed and Quickness)

1	4.02	.81	7	4.00	.82
2	3.76	1.08	8	3.71	1.29
3	4.00	.83	9	3.90	.68
4	3.57	1.03	10	3.98	1.22
5	3.07	.84	11	4.07	1.10
6	3.83	1.03	12	4.02	.88

Category F (Body Control and Balance)

1	4.00	.77	5	3.90	.84
2	4.48	.72	6	3.86	1.04
3	4.62	.39	7	4.10	.56
4	4.57	.38			

Category G (General Floor Play)

1	3.76	.77	5	4.07	.80
2	4.00	.97	6	3.98	1.22
3	4.62	.32	7	3.48	1.13
4	4.10	.81			

Factor Analysis

The results from the evaluation of the fourteen players by three judges on the specific number of items in each category were factor analyzed independently of the other categories using the principal components factor solution with iterations. Therefore, seven separate factor analyses were calculated and interpreted. The purpose of the factor analysis was to explore the possible patterning of variables to determine if items could be eliminated and reduced from the original scale. "One way of stating the purpose of factor analysis is that it is a method for searching for relations in a body of data." (33:110)

The unrotated factor matrix identified the estimated communalities (squared multiple correlations), eigenvalues, the proportion of variance accounted for by each factor and the cumulative percentage of variance described by the factors.

In category A (shooting ability and offensive moves), four factors were identified with eigenvalues greater than one which accounted for 87.9% of the total variance. (Table 2) In category B (defensive moves and tactics), three factors emerged accounting for 82.7% of the variance. Category C (ball handling) produced two factors with eigenvalues greater than one accounting for 80.7% of the total variance. Categories D (rebounding), F (body control and balance) and G (general floor play) described one factor accounting for 88%, 76.9% and 75.9% of the total variance, respectively. Category E (speed and quickness) yielded two factors with eigenvalues superior to one accounting for 86.6% of the total variance. The complete printout of the unrotated factor matrix is found in Appendix I.

TABLE 2

EIGENVALUES, PERCENTAGE OF VARIANCE, AND CUMULATIVE PERCENTAGES OF VARIANCE FOR THE UNROTATED FACTORS

Factor	Eigenvalue	Pct. of Var.	Cum. Pct.
Category A (Shooting Ability and Offensive Moves - 23 Items)			
1	14.74110	64.1	64.1
2	3.04666	13.2	77.3
3	1.33259	5.8	83.1
4	1.10619	4.8	87.9
Category B (Defensive Moves and Tactics - 20 Items)			
1	12.20650	61.0	61.0
2	2.59201	13.0	74.0
3	1.74410	8.7	82.7
Category C (Ball Handling - 15 Items)			
1	10.59950	70.7	70.7
2	1.50322	10.0	80.7
Category D (Rebounding - 12 Items)			
1	10.56452	88.0	88.0
Category E (Speed and Quickness - 11 Items)			
1	9.38678	78.2	78.2
2	1.00613	8.4	86.6
Category F (Body Control and Balance - 7 Items)			
1	5.38433	76.9	76.9
Category G (General Floor Play - 7 Items)			
1	5.31051	75.9	75.9

In each category that produced more than one factor, the factors were rotated utilizing the varimax rotation. The items chosen to represent each of the factors within each category had a factor loading of .65 or higher. As pointed out in Chapter III, Kerlinger (19) suggests using the r that is significant for the N of the study. In this case, a correlation of .623 was significant. Therefore a .65 factor loading was accepted for this study.

Four factors were rotated in category A (shooting ability and offensive moves) employing the varimax rotation. Table 3 indicates the items with high loadings (according to the predetermined criterion) on each of the factors.

Factor I described proper alignment of the body shooting arm and hand release which enables a shooter to be accurate. In addition, the items which indicated use of a variety of shots and the ability to move either left or right to successfully get the shot started from a dribble were also important in describing this factor. The item, "she uses screens effectively to gain an offensive advantage," seemed to add to the dimension of moving the body to a position which would be effective for better shooting.

Factor II included behaviors indicating the use of evasive moves (fakes and cuts) to be in a position for a good shot. Items seven and eight, which were negative statements, seemed to indicate that if a player did not use evasive moves, the result was the execution of a poor shot or shooting from an unbalanced position.

TABLE 3

FACTOR ARRAYS OF VARIMAX ROTATION

Category A (Shooting Ability and Offensive Moves)

Item	Loading	Statement
		Factor I--Proper Alignment of Body
1	.82	She consistently uses an effective alignment of the shooting arm, hand, and wrist in relationship to the feet and the rest of the body.
2	.94	She shoots the ball easily to the basket with a smooth and balanced hand release.
3	.77	She keeps her head level, straight over the center of gravity and base of support.
4	.93	The player pushes the ball toward the basket primarily with her shooting elbow.
5	.89	The shooter permits the ball to roll off her fingers toward the basket.
6	.65	The shooter attempts to square her body toward the basket as she is shooting.
9	.89	She executes a shot with a smooth, continuous, balanced motion.
10	.86	She is consistently accurate in her shooting.
12	.88	She has a soft, natural backspin on the ball when shooting.
13	.77	She has a smooth, continuous follow-through.
14	.74	She uses a variety of shots.
18	.71	The shooter can go both left and right to successfully get the shot started from the dribble.
22	.71	She uses screens effectively to gain an offensive advantage.
		Factor II--Evasive Moves
7	.70	The shooter takes shots when she is off balance.
8	.80	The shooter takes poor shots.
15	.90	When preparing to shoot, she utilizes fakes to be in a position for the high percentage shot.

TABLE 3 (Con't.)

Item	Loading	Statement
16	.87	She continually uses evasive (fakes, cuts) maneuvers to free herself from an opponent.
17	.88	She coordinates her actions with other team members and uses meaningful and evasive moves when she does not have possession of the ball.
19	.69	She goes to meet the ball for a pass reception.
		Factor III--Maneuverability
21	.66	She uses the dribble to draw the opponents out of a good defensive position.
23	.80	She moves quickly into a position to aid a teammate under defensive pressure.
		Factor IV--Pivoting
20	.84	She uses the pivot to gain an offensive advantage.

There were two items that loaded fairly high on Factor III which appeared to be identifying two different types of behavior. The first item, "she uses the dribble to draw the opponents out of a good defensive position," suggested the use of a basic skill to counteract the opposition's position. The second item, "she moves quickly into a position to aid a teammate under defensive pressure," denoted moving effectively without the ball which was an asset on offense. This specific factor did not purport to have clear-cut meaning.

Factor IV described an evasive maneuver by a player. The items which loaded high on Factor II also described evasive moves; however, the item, "she uses the pivot to gain an offensive advantage," which loaded high (.84) on Factor IV was describing a different skill than the behaviors which loaded on Factor II.

In category B (defensive moves and tactics), three factors were rotated. An inspection of the items loading on the respective factors in this category as presented in Table 4 resulted in the following description.

Factor I presented items relating to defensive stance, alertness and aggressiveness. These characteristics also described how well an individual displayed the execution of the behaviors in helping and assisting a teammate(s).

Factor II included items which related to movement when guarding an opposing offensive player. The player moved by maintaining an erect trunk position, shuffling on defense and maintaining contact with the floor to avoid inferior body balance on defense.

TABLE 4

FACTOR ARRAYS OF VARIMAX ROTATION

Category B (Defensive Moves and Tactics)

Item	Loading	Statement
		Factor I--Defensive Stance, Alertness and Aggressiveness
1	.79	In her initial stance and as she moves with her opponent on defense, she bends her knees to bring her body into a good defensive position.
2	.86	Her defensive stance (static or dynamic) is effective for the performance of counteracting the opponent's movements.
7	.76	She works efficiently as part of the total defensive team plan.
8	.86	She is alert to help teammates on defense.
9	.87	She aids her teammates on defense by constantly giving verbal cues.
10	.75	She allows her opponent to drive past her into an easy scoring position.
12	.87	She maintains a defensive position which prevents the opponent from driving around her.
14	.79	She allows herself to be screened by an opponent.
15	.78	She is consistently alert for possible interceptions.
16	.92	She forces her opponent, without the ball, to a less dangerous scoring area.
20	.65	She constantly applies defensive pressure throughout the game.
		Factor II--Defensive Movement
3	.81	She keeps the trunk of her body erect when guarding an offensive player.
6	.70	She crosses her feet when she is moving or shuffling on defense.
17	.87	She leaps into the air when an opponent fakes a shot or a pass.

TABLE 4 (Con't.)

Item	Loading	Statement
		Factor III--Disturbing Opposing Offensive Patterns
13	.81	She consistently moves around a screen or slides through successfully.
18	.84	She causes the offensive player to dribble the ball to the least advantageous position.
19	.72	She forces her opponent, without the ball, to a less dangerous scoring area.

Factor III included behaviors which disturbed the offensive pattern of the opposing team. It indicated that the defensive players were attempting to prevent the offensive players from going in any set patterns.

Table 5 revealed the items and loadings on each of the two factors rotated in category C (ball handling). The statements depicted the items and the loadings on each specific factor.

Factor I in category C described behaviors which related directly to the player's passing capabilities. The passes were sharp, accurate and relevant to each situation during the game.

Factor II presented items relating directly to the dribbling ability of the individual player. This factor specified the position of the head, shoulder and eyes when dribbling. In addition, it described the player who can change pace and direction capably yet controlling the dribble.

Categories D (rebounding), F (body control and balance) and G (general floor play) produced only one factor each. Therefore, there was no rotation executed on each one of the unrotated factor structures. In category D, the unrotated factor structure was meaningless with each item loading above .84. The factor structure for category F produced loadings above .69 and in category G, the lowest loading was .54.

In category E (speed and quickness), two factors were rotated using the varimax rotation scheme. Table 6 supplied the information describing each factor.

TABLE 5

FACTOR ARRAYS OF VARIMAX ROTATION

Category C (Ball Handling)

Item	Loading	Statement
		Factor I--Passing Effectively
6	.75	She tends to waste the dribble by bouncing the ball as soon as she gains possession of it.
9	.74	When receiving a pass, she keeps her eyes on the ball until the ball is in her hands.
10	.79	She loses the ball to her opponents because of poor passes.
12	.78	Her passes are sharp and crisp.
13	.69	Her passes are accurate.
14	.81	Her passes are to a space away from the opponent.
15	.87	Her passes are relevant (lob, bounce, straight) to each situation.
		Factor II--Dribbling Competently
1	.83	Her head and shoulders are up when dribbling.
2	.88	When closely guarded, she dribbles the ball keeping her body between the defender and the ball.
3	.77	She loses the ball because of rule violations (illegal dribble, traveling).
5	.71	Her eyes are on the ball when dribbling.
77	.87	When dribbling the ball, she changes pace and direction efficiently.
8	.84	When dribbling the ball, she allows it to bounce too high.

TABLE 6

FACTOR ARRAYS OF VARIMAX ROTATION

Category E (Speed and Quickness)

Item	Loading	Statement
		Factor I--Quickness of Movement
1	.84	She starts quickly.
2	.83	She stops, changes pace and direction quickly.
3	.76	She establishes her initial defensive position quickly.
5	.72	She maintains her quickness with the ball without causing a turnover.
6	.69	She maintains her speed and quickness throughout the game.
7	.69	She uses her hands and arms quickly and efficiently.
8	.86	She has good straightaway speed with and without the ball.
10	.66	She changes from an offensive position back into a defensive position quickly.
11	.71	She changes from a defensive position back into an offensive position quickly.
12	.79	She stays on the balls of her feet enabling her to move quickly.
		Factor II--Recognition and Response to Opponent
4	.79	On defense, she reacts quickly to her opponent's changes of pace and direction.
6	.67	She maintains her speed and quickness throughout the game.
9	.81	She moves quickly to a good rebounding position.
10	.70	She changes from an offensive position back into a defensive position quickly.

Factor I referred to the individual player's general speed and quickness. The player stops and starts quickly and the player changes pace and direction quickly.

Factor II described behaviors which require quickness in reacting to an opponent's movement. On defense, the player reacted quickly to counteract her opponent's movements.

After carefully examining the rotated factor matrices and recognizing the fact that some categories produced only one factor, the decision was made to collect more data. The basic reason for this decision was based on the existence of the small number of cases which had been evaluated. It was felt that possibly a larger number would provide a clearer factor structure, specifically in categories D, F and G. In addition, many of the factors which had been rotated were not well-defined. Therefore, it was concluded that more players should be evaluated in a game situation utilizing the original 96-item rating scale. Appendix I shows the complete unrotated factor structures of all of the categories. Appendix J displays the complete rotated factor matrices of categories A, B, C and E.

Second Phase

The players evaluated in the second facet of this study were twenty-four interscholastic female basketball players in a select portion of the State of South Dakota. Three judges rated two players during twelve regular season games using the 96-item scale.

Descriptive Statistics

Succeeding the evaluation of the high school female basketball players, results from the first rating and the second rating were combined. The total number which had been evaluated was thirty-eight. The means and standard deviations were computed for each item within each category. The results of the item means and standard deviations are recorded in Table 7.

When comparing the means (Table 1) of the highly skilled collegiate players and the means of the combined group (Table 7), a cursory examination indicated the means of the combined group were considerably lower for each item. The fundamental cause for this occurrence was attributed to the fact that the high school basketball players were not as highly skilled as the collegiate players.

Factor Analysis

After both groups had been combined, the results from the evaluation of the thirty-eight players were factor analyzed utilizing the principal components factor solution with iterations. Again, the purpose for the factor analysis was to determine if there were relationships among the results and to search for possibilities for the reduction of items in the original 96-item scale.

Table 8 shows the results of the estimated communalities, eigenvalues, the proportion of variance accounted for by each factor and the cumulative percentage of variance described by the factors.

Three factors were identified in category A (shooting ability and offensive moves) as compared to four factors in the initial phase.

TABLE 7

MEANS AND STANDARD DEVIATIONS OF THE RATINGS
OF COLLEGIATE AND HIGH SCHOOL PLAYERS
N = 38

Items	Means	St. Dev.	Items	Means	St. Dev.
Category A (Shooting Ability and Offensive Moves)					
1	3.28	.93	13	2.92	1.12
2	3.29	1.06	14	2.62	.96
3	3.61	.75	15	2.66	1.41
4	3.63	.83	16	2.73	1.25
5	3.32	1.12	17	2.96	1.06
6	3.52	.83	18	2.61	1.15
7	3.50	.75	19	3.25	.90
8	3.61	.76	20	2.85	1.06
9	3.01	1.04	21	2.65	1.06
10	2.79	1.04	22	2.58	1.27
11	2.37	.94	23	3.12	1.00
12	3.18	1.10			
Category B (Defensive Moves and Tactics)					
1	3.11	1.09	11	2.32	1.02
2	3.06	.98	12	2.66	1.07
3	3.84	.49	13	2.63	.87
4	3.47	.86	14	3.02	.83
5	3.32	.72	15	3.47	.83
6	3.72	.77	16	2.79	.95
7	3.54	.79	17	2.93	.87
8	3.51	.81	18	2.39	.95
9	2.27	1.29	19	2.21	1.03
10	2.99	1.01	20	2.95	1.02
Category C (Ball Handling)					
1	3.54	.93	9	3.55	.78
2	3.54	.91	10	3.04	.75
3	3.31	.90	11	2.80	.94
4	2.85	1.21	12	3.11	.90
5	3.59	1.04	13	3.13	.74
6	3.88	.87	14	3.07	.82
7	2.90	1.10	15	3.23	.69
8	3.58	.93			

TABLE 7 (Con't.)

Items	Means	St. Dev.	Items	Means	St. Dev.
Category D (Rebounding)					
1	3.19	1.06	7	3.17	1.15
2	2.49	1.34	8	3.62	.74
3	2.68	1.17	9	3.29	1.01
4	3.38	.92	10	3.27	1.17
5	2.91	1.07	11	3.19	1.07
6	3.32	1.15	12	3.62	.79
Category E (Speed and Quickness)					
1	3.44	.96	7	3.32	.97
2	3.19	1.04	8	3.05	1.19
3	3.34	1:02	9	2.83	1.12
4	2.78	1.06	10	3.42	1.07
5	2.82	.73	11	3.58	.95
6	3.63	.82	12	3.19	1.12
Category F (Body Control and Balance)					
1	3.54	.81	5	3.47	.84
2	3.90	.86	6	3.36	1.03
3	3.85	.87	7	3.39	.83
4	3.94	.81			
Category G (General Floor Play)					
1	3.06	.90	5	2.82	1.18
2	3.68	.85	6	3.23	1.05
3	3.99	.73	7	2.62	1.07
4	3.61	.80			

TABLE 8

EIGENVALUES, PERCENTAGE OF VARIANCE AND CUMULATIVE PERCENTAGES OF VARIANCE FOR THE UNROTATED FACTORS

Factor Analysis - Combined Groups
N = 38

Factor	Eigenvalue	Pct. of Var.	Cum. Pct.
Category A (Shooting Ability and Offensive Moves - 23 Items)			
1	15.63	67.9	67.9
2	1.81	7.9	75.8
3	1.26	5.5	81.3
Category B (Defensive Moves and Tactics - 20 Items)			
1	13.22	66.1	66.1
2	1.35	6.7	72.8
3	1.03	5.1	78.0
Category C (Ball Handling - 15 Items)			
1	9.42	62.8	62.8
2	1.75	11.7	74.5
Category D (Rebounding - 12 Items)			
1	8.65	72.0	72.0
Category E (Speed and Quickness - 12 Items)			
1	9.08	75.6	75.6
Category F (Body Control and Balance - 7 Items)			
1	5.35	76.5	76.5
Category G (General Floor Play - 7 Items)			
1	5.13	73.2	73.2

These three factors accounted for 81.3% of the total variance. Three factors in category B (defensive moves and tactics) with eigenvalues greater than one attributed to 78.0% of the total variance. Category C (ball handling) produced two factors accounting for 74.5% of the total variance. The remaining four categories (rebounding, speed and quickness, body control and balance, general floor play) yielded one factor accounting for 72.0%, 75.6%, 76.5% and 73.2% of the total variance, respectively. The entire unrotated factor matrix is found in Appendix K.

Two or three factors were rotated employing the varimax rotation. Three factors were rotated in category A. Table 9 shows the items which loaded highly on these three factors.

There were eleven items which loaded fairly high on Factor I. The behaviors in these items referred to good body alignment, a proper release of the ball and a smooth, continuous follow-through when shooting. Two of the items described the concept of having the ability to use either hand and one item referred to the use of a variety of shots.

Factor II presented items relating to the use of evasive moves and skills to gain an offensive advantage. Items such as, "she uses a variety of shots," "she goes to meet the ball for a pass reception," and "she moves quickly into a position to aid a teammate under defensive pressure," indicated the use of maneuvers and skills which were important for a player to execute on offense.

TABLE 9

FACTOR ARRAYS OF VARIMAX ROTATION

Category A (Shooting Ability and Offensive Moves)

Item	Loading	Statement
		Factor I--Proper Alignment of the Body
1	.62	She consistently uses an effective alignment of the shooting arm, hand, and wrist in relationship to the feet and the rest of the body.
2	.82	She shoots the ball easily to the basket with a smooth and balanced hand release.
4	.80	The player pushes the ball toward the basket primarily with her shooting elbow.
5	.80	The shooter permits the ball to roll off her fingers toward the basket.
9	.74	She executes a shot with a smooth, continuous, balanced motion.
10	.83	She is consistently accurate in her shooting.
11	.64	In executing a lay-up shot, she shoots accurately with either hand.
12	.76	She has a soft, natural backspin on the ball when shooting.
13	.73	She has a smooth, continuous follow-through.
14	.65	She uses a variety of shots.
18	.63	The shooter can go both left and right to successfully get the shot started from the dribble.
		Factor II--Gaining an Offensive Advantage
14	.65	She uses a variety of shots.
15	.77	When preparing to shoot, she utilizes fakes to be in a position for the high percentage shot.
16	.81	She continually uses evasive (fakes, cuts) maneuvers to free herself from an opponent.
17	.73	She coordinates her actions with other team members and uses meaningful and evasive moves when she does not have possession of the ball.
19	.70	She goes to meet the ball for a pass reception.

TABLE 9 (Con't.)

Item	Loading	Statement
20	.66	She uses the pivot to gain an offensive advantage.
21	.75	She uses the dribble to draw the opponents out of a good defensive position.
22	.71	She uses screens effectively to gain an offensive advantage.
23	.78	She moves quickly into a position to aid a teammate under defensive pressure.
		Factor III--Body Position When Shooting
6	.64	The shooter attempts to square her body toward the basket as she is shooting.
7	.79	The shooter takes shots when she is off balance.

Factor III included behaviors which described the balanced body position of a shooter in relation to the basket. The player squares her body toward the basket and shoots from a balanced position.

Three factors were rotated in category B (defensive moves and tactics). The items loading on the respective factors are presented in Table 10.

Most items which described Factor I related to the individual's defensive stance and how the player moved to counteract the offensive maneuvers of the opponent. The item, "she aids her teammates on defense by constantly giving verbal cues," also loaded fairly high on this factor. This was an individual defensive asset. However, it was not related to individual movement which the other items indicated.

Factor II included behaviors which referred to helping a teammate on defence and guarding a player without the ball. Item six, "she crosses her feet when she is moving or shuffling on defense," also had an acceptable loading on this factor.

One item, "she blocks attempted shots by her opponents," described Factor III. This behavior included a defensive act against an opponent shooting compared to the items describing the first two factors which referred to individual and team defensive movement and alertness.

Table 11 exhibited the items and loadings on each of the two factors rotated in category C (ball handling). The statements portrayed the items and loadings on each specific factor.

TABLE 10

FACTOR ARRAYS OF VARIMAX ROTATION

Category B (Defensive Moves and Tactics)

Item	Loading	Statement
		Factor I--Individual Defensive Movement and Counteracting Maneuvers
1	.71	In her initial stance and as she moves with her opponent on defense, she bends her knees to bring her body into a good defensive position.
2	.63	Her defensive stance (static or dynamic) is effective for the performance of counteracting the opponent's movements.
9	.65	She aids her teammates on defense by constantly giving verbal cues.
13	.77	She consistently moves around a screen or slides through successfully.
14	.77	She allows herself to be screened by an opponent.
18	.69	She causes the offensive player to dribble the ball to the least advantageous position.
19	.77	She forces her opponent, without the ball, to a less dangerous scoring area.
20	.70	She constantly applies defensive pressure throughout the game.
		Factor II--Team Defense
5	.67	She avoids losing sight of the ball when guarding an opponent without the ball.
6	.62	She crosses her feet when she is moving or shuffling on defense.
7	.69	She works efficiently as part of the total defensive team plan.
8	.72	She is alert to help teammates on defense.
15	.79	She in consistently alert for possible interceptions.
		Factor III--Blocking Shots
11	.79	She blocks attempted shots by her opponent.

TABLE 11

FACTOR ARRAYS OF VARIMAX ROTATION

Category C (Ball Handling)

Item	Loading	Statement
		Factor I--Efficient Dribbling
1	.85	Her head and shoulders are up when dribbling.
2	.83	When closely guarded, she dribbles the ball keeping her body between the defender and the ball.
3	.70	She loses the ball because of rule violations (illegal dribble, traveling).
4	.75	[illegible] closely guarded, she dribbles the ball successfully with either hand.
5	.88	Her eyes are on the ball when dribbling.
7	.89	When dribbling the ball, she changes pace and direction efficiently.
8	.75	When dribbling the ball, she allows it to bounce too high.
12	.68	Her passes are sharp and crisp.
		Factor II--Efficient Passing
10	.82	She loses the ball to her opponents because of poor passes.
13	.82	Her passes are accurate.
14	.80	Her passes are to a space away from the opponent.
15	.89	Her passes are relevant (lob, bounce, straight) to each situation.

Factor I described behaviors which referred to efficient dribbling, with the exception of item 12 (her passes are sharp and crisp). However, item 12 loaded fairly high (.68) on Factor II as well.

All of the items described by Factor II alluded to having the ability to pass accurately, relevant to the situation and to a space away from the opponent.

The remaining four categories (rebounding, speed and quickness, body control and balance, general floor play) produced only one factor in this phase of the study. Therefore, there was no rotation executed on those specific factor structures. In the initial phase, category E (speed and quickness) did yield two factors. However, the remaining categories generated one factor in both facets of the study. The complete unrotated factor structures for all categories are found in Appendix K and Appendix L shows the rotated factor matrices of categories A, B and C.

Reduction of the Scale

Although many of the categories produced only one factor, the number of items was reduced based on the factor and correlation matrices produced in each category. Seven categories were retained based on a theoretical structure of what the basketball rating scale was supposed to measure; that is, all-around basketball playing ability. Seventeen items were selected to represent the seven categories. For each category which yielded more than one factor, items were chosen which had relatively high factor loadings on the factor they defined and lower correlations with the other factors. Many items met this

criterion; therefore, the diversity of the content was considered in the selection of the items. In addition, many items with high interitem correlations loading on one factor had similar content. Consequently, these items were combined into one specific item to eliminate duplication and an attempt was made to keep the number of items to a minimum.

For each category which produced only one factor, items were chosen or combined based on their high interitem correlation or the similarity of content of the specific items. The reduced scale appears in Appendix F.

In category A (shooting ability and offensive moves), six statements were developed and included. Three factors were identified which related to a balanced body, proper arm position and hand release, gaining an offensive advantage and the description of a specific body position when shooting.

After examining factor number one (Table 9), the items which loaded high (above .60) appeared to have four different contents. One set of items (items 1, 4, 9, and 10) was related to accuracy of shooting with a balanced position of the body and the proper alignment of the shooting arm. These items also had high (above .71) interitem correlations. The statement, "she is accurate in her shooting with the proper alignment of the body and shooting arm," was developed to represent the aforementioned items. Another set of items (2, 5, 12 and 13) concerned the release of the ball and follow-through when shooting. Therefore, the statement, "when shooting, she has a smooth

balanced hand release and follow-through," was included in the shortened rating scale.

The third item, "she uses a variety of shots," was included because of its correlation (.65) with this factor. In addition to the comparatively high loading, it seemingly had a distinctive content which was unique to this explicit factor.

"The shooter can go both left and right to successfully get the shot started from the dribble," was the fourth item which met the criterion of a high factor loading (.63) on one factor and comparatively low loadings on the other factors (Appendix L). Furthermore, the essence of this statement purported to reveal a distinguishing characteristic which was the preparation to shoot contrasted with the actual performance of the shot.

The second factor of category A reflected a player gaining an offensive advantage. Items 15, 16, 17, 20, 21 and 23 all met the criterion of having relatively high factor loadings (.66 and above) on this factor and comparatively lower loadings (.47 and below) on the other factors. When one examined the interitem correlation among these items, the majority of the coefficients were above .70. In addition, the content of these items appeared to be similar, that is, the use of elusive maneuvers. Therefore, the statement, "she gains an offensive advantage by using evasive moves (fakes, cuts, pivots, dribbles)," was incorporated to depict the six items which loaded high on this factor.

Items 6 and 7 which loaded (above .64) on factor three of category A had loadings of .46 and less on the other two factors. The interitem correlation between these two items was .71 (Appendix E); therefore, these two items were combined into one negative statement, "the shooter takes shots when she is off balance and has not squared her body to the basket," to represent factor three of category A.

Category B (defensive moves and tactics) produced three factors (Table 10). For the abbreviated rating scale, three statements were used to represent the three factors within this category.

Items 1, 2, 9, 13, 14, 18, 19 and 20 loaded above .63 on this factor, however, items 1, 13, 14, 18 and 19 met the criterion of having a high loading (.69 and above) on this factor and smaller loadings (.42 and below) on the remaining two factors. The iteritem correlations among items 1, 18 and 19 were high (above .79) but statements 13 and 14 had lower coefficients with some of the above items. Hence, the statement, "she uses the appropriate defensive stance to counteract the opponents' movements on offense," was adopted to denote the first factor of category B. This factor appeared to describe individual defensive movements.

The items which loaded on the second factor seemed to be indicative of team defensive maneuvers. After examining the items, it was found that item 5 had a loading of .67 on this factor and a loading of .40 with the first factor. In addition, item 5 had iteritem correlations of .61 and lower with the remaining four items. Thus, this item was eliminated.

Item 6, "she crosses her feet when she is moving or shuffling on defense," had a loading of .62 on this factor which was not exceptionally high. Also, this item had loadings of .34 and .41 on factors one and three, respectively, which were not comparatively lower than the loading of this item on factor two; therefore, this item was eliminated.

Items 7, 8 and 15 had higher interitem correlations (.70 - .77) and also had improved loadings (.69 - .79) on this factor compared to the loadings on the other two factors. The ensuing statement, "she works efficiently as part of the total defensive team plan by being alert for possible interceptions and aiding teammates on defense," was utilized to represent factor two.

The third factor had one item which loaded above .60 and had low loadings on the other two factors. Therefore, item number 11 from the original scale was employed in the abbreviated scale in category B.

The category, "ball handling" produced two factors (Table 11). The first factor concerned the basic skill of dribbling and the second factor portrayed the ability to pass effectively.

Items 1, 2, 3, 4, 5, 7 and 8 had loadings of .70 and above on the first factor. In addition, these items had loadings of .35 and below on the other factor and the interitem correlations among these items were consistently above .67 with exceptions between items two and three (.61), three and four (.54) and four and eight (.53). Subsequently, the statement, "she executes the dribble with her head and shoulders up and keeps the ball from bouncing too high," was included to illustrate the body and the ball position when dribbling. Item number seven, "when dribbling the ball, she changes pace and direction

efficiently," had the highest loading on this factor, thus it was included with the addition of "using either hand."

Items 10, 13, 14 and 15 had high correlations (.80 - .88) on the second factor. After inspection of the interitem correlations, it was found that these coefficients ranged from .70 to .84. All of the statements had a high correlation (.74 - .84) with statements 13 and 15, thus the two statements were combined and adopted for the shortened rating scale. The accruing statement was, "her passes are accurate and relevant (lob, bounce, straight) to each situation."

In category D (rebounding), only one factor was extracted; therefore there was no rotation performed on this factor. It was difficult to interpret the original factor structure and the factor loadings were meaningless. However, an examination of the interitem correlations (Appendix E) was performed to determine if the statements were measuring the same thing or if there were any statements which had a discrepancy with the others. Most of the interitem correlations were relatively high (above .68) indicating agreement among the statements. Item twelve was an exception with the highest interitem coefficient of .61 among the remaining statements. Subsequently, two items were retained for this category. One item was developed to represent the first eleven statements which was, "she is consistent in acquiring the rebound." The second statement selected for the abbreviated scale in this category was the same as item number twelve in the original scale which was, "when rebounding, she consistently jumps over a positioned player."

Category E (speed and quickness) produced only one factor which was difficult to interpret. Nevertheless, if one examines the interitem correlations, one can see from inspection that most of these coefficients were relatively high (.65 and above). Again, there were two notable exceptions. Item five, "she maintains her quickness with the ball without causing a turnover," had comparatively lower interitem correlations (.32 - .70) than the remaining items. When the content was examined in these two statements, it reflected something somewhat different. In item five, the statement described a behavior regarding ball handling; in statement nine, the item described a rebounding position. Because of the content, these items were not considered for the revised scale in this category.

Item twelve had high interitem correlations (.81 and above) with all the items except number five, six and nine. Therefore this statement was used in the shortened rating scale with slight modifications. The revised statement was, "she maintains her weight on the balls of her feet enabling her to move quickly."

Category F (body control and balance) yielded one factor; therefore no rotation was possible. The correlation matrix revealed all interitem correlations were above .60. Since only one factor appeared and the interitem coefficients were relatively high, the statement, "she maintains body control and balance through the execution of proper footwork," was adopted to represent this category.

The seventh category, "general floor play" generated one factor. The correlation matrix revealed that item seven, "she is at the right

place at the right time consistently," had correlations of .62 and above between items. Because this statement showed substantial (.61 and above) intercorrelations with the remaining items, this one was utilized for the shortened rating scale. The seventeen items which were developed and adopted are found in Appendix F.

Third Phase

After the original scale had been reduced to seventeen items, the shortened scale was used to evaluate the basketball physical performance of high school girls in the 1975 South Dakota State "B" Tournament. Thirty-four players were rated utilizing the revised scale. The three judges rating the players were the same three who had rated the high school girls using the original 96-item scale. The raw scores of the judges ratings appear in Appendix G.

There were some missing data in the results of the judges' ratings. In order to utilize these results to determine the reliability and validity of the scale, missing values were estimated using a method developed by Yates as reported in Steele and Torrie (32:139-140). The estimated missing values are included in the enclosed sections of Appendix G.

Interjudge Reliability

To determine the degree of agreement among the judges utilizing the scale, Kendall's Coefficient of Concordance (12:313-315) was employed. The total scores (including estimated missing data) of each judge for every individual player were found. Each set of judges

scores were ranked from the lowest score to the highest score. The total scores and the rankings appear in Table 12.

Since the data indicated a numerous amount of ties, a correction factor was calculated. The formula utilized subsuming this correction factor was:

$$W = \frac{S}{\frac{1}{12} m^2 (N^3 - N) - m \leq T}$$

The coefficient of concordance or agreement among the three judges was found to be .86. With thirty-three degrees of freedom, the coefficient of .86 indicated a significant agreement among the judges at the .01 level.

Validity

To determine the criterion-related validity, a coefficient of correlation was calculated by finding the degree of relationship between the total scores of players. The total scores were found by summing the three judges scores for each player. The estimated missing values were included in this total. After the totals were computed, the scores were ranked from the highest total points to the lowest number of points each player received on the rating scale.

Two of the judges who had rated the players using the rating scale (working together) ranked the thirty-four players who had been evaluated from the best all-around player to the poorest all-around player. This ranking became the criterion to be used for determining the validity of the finalized scale.

TABLE 12

JUDGES' SCORES AND RANKINGS
ON THE REDUCED SCALE
N = 34

Player	Total Scores Judges			Total Scores Judges' Rankings			Total of Rankings
	1	2	3	1	2	3	
1	37	30	40	6	7.5	16.5	30.0
2	33	28	35	3	4.5	12.0	19.5
3	49	39	43	20	15	18.5	53.5
4	41	31	30	10	9	2	21.0
5	34	23	27	4	1	1	6.0
6	32	27	31	2	3	4	9.0
7	40	34	34	9	10	9	28.0
8	48	47	46	16	22.5	21.5	60.0
9	51	42	38	24.5	18	14	56.5
10	43	51	48	12	26	23.5	61.5
11	48	49	46	16	24	21.5	61.5
12	51	46	51	24.5	21	28	73.5
13	49	63	58	20	32.5	29.5	82.0
14	54	54	58	28.5	28.5	29.5	86.5
15	42	35	40	11	11	16.5	38.5
16	50	45	50	23	20	26.5	69.5
17	48	43	43	16	19	18.5	53.5
18	49	39	34	20	15	9	44.0
19	53	38	39	27	13	15	55.0
20	57	47	49	33	22.5	25	80.5
21	56	55	59	30.5	30	31	91.5
22	57	66	65	33	34	34	101.0
23	54	56	62	28.5	31	32	91.5
24	57	63	63	33	32.5	33	98.5
25	52	51	44	26	26	20	72.0
26	45	39	35	14	15	12	41.0
27	49	36	31	20	12	4	36.0
28	44	54	50	13	28.5	26.5	68.0
29	56	51	48	30.5	26	23.5	80.0
30	35	38	33	5	4.5	6.5	16.0
31	49	29	33	20	6	6.5	32.5
32	39	30	35	8	7.5	12	27.5
33	31	26	34	1	2	9	12.0
34	38	40	31	7	17	4	28.0

Spearman's Coefficient of Rank Correlation method was used to determine the degree of relationship between the two variables. The coefficient obtained was .65. The observed value of .65 was significant at the .01 level and was significantly different from zero.

The total number of points scored by each player during the three games played during the tournament was also acquired. This information is found in Appendix H. Although this information was not considered the primary criterion, a coefficient of correlation was calculated between these scores and the judges' total scores. Each total score was ranked from the highest to the lowest. Again, Spearman's Rank Correlation method was employed. The coefficient obtained was .67.

Discussion

The reduction of the original 96-item scale to a seventeen-item scale was not completely successful with the factorial approach. Since a sufficient number of factors were not produced in each category, a complete factorial method was not utilized to develop the shortened rating scale. Two subsidiary methods were used to supplement the factorial approach because of the lack of information produced by the factor analysis on the data which had been acquired. Each item in the original scale was subjected to a content analysis to determine if the statements were similar or diverse in meaning. This was a judgmental appraisal by the investigator. Finally, an interitem examination was accomplished to statistically determine if the items were homologous.

It appears that the factorial method could be a creditable approach for the development of a rating scale. However, such a

technique necessitates obtaining a larger amount of data. If more data were acquired, the factor analysis process applied across categories in the theoretical structure might support this structure as originally proposed by the author. As Liba and Safrit contend,

> There must be a beginning and since, in general, there is no complete a priori information about the nature of the domain or there would be no need for factor analytic exploration, whatever small segment is chosen for study should begin to add to substantive knowledge about the larger domain of concern. (22:144)

The interjudge reliability of the shortened scale was .86 which was significant at the .01 level. The resulting reliability estimate might have been due to the homogeneity of the sample, therefore decreasing the value of the coefficient. Consequently, interjudge reliability should be studied utilizing samples which are heterogeneous in skill performance.

The reliability of the scale itself is not known. It was impractical to obtain re-ratings by the three judges because of the judging situation. However, the rating scale does provide a framework in which judges can work more systematically. The procedure for estimating the reliability of a rating scale, such as the one which was developed for this study, should be investigated further.

The criterion-related validity of the scale was .65. The result of this estimate might have been due to the adequacy of the criterion which was a subjective ranking. Because of the fallibility of the criterion measure, it is the opinion of the author that different criterion measures should be used in attempting to estimate the criterion-related validity.

CHAPTER V

CONCLUSIONS

Summary

The intent of this study was to develop a rating scale for use in evaluating girls' and women's physical performance in a basketball game situation. To accomplish that purpose, a theoretical structure of basketball performance was developed by identifying seven categories of basketball performance. A 96-item rating scale was designed which purportedly represented the seven categories: shooting ability and offensive moves, defensive moves and tactics, ball handling, rebounding, speed and quickness, body control and balance, and general floor play. The identification of the seven categories was based on an investigation of the literature, interviews with coaches and physical educators and observations of individual players. The original 96-item rating scale was utilized to evaluate the performance of thirty-eight inter-scholastic and intercollegiate female basketball players. Two sets of three judges (women basketball coaches) used the scale to rate the players.

Judges' responses in the form of numerical ratings of the actual performances of basketball players in competitive situations were factor analyzed. The principal factoring with iteration technique was executed and the varimax rotation method was employed to simplify the factor structure. The SPSS program was run at the University of North Carolina, Greensboro at the computer center.

The 96-item scale was reduced to seventeen items by a selection process which acknowledged factor loadings, interitem correlations and diversity and similarity of content. The items which were developed for the abbreviated scale had relatively high loadings on those factors they were selected to define and relatively low correlations on the remaining factors. For the categories which produced only one factor, items were constructed based on the high interitem correlations and similarity of content.

The reduced scale was further used by a set of three judges to evaluate thirty-four interscholastic female basketball players. The results of this rating were used to estimate the interjudge reliability of the scale and obtain results for the criterion-related validity coefficient.

To estimate the interjudge reliability, Kendall's Coefficient of Concordance was utilized. The interjudge reliability estimate for the finalized scale was .86 which was significant at the .01 level.

To examine the criterion-related validity, judges' total scores of each individual player from the ratings on the finalized scale were correlated with a subjective ranking of the individual players by two judges. Spearman's Coefficient of Rank Correlation was used to determine the coefficient. The sequential criterion-related estimate was .65 which was significant at the .01 level.

Conclusions

The primary purpose of this research was to develop a valid and reliable rating scale to evaluate the basketball performance of girls

and women participating in a competitive situation. This was accomplished by showing that the reduced scale did have substantial interjudge reliability and criterion-related validity.

The second problem was to identify specific items for evaluating basketball skill in a competitive situation. Based on a literature search, the identification of items for evaluating basketball performance in a game situation was achieved for the original 96-item scale. The selection of items for the reduced scale was based on the results produced from the factor analysis of the results of the original scale, the interitem correlations and the similarity of content. Although the factor analysis did aid in the selection of items within categories for collapsing the components of play into a usable and practical rating scale, it was not used to substantiate the original seven-category structure. The results of this study indicate that more data must be acquired to use the factor analysis technique to support the theoretical structure which was developed. Additional exploration and research is required to confirm this supposition.

Recommendations

The factor analytic technique for the construction of a rating scale merits further investigation. Recommendations for future study include:

(1) The acquisition of more data on the original 96-item scale to increase the size of the sample. With a larger N, it might be possible to factor analyze the complete 96-item scale to determine if the results corresponded to the original theoretical structure.

(2) The factoring of the reduced scale to determine if the factor structure was similar to the one based on the factor analysis of the original independent categories of the 96-item results.

(3) The acquisition of data of different age and ability groups of performers to determine if a factor analytic technique produces similarity of factor structures between the groups concerning the performances of basketball players.

(4) The application of a different factor model and method of rotation. Perhaps, a canonical or alpha factor analysis with an orthogonal and an oblique solution would provide more information.

(5) The construction of rating scales for the evaluation of performances in other sport areas by utilizing factor analytical techniques.

(6) The attempt to determine the reliability of the original and the shortened rating scale by systematic investigations.

(7) The attempt to resolve the problem of selecting an infallible criterion to estimate criterion-related validity.

BIBLIOGRAPHY

BIBLIOGRAPHY

BOOKS

1. AAHPER Basketball Skills Test Manual for Boys, (David K. Brace, Consultant). Washington, D.C.: American Association for Health, Physical Education and Recreation, 1966.

2. AAHPER Basketball Skills Test Manual for Girls, (David K. Brace, Consultant). Washington, D.C.: American Association For Health, Physical Education and Recreation, 1966.

3. Aiken, L. R. Jr. Psychological and Educational Testing. Boston: Allyn and Bacon, Inc, 1971.

4. Barnes, M. J. Women's Basketball. Boston: Allyn and Bacon, Inc, 1972.

5. Barrow, H. M. & Mc Gee, R. A Practical Approach to Measurement in Physical Education (2nd Ed.). Philadelphia: Lea and Febiger, 1971.

6. Baumgartner, D. Techniques for Great Outside Shooting. Richmond, Indiana: Dick Baumgartner, Inc, 1972.

7. Baumgartner, T. A. & Jackson, A. S. Measurement for Evaluation in Physical Education. Boston: Houghton Mifflin Company, 1975.

8. Bell, M. M. Women's Basketball (2nd Ed.). Dubuque, Iowa: Wm. C. Brown Company Publishers, 1973.

9. Cooley, W. W. & Lohnes, R. R. Multivariate Data Analysis. New York: John Wiley and Sons, Inc, 1971.

10. Cousy, B. & Power, F. G., Jr. Basketball Concepts and Techniques. Boston: Allyn and Bacon, Inc, 1970.

11. Eckert, H. M. Practical Measurement of Physical Performance. Philadelphia: Lea and Febiger, 1974.

12. Ferguson, G. A. Statistical Analysis in Psychology and Education (3rd Ed.). New York: McGraw-Hill Book Company, 1971.

13. Franks, B. D. & Deutsch, H. Evaluating Performance in Physical Education. New York: Academic Press, 1973.

14. Haskins, M. J. Evaluation in Physical Education. Wm. C. Brown Brown Company, 1971.

15. Hobson, H. A. Scientific Basketball for Coaches, Players, Officials, Spectators and Sportswriters. (2nd Ed.). New York: Prentice-Hall, Inc, 1955.

16. Howard, G. W. A Measurement of the Achievement in Motor Skills of College Men in the Game Situation of Basketball. New York: Bureau of Publications, Teachers College, Columbia University, 1937.

17. Jackson, D. N. & Messick, S., (Eds.). Problems in Human Assessment. New York: McGraw-Hill Book Company, 1967.

18. Kalich, R. A. The Basketball Rating Handbook. New York: A. S. Barnes and Company, 1969.

19. Kerlinger, F. N. Foundations of Behavioral Research. New York: Holt, Rinehart and Winston, Inc, 1965.

20. _____. Foundations of Behavioral Research. (2nd Ed.). New York: Holt, Rinehart and Winston, Inc, 1973.

21. Kim, J. Factor Analysis. "In Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K. & Bent, D. H. Statistical Package for the Social Sciences. New York: McGraw-Hill, 1975."

22. Liba, M. R. & Safrit, M. J., Forms and Functions of Factor Analysis. Brown, R. C. & Cratty, B. J., New Perspectives of Man in Action. Englewood Cliffs, New Jersey: Prentice-Hall, Inc, 1969.

23. Mathews, D. K. Measurement in Physical Education. (4th Ed.). Philadelphia: W. B. Saunders Company, 1973.

24. McGuire, F. Defensive Basketball. Englewood Cliffs, New Jersey: Prentice-Hall, Inc, 1959.

25. _____. Team Basketball: Offense and Defense. Englewood Cliffs, New Jersey: Prentice-Hall, Inc, 1966.

26. Montoye, H. J. (Ed.). An Introduction to Measurement in Physical Education. Indianapolis, Indiana: Phi Epsilon Kappa Fraternity, 1970.

27. Neal, P. Basketball Techniques for Women. New York: Ronald Press Company, 1966.

28. Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., & Bent, D. H. Statistical Package for the Social Sciences. (2nd Ed.). New York: McGraw Hill, 1975.

29. Rummel, R. J. Applied Factor Analysis. Evanston: Northwestern University Press, 1970.

30. Safrit, M. J. Evaluation in Physical Education. Englewood Cliffs, New Jersey: Prentice-Hall, Inc, 1973.

31. Sheehan, T. J. An Introduction to the Evaluation of Measurement Data in Physical Education. Reading, Massachusetts: Addison-Wesley Publishing Company, 1971.

32. Steel, R. G. D. & Torrie, J. H. Principles and Procedures of Statistics. New York: McGraw-Hill, 1960.

33. Tucker, L. R. The Extension of Factor Analysis to Three-Dimensional Matrices. "In Frederiksen, N. & Gullikson, H., (Eds.), Contributions to Mathematical Psychology. New York: Holt, Rinehart, and Winston, Inc, 1964.

34. Winer, B. J. Statistical Principles in Experimental Design. (2nd Ed.). New York: McGraw-Hill, 1971.

35. Wooden, J. R. Practical Modern Basketball. New York: Ronald Press Company, 1966.

PERIODICALS

36. Abeles, H. F. A Facet-Factorial Approach to the Construction of Rating Scales to Measure Complex Behaviors. Journal of Educational Measurement, 1973. 10, 145-151.

37. Butt, D. S. & Fiske, D. W. Comparison of Strategies in Developing Scales for Dominance. Psychological Bulletin, 1968. 70, 505-519.

38. Campbell, J. P., Dunnette, M. D., Arvey, R. D., & Hellervik, L. V. The Development and Evaluation of Behaviorally Based Rating Scales. Journal of Applied Psychology, 1973. 57, 15-22.

39. Durrant, S. M. An Analytical Method of Rating Synchronized Swimming Stunts. The Research Quarterly, 1964. 35, 126-134.

40. Edgren, H. D. An Experiment in the Testing of Ability and Progress in Basketball. The Research Quarterly, 1932. 3, 159-171.

41. Elbel, E. R. & Allen, F. C. Evaluating Team and Individual Performance in Basketball. The Research Quarterly, 1941. 12, 538-555.

42. Fox P. S. & Usilander, H. Ball-Handling Specifics. Scholastic Coach, 1963. 33, 42-44.

43. Glass, G. V. & Taylor, P. A. Factor Analytic Methodology. Review of Educational Research, 1966. 36, 566-587.

44. Hartley, J. W. & Fulton, C. Mechanical Analysis of the Jump Shot. Athletic Journal, 1971. 51, 92+.

45. Hase, H. D. & Goldberg, L. R. Comparative Validity of Different Strategies of Constructing Personality Inventroy Scales. Psychological Bulletin, 1967. 67, 231-248.

46. Hoyt, C. Test Reliability Estimated by Analysis of Variance. Psychometrika, 1941. 6, 153-160.

47. Kroll, W. A Note on the Coefficient of Intraclass Correlation as an Estimate of Reliability. The Research Quarterly, 1962. 33, 313-316.

48. Lawshe, C. H., Jr. & Maleski, A. Studies in Job Evaluation. 3. An Analysis of Point Ratings for Salary Paid Jobs in an Industrial Plant. Journal of Applied Psychology, 1946. 30, 117-128.

49. _____ & Wilson, R. F. Studies in Job Evaluation. 5. An Analysis of the Factor Comparison System as it Functions in a Paper Mill. Journal of Applied Psychology, 1946. 30, 426-434.

50. _____. Studies in Job Evaluation. 6. The Reliability of Two Point Rating Systems. Journal of Applied Psychology, 1947. 31, 355-365.

51. _____, Dudek, E. E., & Wilson, R. F. Studies of Job Evaluation. 7. Factor Analysis of Two Point Rating Methods of Job Evaluation. Journal of Applied Psychology, 1948. 32, 118-129.

52. Lehsten, N. A Measure of Basketball Skills in High School Boys. The Physical Educator, 1948. 5, 103-109.

53. Lorr, M., Rubinstein, E., & Jenkins, R. L. A Factor Analysis of Personality Ratings of Outpatients in Psychotherapy. The Journal of Abnormal and Social Psychology, 1953. 48, 511-514.

54. McCatty, C. A. M., Romeiko, S., & Campbell, R. Performance Rating in Three Aquatic Strokes. Journal of the Canadian Association for Health, Physical Education and Recreation, 1971. 37, 10-14 + 44.

55. Miller, W. K. Achievement Levels in Basketball Skills for Women Physical Education Majors. The Research Quarterly, 1954. 25, 450-455.

56. Ryans, D. G. A Study of Criterion Data (A Factor Analysis of Teacher Behaviors in the Elementary School). Educational and Psychological Measurement, 1952. 12, 333-344.

57. Schwartz, H. Knowledge and Achievement Tests in Girls' Basketball on the Senior High School Level. The Research Quarterly, 1937. 8, 143-153.

58. Smith, P. C., & Kendall, L. M. Retranslation of Expectations: An Approach to the Construction of Unambiguous Anchors for Rating Scales. Journal of Applied Psychology, 1963. 47, 149-155.

59. Voltmer, E. F. & Watts, T. A Rating Scale of Player Performance in Basketball. The Journal of Health and Physical Education, 1940. 11, 94-95 + 123-124.

60. Vroom, G. A. & Nixon, J. E. Fundamental Basketball Skills of College Freshmen. Athletic Journal, 1956. 36, 16 + 53.

61. Wilson, R. The Physical Educator as Evaluator. Quest, 1966 (Monograph VII).

62. Wright, L. & Wright, P. K. An Instrument for Evaluation of Skill in Women's Physical Education Classes. The Research Quarterly, 1964. 35, 69-74.

63. Young, G. & Moser, H. A Short Battery of Tests to Measure Playing Ability. The Research Quarterly, 1934. 5, 3-23.

UNPUBLISHED MATERIALS

64. Ammons, M. Evaluation: What Is It? Who Does It? When Should It Be Done? (Himeographed) University of Wisconsin, [n.d.]

65. Clayton, C. Basketball Rating Scale. (Mimeographed) University of North Carolina, [n.d.]

66. Cracraft, J. D. A Basketball Bibliography of Books, Selected Periodical Articles, Unpublished Theses and Dissertations, and Films Produced from July 1, 1957 through June 30, 1968 Including Annotations and Comments on Selected Materials. Unpublished Master of Arts Thesis, Sacramento State College, 1968.

67. Cunningham, P. Measuring Basketball Playing Ability of High School Girls. Unpublished Doctoral Dissertation, University of Iowa, 1964.

68. Edwards, J. M. A Study of Three Measures of the Tennis Serve. Unpublished Master of Science Thesis, University of Wisconsin, 1965.

69. Harrison, E. R. A Test to Measure Basketball Ability for Boys. Unpublished Master of Arts Thesis, University of Florida, 1969.

70. Hill, L. J. Determining Basketball Ability Through the Use of a Basketball Skill Test. Unpublished Master of Science Thesis, State College of Washington, 1956.

71. Hosinski, J. P. An Investigation of the Use of Computer Assisted Instruction in Teaching the Shuffle Offense in Basketball. Unpublished Doctoral Dissertation, Florida State University, 1965.

72. Jackson, P. L. A Rating Scale for Discriminating Relative Playing Performance of Skilled Female Volleyball Players. Unpublished Masters of Arts Thesis, The University of Alberta, 1967.

73. Lambert, A. T. A Basketball Skill Test for College Women. Unpublished Master of Science Thesis, University of North Carolina, 1969.

74. Leilich, A. R. The Primary Components of Selected Basketball Tests for College Women. Unpublished Doctoral Dissertation. Indiana University, 1952.

75. Squibb, D. D. Evaluation of Basketball Player Combinations by Use of the Offensive and Defensive Efficiency Rating System. Unpublished Master of Science Thesis, South Dakota State University, 1971.

76. Walter, R., Jr. A Comparison Between Two Selected Evaluative Techniques for Measuring Basketball Skill. Unpublished Master of Science Thesis, Western Illinois University, 1968.

77. Yow, K. Identification of Elements in Defensive Rebounding. (Mimeographed) University of North Carolina, (n.d.)

APPENDICES

APPENDIX A

BASKETBALL RATING SCALE

NAME OF PLAYER _____

Key to Rating Scale

HA Highly Agree the statement is descriptive of the player.

A Slightly Agree the statement is descriptive of the player.

NN Neither Disagree nor Agree the statement is descriptive of the player.

D Slightly Disagree the statement is descriptive of the player.

HD Highly Disagree the statement is descriptive of the player.

Please choose only one response to each statement.

Please attempt to answer every statement.

Place a check (✓) mark in the space which corresponds to your judgment.

The N found in front of several statements indicates a negative statement.

NAME OF RATER _____

Shooting Ability and Offensive Moves

	HA	A	NN	D	HD
1. She consistently uses an effective alignment of the shooting arm, hand, and wrist in relationship to the feet and the rest of the body.					
2. She shoots the ball easily to the basket with a smooth and balanced hand release.					
3. She keeps her head level, straight over the center of gravity and base of support.					
N4. The player pushes the ball toward the basket primarily with her shooting elbow.					
5. The shooter permits the ball to roll off her fingers toward the basket.					
6. The shooter attempts to square her body toward the basket as she is shooting.					
N7. The shooter takes shots when she is off balance.					
N8. The shooter takes poor shots.					
9. She executes a shot with a smooth, continuous, balanced motion.					
10. She is consitently accurate in her shooting.					
11. In executing a lay-up shot, she shoots accurately with either hand.					
12. She has a soft, natural backspin on the ball when shooting.					
13. She has a smooth, continuous follow-through.					

Name of Player _____

Shooting Ability and Offensive Moves (Con't.)

	HA	A	NN	D	HD
14. She uses a variety of shots.					
15. When preparing to shoot, she utilizes fakes to be in a position for the high percentage shot.					
16. She continually uses evasive (fakes, cuts) maneuvers to free herself from an opponent.					
17. She coordinates her motions with other team members and uses meaningful and evasive moves when she does not have possession of the ball.					
18. The shooter can go both left and right to successfully get the shot started from the dribble.					
19. She goes to meet the ball for a pass reception.					
20. She uses the pivot to gain an offensive advantage.					
21. She uses the dribble to draw the opponents out of a good defensive position.					
22. She uses screens effectively to gain an offensive advantage.					
23. She moves quickly into a position to aid a teammate under defensive pressure.					

Defensive Moves and Tactics

		HA	A	NN	D	HD
	1. In her initial stance and as she moves with her opponent on defense, she bends her knees to bring her body into a good defensive position.					
	2. Her defensive stance (static or dynamic) is effective for the performance of counteracting the opponent's movements.					
	3. She keeps the trunk of her body erect when guarding an offensive player.					
	4. She utilized slide steps for maintaining the path of her defensive action relative to the path of her opponent's action.					
	5. She avoids losing sight of the ball when guarding an opponent without the ball.					
N	6. She crosses her feet when she is moving or shuffling on defense.					
	7. She works efficiently as part of the total defensive team plan.					
	8. She is alert to help teammates on defense.					
	9. She aids her teammates on defense by constantly giving verbal cues.					
N	10. She allows her opponent to drive past her into an easy scoring position.					
	11. She blocks attempted shots by her opponent.					
	12. She maintains a defensive position which prevents the opponent from driving around her.					

Name of Player _____

Defensive Moves and Tactics (Con't)	HA	A	NN	D	HD
13. She consistently moves around a screen or slides through successfully.					
N 14. She allows herself to be screened by an opponent.					
15. She is consistently alert for possible interceptions.					
16. She forces her opponent to hurry her passes.					
N 17. She leaps into the air when an opponent fakes a shot or a pass.					
18. She causes the offensive player to dribble the ball to the least advantageous position.					
19. She forces her opponent, without the ball, to a less dangerous scoring area.					
20. She constantly applies defensive pressure throughout the game.					

Name of Player _____

Ball Handling

		HA	A	NN	D	HD
1.	Her head and shoulders are up when dribbling.					
2.	When closely guarded, she dribbles the ball keeping her body between the defender and the ball.					
N 3.	She loses the ball because of rule violations (illegal dribble, traveling).					
4.	When closely guarded, she dribbles the ball successfully with either hand.					
N 5.	Her eyes are on the ball when dribbling.					
N 6.	She tends to waste the dribble by bouncing the ball as soon as she gains possession of it.					
7.	When dribbling the ball, she changes pace and direction efficiently.					
N 8.	When dribbling the ball, she allows it to bounce too high.					
9.	When receiving a pass, she keeps her eyes on the ball until the ball is in her hands.					
N 10.	She loses the ball to her opponents because of poor passes.					
11.	She is able to penetrate the defense with well-executed, deceptive passes.					
12.	Her passes are sharp and crisp.					
13.	Her passes are accurate.					
14.	Her passes are to a space away from the opponent.					
15.	Her passes are relevant (lob, bounce, straight) to each situation.					

Name of Player _____

Rebounding (Offensive and Defensive)	HA	A	NN	D	HD
1. She is active in attempting to gain position for a rebound.					
2. On defense, she "boxes out" her opponent immediately after a shot has been taken.					
3. As a prime rebounder, she attempts to move around the defensive person into position to obtain an offensive rebound.					
N 4. She passes immediately to the outside after retrieving an offensive rebound.					
5. On defense, she assumes a wide, balanced stance to provide a broad coverage of the rebound area.					
6. She jumps and reaches to retrieve a rebound.					
7. When rebounding, the timing of her jump brings her in contact with the ball at the highest point of her jump.					
N 8. She allows her opponent to force her too far under the basket for a good rebounding position.					
9. She grasps the ball solidly with both hands when rebounding.					
10. After a successful rebound, she protects the ball with her body.					
11. After rebounding the ball, she lands with her knees bent, feet wide apart and weight balanced.					
N 12. When rebounding, she consistently jumps over a positioned defender.					

Name of Player _____

Speed and Quickness	HA	A	NN	D	HD
1. She starts quickly.					
2. She stops, changes pace and direction quickly.					
3. She establishes her initial defensive position quickly.					
4. On defense, she reacts quickly to her opponent's changes of pace and direction.					
5. She maintains her quickness with the ball without causing a turnover.					
6. She maintains her speed and quickness throughout the game.					
7. She uses her hands and arms quickly and efficiently.					
8. She has good straightaway speed with and without the ball.					
9. She moves quickly to a good rebounding position.					
10. She changes from an offensive position back into a defensive position quickly.					
11. She changes from a defensive position back into an offensive position quickly.					
12. She stays on the balls of her feet enabling her to move quickly.					

Name of Player _____

Body Control and Balance

		HA	A	NN	D	HD
1.	She changes direction quickly without losing her balance.					
N 2.	She bumps into other players because of the inability to stop or change direction quickly.					
N 3.	She lunges at her opponent when playing defense.					
N 4.	Her movements are stiff and jerky.					
5.	She maintains good body balance when playing defense.					
6.	She has good footwork enabling her to start and stop quickly.					
N 7.	She reaches for the ball instead of getting into a good position.					

Name of Player _____

General Floor Play

	HA	A	NN	D	HD
1. She sees the entire court, both defensively and offensively.					
2. She synchronizes her efforts with the rest of the team.					
3. She gears her efforts toward team play.					
4. She has good stamina, endurance and consistency.					
5. She has good over-all execution of basic fundamentals.					
6. She adjusts quickly to offensive and defensive changes with the correct counteracting actions.					
7. She is at the right place at the right time consistently.					

Name of Player _____

APPENDIX B

INSTRUCTIONS TO RATERS

The purpose of this study is to develop a rating scale which can be used to evaluate a player's physical performance in a game situation. The original scale (this one--the one you are to use) has 96 items which you will use to evaluate each player's performance. After collecting this data, a factor analysis technique will be used to determine the relevant factors to analyze the items which have the high factor loadings. From this information, the scale will be reduced and only the items with the high factor loadings will be retained for the final rating scale. Hopefully, a rating scale can be developed which can be utilized efficiently, easily and quickly for evaluating a player's physical performance.

The items in this rating scale have been developed to evaluate only a player's physical performance. There are also other affective factors involved when evaluating a player, but that is not the purpose of this scale.

Seven factors have been indicated for evaluating a player's physical performance. They are: shooting ability and offensive moves, defensive moves and tactics, speed and quickness, ball handling, rebounding, body control and balance and general floor play. The statistical treatment of the data may indicate these are important or it may indicate there are other factors which are as important.

The statements have been phrased both negatively and positively. The N in front of several of the statements indicates a negative statement. The responses to each item range from "highly agree" that the statement is descriptive of the performer to "highly disagree" that the statement is descriptive of the player. You are to check the category which describes the player's physical performance, according to your judgment. For example, number one under shooting ability and offensive moves: If a player is accurate in her shooting all of the time, you would check HA, "highly agree," because the statement is descriptive of the player's performance. If a player is accurate most of the time, you would check A, "agree," because the statement is descriptive of how she performs most of the time. If the player is accurate occasionally, you would check D, "disagree," because the statement is descriptive of her performance part of the time. If the player is never accurate, you would check HD, "highly disagree," because the statement is never descriptive of the player. A negative statement involves the same process, but in reverse. For example, number five under ball handling: If the player's eyes are always on the ball when she is dribbling, you would check HA, "highly agree," because the statement describes exactly how she performs the skill. If the player's eyes are on the ball most of the time, but not all of the time, you would check A, "agree," because the statement describes how she performs part of the time. If the player's eyes are on the ball occasionally, you would check D, "disagree," because this does not describe her performance most of the time. If the player's eyes

are never on the ball when she is dribbling, you would check HD, "highly disagree," because the statement is never descriptive of her performance. If possible, attempt to use the first two or the last two categories.

You may take as long as you feel is important in completing the rating scale. Please do not consult any of the other judges when completing the rating scale.

Please read over each statement carefully. When you feel you can make a judgment concerning a player's performance on any one of the items, as accurately as possible describe the performance by checking the appropriate category.

APPENDIX C

RAW SCORES
(First Rating - Collegiate Players)
N = 14

Player	Judge	Scores
1	1	4 4 4 4 2 2 4 4 3 4 4 4 4 4 4 4 5 4 4 4 5 5 4 5 5 4 4 4 5 4 4 5 5 4 4 4 4 5 5 4 4 4 5 5 5 4 5 4 4 5 5 4 4 4 4 4 4 4 4 4 3 5 4 4 3 5 4 4 4 4 5 5 5 4 4 5 4 5 4 5 5 5 5 5 5 5 5 4 4 5 4 4 5 5 5 5 5
1	2	4 4 4 4 5 2 4 4 4 2 4 4 2 2 4 2 2 2 4 2 2 2 4 4 4 4 4 2 4 4 2 4 2 4 2 4 4 4 4 4 4 4 4 4 4 4 5 5 4 5 4 2 4 3 2 2 2 4 4 4 4 4 4 5 2 4 4 2 4 5 5 5 4 2 4 4 5 4 4 4 5 4 5 4 4 4 4 4 4 4 4 4 4 4 4
1	3	5 4 4 5 5 5 4 4 4 4 4 5 4 5 5 5 4 5 4 4 4 5 4 5 4 4 5 4 4 4 5 5 4 4 4 4 4 4 4 2 4 4 4 5 5 4 5 5 5 5 4 4 2 4 4 4 2 4 4 4 3 5 5 5 5 5 4 5 5 4 5 5 5 5 4 5 5 5 5 5 5 5 5 5 5 4 5 5 5 5 5 5 5 5 5 5
2	1	5 5 4 5 5 4 5 5 5 5 4 5 4 5 5 5 4 5 5 5 5 5 4 4 4 4 3 4 4 4 4 4 3 4 4 4 3 3 4 4 4 4 4 4 4 3 4 4 3 4 4 4 4 4 4 4 4 4 3 3 4 4 4 3 4 4 4 4 4 4 4 4 4 3 4 4 2 3 4 4 4 4 4 5 5 4 4 4 4 4 4 5 4 4 4
2	2	5 5 5 5 5 5 4 4 5 4 2 5 5 4 4 4 4 2 2 4 2 4 4 4 5 4 5 5 5 4 5 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 5 5 4 4 5 5 5 4 4 4 4 5 4 5 4 4 4 4 5 4 5 4 4 2 2 4 4 4 4 5 4 5 5 5 5 4 5 5 5 5 4 5 5 5 5 4 4 4 5
2	3	4 5 5 4 5 4 4 4 4 4 4 5 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 2 4 4 2 4 3 2 4 4 4 3 4 4 4 4 4 5 4 4 5 5 4 4 4 4 4 4 4 4 4 4 4 4 5 4 4 5 5 4 5 5 4 4 2 4 2 3 3 4 2 4 4 4 4 4 5 5 5 4 4 4 4 4 5 5 4 4 4
3	1	2 4 4 4 4 2 4 4 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 5 4 4 5 4 5 4 4 4 4 3 4 4 4 5 4 4 4 4 5 5 5 5 5 5 5 5 5 4 4 4 4 4 4 4 5 5 5 4 5 5 5 5 4 5 5 5 5 5 5 5 5 4 5 5 4 4 5 5 5 5 4
3	2	4 5 5 5 5 5 4 4 5 5 2 5 5 4 5 5 4 5 2 5 4 4 4 5 5 4 5 5 5 2 2 4 4 3 4 4 4 5 4 4 4 4 4 5 5 4 4 4 4 5 5 4 4 4 4 2 4 4 4 2 3 4 2 4 4 4 4 4 4 4 5 5 4 4 2 5 5 5 3 5 5 5 5 5 4 5 4 5 2 4 4 4 5 5 5 4

Player	Judge	Scores
3	3	4 4 4 4 4 4 4 4 4 4 5 5 4 4 4 5 5 5 5 4 4 4 4 5 4 4 5 4 5 4 4 2 4 3 4 4 4 4 4 2 4 4 4 5 5 4 5 5 5 4 5 4 2 4 4 4 4 4 3 4 3 3 4 4 4 3 4 5 5 5 4 5 4 4 4 4 5 5 4 5 5 5 5 5 5 5 4 4 4 4 5 5 5 5 5 4
4	1	4 4 4 5 4 4 5 5 4 4 4 4 4 4 4 4 4 3 4 4 3 4 4 4 4 4 4 4 5 4 4 4 4 5 4 4 4 4 4 4 2 2 4 4 4 4 3 4 4 4 4 4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 4 4 4 4 4 2 4 4 5 4 4 4 4 5 5 5 4 4 4 4 4 5 2 4 4 4
4	2	4 5 4 5 5 5 4 5 4 4 2 4 5 4 4 2 2 4 2 4 3 4 4 4 4 4 5 5 4 4 2 2 5 4 4 4 4 4 4 2 4 2 4 2 4 4 5 5 2 4 4 4 4 4 2 4 4 4 2 4 4 5 5 2 4 4 5 4 4 3 4 2 2 4 4 2 4 2 2 4 4 4 4 4 4 2 4 4 4 4 3 4 4 2
4	3	4 4 4 4 5 4 4 4 4 4 5 5 4 4 4 4 4 4 5 4 4 5 5 5 4 4 5 4 4 5 5 4 4 4 4 4 4 4 4 4 3 4 4 4 4 4 4 5 4 4 4 4 4 5 4 4 4 5 5 5 5 5 5 4 5 4 5 5 4 4 4 4 4 4 4 4 4 4 5 5 4 4 5 5 5 5 4 5 4 5 5 4 4 5 4
5	1	4 4 4 5 4 4 5 5 4 4 2 4 4 4 5 5 5 2 5 5 5 5 5 4 4 4 4 2 5 4 4 3 4 3 4 4 4 5 4 4 4 4 4 5 5 5 2 5 4 4 5 4 4 4 4 4 4 4 5 5 5 4 4 5 4 5 3 5 5 5 5 5 5 5 5 4 5 4 4 4 5 5 5 5 4
5	2	4 4 4 3 4 4 4 4 2 4 1 2 2 4 5 5 4 4 4 4 4 4 4 4 4 4 5 4 5 4 4 4 5 2 4 4 4 4 4 4 4 4 4 4 4 4 4 1 4 4 4 4 4 4 4 4 4 4 2 2 4 4 3 2 4 5 4 4 4 4 4 3 5 5 5 4 2 4 4 5 3 5 5 5 5 5 4 5 4 5 4 4 4 4 5 4 5 4
5	3	5 4 5 4 5 5 4 4 4 4 5 5 4 4 4 4 4 2 5 4 4 4 5 4 4 5 4 4 4 4 4 2 4 2 4 4 4 4 3 4 3 3 4 4 5 4 2 5 5 4 5 4 2 3 4 4 4 4 3 5 3 4 4 4 4 5 4 4 4 5 5 5 4 2 4 4 4 5 4 5 5 4 4 5 5 5 4 4 5 4 4 4 4 4 4 4
6	1	5 5 5 5 5 5 4 4 5 5 3 5 5 4 2 2 2 3 3 2 2 4 3 4 4 4 4 2 5 2 2 2 2 3 2 2 2 2 2 4 2 2 2 4 4 4 3 4 4 4 4 4 4 4 4 4 4 4 2 2 2 4 3 2 2 3 2 4 3 3 4 4 4 3 4 4 2 4 5 4 3 2 3
6	2	4 4 5 5 5 4 4 4 4 4 4 4 5 4 5 4 4 4 4 5 4 4 4 2 2 4 4 4 5 4 2 2 4 2 4 2 4 2 2 4 2 2 2 4 4 4 4 5 4 4 4 4 4 4 4 4 4 4 2 2 4 2 2 2 4 4 4 4 4 2 2 2 2 2 2 4 2 2 2 2 4 2 4 4 5 2 2 4 5 4 5 2 4 2 2
6	3	4 4 4 4 5 5 4 4 4 4 5 5 4 4 4 4 2 4 4 4 4 4 2 4 4 2 3 4 4 2 2 4 2 3 2 4 2 4 3 3 3 4 4 4 4 4 5 4 4 4 4 4 4 5 5 4 5 5 5 4 5 5 5 4 4 4 4 2 2 4 2 4 4 4 2 2 5 5 3

Player	Judge	Scores
7	1	4 4 3 5 4 4 5 5 4 4 4 4 4 2 4 4 4 3 4 4 4 4 4 4 5 5 5 4 5 5 5 4 5 3 5 5 4 4 4 5 4 4 5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 5 5 4 4 5 5 5 5 5 5 5 4 4 5 5 4 4 4 4 5 5 5 5 4 5 5 5 5 4 5 4 5 5 5 4 5 4
7	2	4 4 4 3 4 4 4 4 4 2 2 4 2 2 2 2 2 2 2 2 4 2 2 2 2 3 4 2 4 4 2 2 4 1 2 2 4 4 4 4 2 2 2 4 4 4 4 4 4 4 4 4 4 2 4 2 4 2 4 4 4 4 4 4 4 4 4 4 4 4 2 2 2 2 2 2 4 4 2 4 4 4 4 2 4 5 4 2 4 4 2 4 4 2 2 4 2
7	3	4 4 4 4 4 4 4 4 4 4 4 4 5 4 4 4 4 4 5 5 4 4 4 4 5 4 4 2 4 3 4 4 4 4 4 4 2 4 5 4 5 4 5 4 5 4 5 4 4 4 4 4 4 4 4 5 4 5 4 4 5 5 4 5 5 5 5 5 4 5 5 5 4 4 4 4 4 4 5 5 4 4 4 5 4 4 4 4 4 4
8	1	3 3 2 5 4 4 2 3 2 2 3 2 2 2 2 2 2 2 2 3 2 3 2 2 2 3 4 2 4 3 2 2 2 4 2 2 2 2 2 4 2 2 2 2 2 4 2 2 4 2 4 2 4 2 2 2 2 3 4 4 4 4 4 5 5 4 4 4 4 4 2 2 1 2 2 1 2 2 4 1 1 2 2 4 4 4 2 2 4 2 2 4 2 4 1 2
8	2	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 4 2 2 2 2 2 4 2 2 4 2 2 2 2 4 2 2 2 2 2 4 4 4 2 2 3 2 2 4 4 2 4 4 2 2 2 2 2 2 4 2 2 4 4 4 4 4 4 4 2 4 1 1 1 1 1 1 2 1 1 1 1 1 2 4 4 2 1 2 2 2 4 1 1 1 1
8	3	4 5 4 4 5 4 2 2 4 4 4 5 4 4 4 4 4 3 4 4 4 2 4 2 3 2 4 4 2 4 4 4 4 4 4 4 4 2 3 3 4 4 4 2 5 4 4 2 4 2 5 5 5 4 5 4 5 5 5 5 4 4 4 2 4 2 2 3 4 2 4 2 2 4 4 4 4 4 2 2 4 4 4 4 3 2 3
9	1	3 2 3 4 4 4 4 4 2 3 2 3 2 4 4 2 3 4 3 2 4 3 4 4 4 4 4 4 4 4 5 4 4 4 4 4 3 4 4 4 4 4 2 4 4 2 4 4 2 4 4 4 2 2 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 2 4 4 4 4 3 2 4 4 4 4 3 4 4 4 5 4 4 3 4
9	2	2 2 2 4 4 2 2 2 2 2 2 2 2 2 2 3 4 2 2 2 2 2 4 4 4 2 4 4 4 4 4 5 4 4 4 2 4 4 4 4 2 2 4 2 2 4 2 4 4 2 2 4 2 2 2 4 4 5 4 4 5 4 2 4 4 4 4 4 4 4 2 2 4 4 2 4 4 4 2 4 4 4 4 4 2 4 2 2 4 2 2 4 2
9	3	4 4 4 4 5 4 4 4 2 4 5 5 4 4 4 4 2 4 2 4 4 4 4 4 4 4 5 4 5 5 5 5 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 5 4 4 4 2 2 4 2 4 4 5 5 5 2 5 5 4 5 4 5 5 4 4 4 4 4 2 3 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 3 4

Player	Judge	Scores
10	1	4 4 3 4 4 4 4 4 4 4 4 3 4 4 2 3 3 3 2 4 2 2 4 2 2 2 2 4 2 4 2 2 2 2 3 2 2 4 2 2 2 2 2 2 4 4 4 3 4 4 2 4 4 4 3 3 3 3 3 3 2 3 4 2 2 3 4 3 4 3 3 4 2 3 2 2 3 2 4 2 2 4 3 4 4 4 4 2 3 4 2 4 4 4 3 2 3
10	2	4 4 4 4 4 4 4 4 4 4 2 2 4 4 2 4 2 4 4 2 4 2 2 4 4 4 2 4 4 4 4 4 2 4 2 4 2 4 4 4 2 4 2 4 4 4 4 2 4 4 4 4 4 4 4 4 2 4 2 4 4 4 2 4 4 4 4 4 4 2 4 4 2 4 4 3 4 4 3 2 4 4 4 4 4 5 5 4 4 3 2 4 4 4 4 4 4
10	3	5 5 5 4 5 4 4 4 4 4 4 5 5 5 4 4 4 2 5 4 4 4 4 4 4 4 2 4 2 4 2 4 4 2 2 3 2 2 2 4 4 2 4 2 4 4 5 4 4 5 5 4 4 4 2 4 4 2 4 4 4 4 4 4 4 4 4 4 4 5 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 5 4 4 4 2
11	1	5 5 5 5 5 5 5 5 5 5 4 5 5 4 5 5 5 4 5 5 5 5 5 4 4 4 4 4 5 5 5 5 5 4 4 4 4 4 4 4 4 4 4 4 4 4 5 4 5 5 4 5 4 5 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 4 5 5 4 5 5 5 5 5 5 5 4 5 5 5 5 5 5 5 5 5 5 4 5 5 5
11	2	4 5 5 5 5 5 4 4 5 5 5 5 4 5 5 5 4 4 4 4 5 5 5 5 4 5 5 5 4 5 5 4 4 4 4 4 5 4 4 4 4 4 5 4 2 5 5 5 4 1 5 2 4 4 4 5 4 5 4 5 1 4 5 4 5 4 5 4 4 4 4 4 4 3 5 5 4 5 4 4 4 4 5 5 5 4 4 2 5 5 5 5 5 4 4
11	3	5 5 5 5 5 5 5 5 4 4 5 5 5 4 4 4 4 5 5 4 4 5 5 5 4 5 4 4 5 5 5 2 4 4 4 4 2 4 4 5 4 4 5 4 5 4 5 5 5 4 5 4 4 4 5 4 5 4 4 5 5 5 5 5 5 5 5 5 5 5 4 4 4 4 4 4 5 5 5 5 4 4 5 5 5 5 5 5 4 5 5 5 5 5 5
12	1	5 5 4 5 5 5 5 5 5 5 5 5 4 5 5 5 4 4 5 5 5 4 5 5 5 5 5 5 5 5 5 5 3 5 5 4 5 5 4 4 4 5 5 5 5 5 5 5 5 5 5 4 4 4 4 4 4 4 4 4 5 4 5 5 5 5 4 4 5 5 5 5 5 4 5 5 5 4 5 5 5 5 5 5 5 5 5 5 5 4 5 5 5 5 5 4
12	2	5 5 5 5 5 4 4 4 5 4 2 5 5 4 5 5 4 5 4 5 5 5 4 5 5 5 5 5 5 4 4 4 5 4 4 4 4 5 5 4 4 4 4 5 5 4 5 5 5 5 5 4 4 4 5 4 4 4 5 5 3 4 4 5 4 4 4 5 4 2 5 5 5 5 4 5 5 5 4 5 5 5 5 5 5 5 5 5 5 4 5 4 4 5 5 5 4
12	3	5 5 5 5 5 5 4 5 4 4 5 5 5 5 5 5 4 5 5 4 4 5 4 5 5 4 4 4 4 5 5 4 5 3 4 4 4 5 4 4 4 4 5 5 5 4 5 5 5 4 4 4 4 4 5 4 5 5 4 5 4 5 5 5 4 5 5 5 5 4 4 5 5 5 5 4 5 5 4 5 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5

Player	Judge	Scores
13	1	2 2 2 3 3 3 4 4 2 2 3 2 3 2 4 4 4 4 4 3 4 4 5 5 5 5 5 5 5 5 5 5 4 5 4 4 4 4 4 4 5 5 4 4 4 2 4 4 4 4 4 4 3 4 4 4 4 5 5 5 5 5 5 4 5 4 4 4 4 4 3 4 5 3 4 4 4 5 5 5 4 4 5 5 5 5 4 4 4 5 5 5 4 5 4
13	2	2 1 4 2 2 2 4 4 2 1 1 2 2 2 4 4 4 2 4 4 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 2 3 4 2 4 4 2 4 4 4 2 4 2 4 4 4 4 5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 5 5 5 5 5 4 4 4 4 4 4 4 5 5 3 4 4 4
13	3	4 4 4 4 4 4 4 4 2 2 4 5 4 4 5 4 4 4 4 4 3 4 4 4 5 4 4 4 5 5 5 5 4 4 4 4 4 4 5 4 5 4 4 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 4 4 4 5 5 4 4 4 5 4 4 4 4 4 5 5 4 4 4 5 4 4 5 4 4 5 4
14	1	5 5 5 5 5 5 5 5 5 5 4 4 5 4 5 5 4 4 4 4 4 5 4 4 5 4 4 5 5 4 4 4 5 3 4 4 4 4 4 4 4 4 4 4 4 5 4 5 5 5 5 4 4 3 4 4 4 3 4 4 4 4 4 4 4 4 4 4 3 4 5 5 4 4 4 5 5 5 4 4 4 4 4 5 5 5 4 5 4 4 4 5 5 5 4 4
14	2	5 5 5 5 5 5 4 4 5 4 4 5 5 4 5 5 4 5 4 4 4 4 5 5 5 5 5 4 5 5 5 4 4 4 4 4 4 5 4 4 4 4 4 5 4 4 4 5 5 4 5 5 4 4 4 4 4 5 5 5 4 4 4 5 5 4 4 5 4 4 4 4 5 4 4 4 5 4 5 4 4 5 5 5 5 5 4 5 5 5 5 5 4 5 5 5
14	3	4 5 4 4 5 5 4 5 4 4 5 5 5 5 5 5 5 5 5 4 5 5 4 4 5 4 4 4 4 4 4 5 5 2 4 5 5 4 4 4 4 4 5 5 5 5 4 5 5 4 5 4 4 4 4 4 4 5 5 5 5 5 5 4 4 5 5 5 5 5 5 5 4 5 5 5 4 5 4 5 5 4 4 5 5 4 5 5 5 4 5 5 5 5 5 5

APPENDIX D

RAW SCORES
(Second Rating - High School Players)
N = 24

Player	Judge	Scores
1	1	4 2 4 4 2 2 2 2 2 4 0 2 2 2 2 1 2 0 4 1 2 1 2 4 2 4 2 4 4 4 4 1 2 1 2 4 2 3 2 3 2 2 2 4 2 4 4 2 4 4 4 2 4 4 4 4 2 1 2 4 2 2 3 4 4 2 4 4 4 2 4 2 2 4 2 3 2 4 4 2 4 4 4 2 4 4 4 4 4 4 4 2 4 2
1	2	2 2 1 2 2 2 2 2 2 2 1 1 2 2 1 1 1 1 1 1 1 2 2 2 4 4 4 4 2 3 1 3 2 2 3 3 4 2 3 1 1 2 4 2 2 1 4 4 1 3 4 2 1 2 2 2 2 2 1 1 3 2 2 2 3 2 2 1 4 2 2 4 2 1 2 2 2 2 3 2 1 2 4 3 2 3 3 2 2 2 4 2 2 2 2
1	3	2 2 2 1 2 2 2 2 1 2 1 2 2 2 1 1 2 1 2 1 2 3 2 2 2 4 2 2 2 2 2 1 2 2 2 3 3 2 2 2 2 2 2 4 2 4 1 4 4 1 2 2 2 2 2 2 2 2 2 2 2 4 2 4 2 2 2 2 2 4 2 2 2 2 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 4 4 2 1 2 2
2	1	4 2 2 4 2 4 4 5 2 2 2 2 2 2 4 4 2 4 2 4 3 4 4 4 4 4 4 4 4 4 4 4 1 4 3 4 4 2 3 2 2 2 2 4 4 2 4 4 4 4 2 4 4 4 4 4 4 4 4 2 2 4 2 2 4 4 4 4 4 4 4 4 4 4 4 2 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 2
2	2	4 2 4 2 2 4 4 4 2 2 2 2 2 2 4 2 4 2 4 4 4 2 4 4 4 4 4 4 2 4 4 5 2 2 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 4 3 3 4 4 2 4 4 2 2 4 4 4 4 5 4 4 4 4 4 4 4 4 4 2 4 4
2	3	4 2 4 2 2 4 4 4 2 2 2 2 2 2 4 2 4 2 4 4 4 2 4 2 4 4 2 4 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 2 4 4 4 4 4 4 4 4 4 2 2 2 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4
3	1	4 4 4 4 4 4 4 4 4 4 4 2 4 4 2 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 2 4 2 2 2 2 2 4 4 2 4 2 2 4 5 4 4 5 5 4 4 4 4 4 4 4 4 4 4 4 2 2 2 4 4 4 4 2 4 4 4 4 4 4 2 4 4 5 4 2 4 4 4 4 4 4 4 5 4 4 4 4 4 4 4 4 4 4
3	2	4 5 5 4 5 4 4 4 4 4 4 3 5 5 4 4 4 4 4 4 4 3 4 3 5 4 5 4 4 4 4 4 4 4 4 4 4 4 3 4 4 4 4 2 5 4 4 4 5 4 4 4 4 5 4 5 4 4 4 4 4 3 3 3 3 3 4 4 4 4 4 3 3 4 4 4 4 4 4 4 5 5 2 4 4 4 5 5 4 5 4 4 4 4 4 5 5 4 4 4

Player	Judge	Scores
3	3	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 4 4 2 4 4 2 4 4 4 4 2 4 4 4 4 5 4 4 5 4 4 4 4 4 4 4 4 4 2 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
4	1	2 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 4 4 2 2 2 4 4 4 4 4 4 4 4 2 4 4 4 4 4 4 2 4 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 3 4 3 4 4 4 4 4 4 4 2 4 2 2 4 4 4 2 4 4 4 4 4 4 4 4 4 4 2 2 2 2 4 4 2
4	2	2 4 4 4 4 4 4 4 4 4 2 2 4 2 4 4 2 4 2 4 4 4 4 4 2 4 4 2 2 4 4 4 2 4 4 2 2 2 4 2 1 1 2 4 2 2 1 4 4 2 4 4 2 4 4 2 4 2 4 1 2 5 4 4 4 4 4 4 4 4 2 2 2 2 2 4 2 2 2 4 4 2 2 4 2 4 4 4 4 2 4 4 4 2 2 2
4	3	2 4 4 4 4 4 4 4 4 4 2 3 4 2 4 4 4 4 2 4 4 4 4 4 2 4 4 2 2 4 4 4 2 2 4 2 2 2 4 4 4 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 2 4 2 4 4 4 4 4 4 4 4 4 2 2 4 2 2 4 4 4 2 4 4 4 4 4 4 4 2 2 4 4 2 4 2 2
5	1	4 2 4 2 2 2 4 1 2 3 2 2 2 2 2 4 4 2 1 2 4 4 2 4 4 4 1 2 2 2 2 2 2 3 2 2 2 2 1 2 5 4 4 4 2 4 4 4 4 2 4 5 4 4 4 4 4 4 4 4 4 2 4 2 3 4 4 3 4 4 4 4 4 4 4 4 4 4 2 2 2 4 4 2 4 2
5	2	2 2 1 3 4 4 4 4 2 2 1 2 2 2 1 1 2 1 4 4 2 1 2 4 2 4 4 4 4 4 4 5 4 2 4 2 3 4 2 3 1 1 2 3 4 2 1 3 3 2 3 4 2 2 2 2 2 3 4 1 4 5 4 4 4 4 4 5 4 4 4 4 4 4 3 4 4 3 5 4 4 4 4 4 5 4 4 4 4 2 4 4 4 2 4 2
5	3	2 2 4 4 2 4 4 4 2 2 3 2 2 2 4 4 4 3 4 2 2 2 4 2 4 4 2 4 4 4 4 2 4 2 2 4 4 2 2 2 2 4 4 3 3 3 3 3 4 3 3 4 4 2 4 4 4 4 4 4 2 4 4 2 4 4 4 4 4 4 4 4 4 4 4 3 4 4 3 2 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 2 2 2
6	1	4 4 4 5 2 4 4 4 4 4 1 2 4 2 2 2 4 2 2 2 1 1 2 2 2 4 2 2 2 2 2 1 4 2 1 2 3 2 2 3 2 1 2 4 4 4 5 2 4 2 4 4 2 4 2 4 1 1 1 2 2 2 4 4 2 2 2 2 3 4 4 2 1 4 2 2 3 4 4 4 2 2 4 4 4 4 4 2 4 2
6	2	4 4 4 4 4 2 4 4 4 1 4 2 2 1 1 1 1 1 1 1 1 1 1 2 4 2 2 4 2 2 1 2 1 2 2 3 2 1 3 1 1 2 2 3 3 3 2 5 3 3 2 2 2 4 2 2 4 1 1 1 3 3 1 1 5 3 3 3 3 2 2 1 2 2 4 2 2 1 2 2 2 2 4 5 4 4 2 2 2 4 4 4 2 1 2
6	3	4 4 4 4 4 4 4 4 4 4 3 4 2 2 1 1 2 1 1 1 2 1 1 2 2 4 2 2 2 2 2 1 2 2 1 3 3 2 2 2 1 1 1 2 3 3 3 2 4 3 3 4 2 2 2 2 2 2 1 1 1 3 1 1 1 4 1 2 1 4 2 1 1 1 3 2 1 1 1 1 1 2 2 4 4 4 1 2 2 2 2 2 2 1 1 1

Player	Judge	Scores
7	1	2 2 2 2 2 3 4 4 2 1 1 2 2 2 2 2 2 2 1 1 4 2 2 4 2 4 4 2 4 2 2 1 2 3 3 4 2 2 2 1 2 4 5 2 4 3 2 4 2 4 4 1 2 4 2 2 2 4 2 2 2 2 2 2 4 2 3 4 2 2 2 4 2 2 2 2 4 4 2 2 2 4 4 4 4 2 4 2
7	2	2 1 2 2 2 2 2 2 2 2 1 2 2 2 1 1 2 2 1 1 2 1 2 4 1 4 4 2 4 1 2 1 1 2 2 2 2 2 2 1 1 2 2 2 4 1 2 3 2 4 2 2 1 2 2 2 3 4 1 1 3 2 1 1 1 1 1 1 2 2 2 2 1 3 2 2 1 2 2 2 1 2 2 2 2 4 2 2 1 2 4 4 2 1 2 2
7	3	1 2 2 2 2 2 2 2 2 2 1 1 2 2 1 1 2 2 2 2 2 2 2 2 2 2 2 4 4 2 4 2 4 1 5 4 1 2 2 2 4 2 1 1 1 2 2 2 2 2 2 2 2 1 1 3 1 1 1 2 1 2 2 2 2 2 2 2 2 4 4 1 2 2 2 2 4 4 2 2 1 4 2 2 1 1 1
8	1	4 4 4 4 2 2 4 4 4 2 4 4 2 1 2 2 4 2 2 1 2 4 4 4 4 4 4 4 4 1 2 2 2 3 3 4 2 3 2 1 4 4 4 4 2 4 4 4 2 4 2 2 4 3 4 4 2 2 4 2 4 3 4 2 2 2 4 2 2 4 2 3 4 2 2 2 4 4 2 2 2 2 2 4 2 2 2 4 4 4 2 4 2
8	2	2 2 1 2 2 4 4 4 2 1 1 2 2 1 1 1 2 1 2 1 1 1 2 2 1 4 4 4 4 2 4 1 2 1 2 1 3 4 2 3 1 1 4 2 2 2 1 1 4 1 3 2 2 1 2 3 2 2 4 2 1 3 2 3 2 4 2 2 1 4 4 4 3 2 1 4 2 2 4 2 4 2 4 4 2 4 2 4 2 2 4 4 4 2 2 2
8	3	2 2 4 4 2 4 4 4 2 2 2 2 2 2 2 2 4 2 4 2 2 2 4 2 2 4 4 4 4 4 4 1 2 2 2 3 3 4 4 2 2 2 2 2 2 2 4 2 2 4 2 2 2 2 4 2 2 2 2 4 2 4 4 2 4 2 2 2 2 2 4 4 4 4 2 2 4 4 2 2 4 4 4 4 4 2 4 4 4 4 2 4 4 4 2 2 2
9	1	4 4 4 4 4 2 4 4 4 2 4 2 2 4 2 2 3 4 2 2 1 2 4 4 4 4 4 4 4 4 1 2 1 2 3 3 4 2 3 2 2 4 4 4 4 4 4 2 4 4 2 2 2 2 2 2 4 4 4 2 4 4 4 4 4 4 2 4 4 4 4 4 2 2 4 2 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 2
9	2	2 2 2 2 2 2 2 1 2 2 1 2 2 2 4 2 1 4 2 2 2 2 2 2 2 4 2 2 2 4 2 1 2 1 1 1 3 2 2 3 1 1 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 1 1 3 2 4 4 4 4 1 2 4 2 2 4 2 2 4 2 2 4 4 2 2 4 4 4 2 2 4 2 2 4 4 4 2 2 2
9	3	2 2 4 4 2 4 2 2 2 2 2 2 2 2 4 2 4 4 4 4 4 2 2 2 2 4 4 4 4 4 2 1 2 2 2 3 3 2 2 4 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 2 4 4 4 4 4 2 4 4 4 4 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 2 4 4 4 2 2 2
10	1	4 4 4 5 4 4 4 4 4 4 4 3 4 4 2 2 2 2 3 4 2 2 2 2 4 4 4 4 2 4 2 4 1 2 1 2 2 2 4 2 3 2 2 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 1 2 2 3 2 1 2 4 3 3 3 4 4 2 2 2 4 4 4 4 1 4 4 2 2 4 4 4 2 2 3 2 2 4 4 2 4 2

Player	Judge	Scores
10	2	2 4 2 4 4 4 4 4 4 4 1 4 2 2 1 1 4 2 1 2 4 2 1 2 2 2 1 2 1 2 4 2 3 2 1 2 4 4 4 4 4 4 2 4 4 4 2 4 4 4 4 2 2 1 3 2 2 2 2 2 4 4 4 2 2 2 4 4 2 1 2 4 2 4 4 2 4 4 2 2 2 2 4 4 2 2 2
10	3	2 4 4 4 4 4 4 4 4 4 3 2 2 2 2 2 4 4 2 2 2 2 2 4 2 4 4 4 4 4 4 2 1 2 2 2 2 2 2 4 2 2 2 4 4 4 4 4 4 4 4 4 2 2 2 2 2 2 2 1 2 4 2 2 2 4 2 2 2 4 4 4 2 2 4 4 2 4 2 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 2 2
11	1	4 4 4 4 2 4 4 4 4 2 3 2 2 2 2 2 4 4 2 4 2 2 2 4 2 4 4 4 5 4 4 4 1 4 1 4 3 3 4 2 3 2 1 4 4 4 4 4 4 2 3 4 4 4 4 4 4 4 4 2 2 2 3 2 2 2 4 4 4 4 4 2 2 2 2 4 4 4 2 2 2 2 2 2 4 4 4 4 2 2 4 4 4 4 2 2 2
11	2	2 2 2 2 2 2 2 2 2 2 1 2 2 2 1 1 4 1 4 2 2 2 4 2 2 4 2 4 4 4 4 1 1 2 3 4 2 3 2 1 4 4 4 3 4 4 4 2 4 4 3 2 4 4 2 4 2 2 1 3 1 2 1 2 4 4 3 4 2 2 2 2 2 4 2 2 2 2 4 2 2 2 2 2 2 4 2 4 4 4 4 2 2 2
11	3	2 2 4 4 2 4 2 2 2 2 2 2 2 2 2 2 2 4 2 4 2 2 2 4 2 2 4 2 2 2 4 4 2 2 2 2 2 2 2 2 2 2 2 2 4 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 2 2 2 4 2 2 2 2 2 4 4 4 2 4 2 2 4 2 2 2 2 2 2 2 4 2 2 2 2 2 4 2 4 4 2 2 2 2
12	1	4 4 4 4 2 2 2 4 4 2 3 2 2 4 2 4 4 3 4 1 2 2 4 4 2 4 4 4 4 4 4 4 4 2 1 2 4 4 4 2 3 2 1 4 2 4 4 4 2 2 4 4 4 4 2 2 4 4 4 4 4 2 2 4 4 2 2 4 4 4 4 4 4 2 4 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 2
12	2	2 2 4 2 2 2 2 2 2 2 1 2 2 2 1 1 2 2 4 1 2 4 4 4 4 4 4 4 4 4 4 1 4 1 4 3 3 4 4 3 1 1 5 4 4 4 1 4 4 2 4 4 2 2 4 2 4 4 2 2 2 3 2 1 1 3 4 4 4 4 2 2 4 4 2 2 4 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 2 4 4
12	3	2 2 4 2 2 4 4 4 2 2 2 2 2 2 2 2 4 2 4 2 4 2 4 4 2 4 4 2 4 4 4 2 2 2 2 2 2 2 4 2 4 2 2 4 4 4 2 4 4 2 2 4 2 4 4 4 4 4 2 2 2 4 2 2 2 4 4 4 4 4 4 4 4 4 2 4 4 2 2 4 4 4 4 4 4 4 4 4 4 2 4 4 4 2 4 2
13	1	4 4 4 4 4 4 4 1 4 4 3 4 4 2 2 4 4 3 4 2 2 2 4 2 4 4 4 4 4 4 4 1 3 2 4 3 4 4 2 3 2 2 2 4 4 4 3 4 4 3 4 4 4 2 2 4 4 4 2 4 2 4 4 4 4 4 4 4 4 4 4 4 4 3 4 5 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
13	2	4 4 4 4 4 4 4 2 2 3 4 4 4 2 2 2 4 2 2 4 2 1 4 2 2 4 2 4 4 4 2 1 2 2 2 2 3 4 2 1 1 2 4 4 2 4 4 4 4 4 4 2 4 4 2 2 4 4 2 4 2 4 4 4 4 4 4 4 5 5 4 2 2 4 2 4 2 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 2 2

Player	Judge	Scores
13	3	4 4 4 5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 2 4 2 2 4 4 4 4 4 4 2 2 4 2 2 2 4 4 4 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
14	1	4 4 2 4 2 2 4 4 2 2 3 4 4 2 2 4 4 3 4 2 2 1 4 2 4 4 4 4 4 4 4 2 2 1 2 3 3 4 2 3 4 1 2 4 4 5 3 4 5 3 4 4 2 4 4 2 2 4 2 2 2 4 2 4 2 4 4 2 2 5 4 4 4 2 4 4 4 4 2 4 4 4 4 4 4 4 4 2 4 4 4 4 4 4 2 4 2
14	2	2 2 2 2 2 4 2 2 2 3 2 2 2 2 2 2 4 1 2 2 1 1 4 2 2 4 4 4 4 4 2 1 1 1 2 2 4 2 3 2 1 4 4 2 4 2 4 4 2 3 2 2 4 4 2 2 1 4 2 2 4 4 4 4 4 5 4 4 4 2 2 4 4 4 4 5 4 4 4 4 4 4 4 2 2 4 4 4 2 2 2
14	3	2 2 4 2 4 4 2 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 4 4 4 4 4 4 2 2 2 2 2 2 4 4 4 2 2 4 4 4 4 4 4 4 2 4 2 2 4 2 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 2
15	1	4 4 4 5 2 4 4 4 4 4 4 2 2 2 4 2 2 2 4 2 2 4 1 2 4 4 4 4 4 4 2 4 1 2 2 2 3 3 4 2 3 2 2 2 4 4 4 4 5 4 4 4 2 2 2 2 2 2 2 4 1 2 3 4 4 4 4 4 2 4 4 2 2 2 2 4 4 4 2 2 4 4 4 4 4 4 4 4 4 2 4 4 2 2 4 4 4 2
15	2	4 2 4 4 2 2 2 2 2 2 2 2 2 2 4 4 2 2 4 2 2 4 1 4 1 2 4 2 2 4 4 4 1 2 2 2 1 2 2 2 1 2 2 4 4 4 2 4 4 4 4 4 2 2 2 2 2 2 2 4 2 2 4 4 4 4 4 4 4 4 4 4 4 2 2 4 4 2 4 4 2 4 2 4 4 4 4 2 4 2 2 2 4 4 2 2 2
15	3	2 4 2 2 4 2 2 2 1 2 2 2 4 2 2 2 4 2 2 4 3 2 1 1 4 2 2 2 2 2 1 4 2 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 2 4 2 4 2 2 2 2 2 4 2 2 2 2 2 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 2 2 2 2
16	1	4 2 4 2 2 2 2 2 2 2 3 2 2 4 1 2 2 3 2 1 1 1 2 2 4 4 4 4 4 2 2 1 2 2 2 3 3 2 2 3 2 3 2 4 5 2 4 2 2 4 2 4 2 1 2 4 2 4 4 4 2 2 2 2 2 2 2 2 2 2 4 2 2 2 4 4 2 2 2 2 2 2 2 4 4 4 4 4 2 4 2
16	2	2 2 1 2 2 2 4 1 1 1 1 2 1 1 1 1 1 1 1 1 2 1 1 2 2 2 1 1 2 1 3 1 1 3 1 1 1 2 1 1 2 1 1 1 1 1 1 4 1 2 1 2 2 1 1 3 1 1 2 1 1 1 1 1 1 2 2 1 2 3 2 1 2 1 2 1 2 2 2 1 2 1
16	3	1 1 2 5 1 2 2 4 1 2 3 1 1 1 1 1 1 3 1 1 1 3 2 1 1 4 4 2 2 2 2 1 5 1 1 3 3 2 1 2 1 1 1 2 1 2 2 2 2 1 1 1 2 1 2 2 2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 1 2 2 2 2 1 1 1 1

Player	Judge	Scores
17	1	4 4 4 4 4 2 4 4 4 3 4 4 4 4 2 4 4 3 4 2 4 1 4 4 4 4 2 4 4 4 4 1 2 1 1 3 3 4 2 3 2 2 4 4 4 4 4 4 2 4 4 4 4 4 4 4 4 4 2 2 2 4 2 4 2 4 2 2 2 2 4 4 4 2 4 3 4 4 2 2 4 2 4 4 4 4 2 2 2 2 2 2 3 2 4 2
17	2	2 2 2 1 2 2 4 2 1 1 1 1 1 1 1 1 2 1 2 1 1 1 2 1 1 2 1 2 2 2 3 1 1 1 3 3 2 1 1 1 2 4 4 2 1 4 2 2 4 2 2 1 1 2 2 2 2 1 1 3 2 2 2 3 2 1 1 2 2 2 2 1 2 2 2 4 2 2 4 2 4 4 2 4 2 2 2 2 2 2 2 2 2 2
17	3	2 2 4 2 2 2 2 4 2 2 2 2 2 2 1 1 2 2 2 2 2 3 2 2 1 2 2 2 2 2 2 1 2 1 1 3 3 2 2 3 2 2 2 4 2 2 4 2 2 2 2 2 2 1 1 1 2 2 1 1 2 1 1 4 2 2 1 2 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 1 1 1 2 2 2 2 1 2 1
18	1	2 4 4 4 4 4 4 4 4 4 3 2 4 2 2 2 2 2 2 4 2 2 1 2 4 4 4 4 4 4 4 2 2 2 2 1 2 3 3 2 2 2 2 2 4 4 4 1 2 4 2 4 4 2 2 2 4 4 4 4 2 1 2 3 2 3 4 4 4 4 4 2 2 4 2 2 4 2 4 2 4 4 2 3 4 4 4 3 2 4 2 4 4 4 2 4 2
18	2	4 4 3 4 4 4 4 2 2 2 1 4 2 2 2 2 2 1 4 4 2 2 4 2 2 4 2 2 4 2 2 1 2 1 1 1 3 2 1 3 1 1 2 2 2 2 1 2 4 2 4 4 2 2 2 2 2 3 4 1 2 3 2 2 4 4 2 4 4 4 2 2 2 2 2 2 2 2 2 1 4 2 2 4 4 4 2 3 2 2 4 4 2 2 2 2
18	3	4 4 4 4 4 4 4 4 4 4 2 2 4 2 2 2 2 2 2 2 2 2 2 2 4 4 4 4 4 4 4 2 2 2 2 2 2 2 2 2 2 2 4 4 2 4 2 2 2 4 2 4 2 2 2 2 2 4 2 2 2 2 4 2 4 4 4 2 2 2 4 2 2 2 2 2 4 2 2 2 2 2 2 2 4 4 4 4 2 2 2 4 4 2 2 2 2
19	1	4 4 4 5 4 4 4 5 4 3 4 4 1 2 2 4 2 4 2 2 2 4 4 4 4 4 2 4 4 4 2 4 2 2 3 3 4 2 4 2 4 2 4 2 2 2 2 2 4 4 4 2 2 4 4 4 1 1 1 2 2 4 4 4 4 5 4 4 4 4 4 4 4 4 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4
19	2	4 2 2 4 2 4 4 5 3 2 3 2 2 1 1 1 1 1 4 2 1 1 1 4 2 2 4 2 4 2 2 2 2 1 1 2 2 2 2 3 2 1 2 2 4 2 1 2 4 2 4 4 2 2 2 2 2 3 4 1 2 3 2 4 2 2 2 1 1 3 2 2 1 2 2 2 4 4 4 2 2 2 2 4 4 3 2 2 2
19	3	4 4 4 2 4 4 4 4 4 2 3 4 2 2 2 2 4 2 1 2 2 2 4 4 4 4 2 4 4 2 2 2 2 2 2 2 4 4 4 4 2 2 2 2 2 1 2 4 1 4 2 2 2 2 2 2 2 2 2 2 4 2 4 4 4 2 2 2 4 4 4 4 4 2 4 2 2 2 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 2 2 2
20	1	2 2 4 4 2 4 4 4 2 3 2 1 2 1 1 1 4 4 2 3 3 2 2 3 4 4 4 4 4 3 1 1 3 3 2 2 2 1 2 4 4 2 4 4 4 4 4 4 2 2 4 4 4 2 1 2 4 2 4 3 4 2 2 2 4 4 2 4 2 3 4 2 3 2 4 4 2 4 4 4 2 3 4 4 4 4 4 4 2 4 2

Player	Judge	Scores
20	2	1 1 2 2 2 4 4 2 1 1 2 2 1 1 1 1 2 1 4 1 1 1 2 2 4 2 1 4 2 2 1 2 1 1 1 3 2 1 3 1 1 1 2 2 2 1 2 2 2 4 2 1 4 4 2 2 4 1 1 2 2 2 2 2 2 2 3 4 2 2 1 2 4 2 2 1 2 4 3 2 2 2 2 2 2 2 2 4 4 2 1 2 1
20	3	2 2 2 2 2 2 2 2 2 1 3 2 2 1 1 1 1 2 1 1 1 1 1 1 1 4 1 2 2 2 2 1 4 1 1 3 3 2 1 2 1 1 1 2 2 2 1 2 1 2 2 2 1 1 1 2 1 2 1 1 2 1 2 2 2 2 2 2 2 2 1 1 1 2 2 1 1 1 1 1 1 2 2 2 2 1 1 2 1 2 2 1 1 1 1
21	1	4 4 4 4 2 4 3 2 2 2 2 2 2 1 2 2 4 3 2 2 1 3 2 2 4 4 4 4 2 2 1 2 1 2 3 2 1 1 2 4 4 2 4 4 2 4 2 4 2 2 2 4 4 4 2 1 2 4 2 4 2 2 4 2 4 4 4 2 1 4 4 2 3 4 4 4 2 2 2 2 2 2 4 2 4 2
21	2	2 2 2 2 2 4 2 4 1 2 1 2 2 1 1 1 1 2 4 4 2 1 2 1 1 4 2 4 4 2 2 1 2 1 2 1 3 4 2 3 1 1 1 4 4 2 4 4 4 2 2 4 2 1 2 4 4 4 2 1 1 4 2 1 1 3 2 2 2 3 4 4 2 2 2 4 4 4 1 2 3 4 4 4 4 4 4 2 2 4 4 4 2 1 2
21	3	4 2 4 2 2 2 2 2 2 2 3 2 2 2 1 1 2 2 2 2 2 1 2 1 1 4 1 2 2 2 2 1 2 1 1 3 3 2 2 2 1 1 1 4 2 2 2 2 4 1 2 4 2 2 1 2 2 1 1 1 4 1 2 2 2 2 1 1 2 2 2 2 1 1 2 1 1 1 1 1 1 1 2 4 3 2 2 1 2 1 1 1 1 1 1 1
22	1	4 4 4 4 2 2 4 4 4 3 4 2 2 1 2 2 4 4 1 2 1 2 2 4 4 4 4 5 4 4 1 2 1 2 5 2 2 1 2 4 4 2 4 5 4 4 2 4 2 3 3 2 2 4 4 1 4 4 2 4 4 4 4 4 4 4 4 4 4 2 4 5 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 2 4 4
22	2	4 4 4 4 4 4 4 4 2 2 1 2 2 1 1 1 1 4 4 2 1 4 2 4 4 4 2 4 4 4 1 4 2 3 4 2 4 1 1 1 2 2 2 2 2 4 2 2 4 2 2 2 2 2 2 4 2 4 4 2 4 4 4 4 2 2 4 5 5 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 2 4 4
22	3	2 2 4 2 2 4 2 2 2 2 3 2 2 2 1 1 2 4 4 2 2 1 2 2 2 4 2 2 2 4 4 1 2 2 2 3 3 4 2 2 2 2 2 2 2 2 2 2 4 2 2 4 2 2 2 2 2 2 4 2 4 4 2 4 4 2 4 2 4 2 4 4 4 4 2 4 4 2 2 4 4 4 4 4 2 4 4 4 2 2 4 4 4 2 2 2
23	1	2 2 4 4 2 4 4 4 2 2 2 2 1 1 2 2 4 4 2 2 2 2 2 4 4 4 3 4 4 4 1 1 2 2 2 4 2 4 1 2 4 4 4 4 4 4 4 2 2 4 3 2 4 4 4 2 1 2 4 2 4 4 4 4 4 4 4 4 2 4 4 2 5 4 4 2 4 4 4 4 2 4 4 4 4 4 3 4 4 4 2 4 2
23	2	2 2 2 2 4 2 4 4 2 1 2 2 2 2 2 2 1 1 4 2 1 1 2 2 2 4 4 4 4 3 2 1 3 2 2 3 4 1 3 1 1 2 2 2 1 2 2 4 2 2 2 2 2 4 1 3 3 2 4 4 3 4 4 3 4 4 4 4 2 2 4 3 4 4 4 4 4 4 4 4 4 4 4 4 2 4 4 4 2 4 2

Player	Judge	Scores
23	3	2 2 4 2 2 4 2 2 2 2 3 2 2 2 1 2 2 2 2 2 2 2 2 2 2 4 2 4 2 4 4 1 2 2 2 3 3 4 2 2 2 1 2 2 2 2 2 2 4 1 2 2 2 2 2 2 2 2 2 2 4 4 2 4 4 2 2 2 2 2 4 2 4 2 2 4 4 2 2 4 4 4 4 2 2 4 4 4 2 2 4 4 4 2 2 2
24	1	2 2 4 4 2 4 4 4 2 2 4 2 2 1 1 2 4 2 1 1 2 2 4 4 4 4 4 4 4 1 4 2 4 4 2 2 1 2 4 4 4 2 2 4 3 4 4 4 3 3 4 4 4 4 1 2 4 2 4 4 4 4 4 4 2 2 2 2 4 3 4 2 1 4 2 2 2 3 4 4 4 4 2 4 4 4 4 2 1 2 2
24	2	2 2 4 4 2 4 4 4 2 2 2 2 2 2 2 2 2 1 2 4 2 2 2 2 4 4 4 4 4 3 1 3 2 3 3 3 4 2 3 1 1 2 4 2 4 2 2 4 1 2 4 4 2 2 4 4 4 4 1 4 2 2 2 4 4 2 2 3 2 2 2 2 2 4 2 4 3 4 3 4 4 4 4 2 4 4 4 4 4 2 2 3
24	3	2 2 4 4 2 4 2 4 2 2 3 2 2 2 1 2 2 2 4 2 2 1 2 2 2 4 2 2 2 4 4 1 4 4 2 3 3 4 4 4 2 2 2 4 4 4 2 4 4 2 4 4 4 2 2 4 4 4 4 2 4 4 2 4 2 4 4 4 4 4 2 2 2 2 2 2 4 1 2 2 2 2 2 4 4 4 4 2 2 2 4 4 2 2 2 2

APPENDIX E
CORRELATION MATRIX
(Within Each Category) N = 30

Category A (Shooting Ability and Offensive Moves - 23 Items)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	1.00*	81	71	71	74	67	57	57	70	73	57	75	77	60	56	65	60	61	46	56	61	66	55
2		1.00	81	85	91	79	66	50	93	87	60	93	84	71	67	67	60	64	55	63	62	70	62
3			1.00	79	70	74	68	59	80	73	56	77	75	73	70	68	64	68	66	63	63	64	57
4				1.00	86	78	65	58	84	84	67	87	78	71	66	62	52	60	38	68	55	67	44
5					1.00	72	67	57	81	87	76	94	86	72	75	75	57	73	44	74	59	80	56
6						1.00	71	60	69	63	53	74	66	56	81	58	58	45	60	61	53	56	56
7							1.00	76	70	58	43	70	65	63	61	59	64	29	50	58	44	51	53
8								1.00	61	47	47	63	56	46	56	56	56	36	42	50	52	67	56
9									1.00	84	57	87	81	65	60	58	58	59	41	57	55	64	47
10										1.00	66	84	92	77	66	68	56	66	37	68	54	72	57
11											1.00	71	71	67	62	68	54	56	30	57	58	59	52
12												1.00	89	72	77	78	64	65	53	77	65	78	57
13													1.00	77	75	80	67	70	49	70	60	80	70
14														1.00	82	80	63	71	50	68	80	87	68
15															1.00	68	79	70	56	68	64	66	73
16																1.00	86	67	67	61	61	83	81
17																	1.00	44	72	67	71	69	64
18																		1.00	38	59	71	65	42
19																			1.00	66	61	59	79
20																				1.00	76	80	66
21																					1.00	80	66
22																						1.00	72
23																							1.00

*Decimal points omitted

Category B (Defensive Moves and Tactics - 20 Items)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1.00	65	22	82	46	65	59	59	83	66	50	77	63	68	55	80	69	79	81	84
2		1.00	41	76	55	73	73	60	88	77	65	33	70	73	67	82	69	73	76	87
3			1.00	40	42	57	41	37	36	47	24	45	40	32	25	28	72	22	23	28
4				1.00	59	77	70	59	74	65	53	76	59	64	64	80	70	75	72	78
5					1.00	49	54	60	54	42	24	57	54	10	61	37	28	52	48	62
6						1.00	70	65	61	65	51	69	33	44	64	74	58	51	61	64
7							1.00	74	64	57	55	75	45	45	71	67	63	50	70	67
8								1.00	68	65	50	77	51	42	77	76	56	50	52	65
9									1.00	81	68	84	67	70	54	64	74	58	77	25
10										1.00	70	63	72	60	53	84	47	34	79	64
11											1.00	74	40	51	48	74	62	53	65	70
12												1.00	64	69	74	88	76	65	60	72
13													1.00	75	50	70	63	72	73	73
14														1.00	33	70	64	57	76	69
15															1.00	75	43	61	51	66
16																1.00	72	76	77	55
17																	1.00	60	74	68
18																		1.00	62	79
19																			1.00	74
20																				1.00

Category C (Ball Handling - 15 Items)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.00	84	70	79	80	45	79	71	58	48	58	68	58	58	48
2		1.00	68	72	81	46	80	61	65	49	61	69	47	60	47
3			1.00	54	70	66	67	74	50	54	61	74	41	56	51
4				1.00	78	56	79	55	50	38	55	49	41	49	43
5					1.00	53	80	70	60	50	67	60	46	52	46
6						1.00	56	56	52	45	55	65	32	39	42
7							1.00	69	57	39	65	71	55	41	42
8								1.00	49	56	50	71	56	46	45
9									1.00	62	45	58	56	70	59
10										1.00	60	74	77	71	78
11											1.00	80	58	62	67
12												1.00	54	62	55
13													1.00	74	60
14														1.00	64
15															1.00

Category D (Rebounding - 12 Items)

	1	2	3	4	5	6	7	8	9	10	11	12
1	1.00	69	80	73	74	82	78	58	76	68	72	46
2		1.00	81	74	68	75	74	60	70	76	72	47
3			1.00	71	80	79	79	66	75	74	71	47
4				1.00	55	65	55	55	61	55	54	54
5					1.00	77	83	75	78	72	80	52
6						1.00	91	65	76	68	72	52
7							1.00	67	83	77	80	53
8								1.00	60	61	56	59
9									1.00	66	61	64
10										1.00	91	59
11											1.00	63
12												1.00

Category E (Speed and Quickness - 12 Items)

	1	2	3	4	5	6	7	8	9	10	11	12
1	1.00	89	85	70	60	75	78	84	59	84	87	86
2		1.00	79	72	70	75	81	85	59	81	82	81
3			1.00	70	47	70	78	72	64	86	84	84
4				1.00	54	65	81	66	71	79	79	85
5					1.00	55	70	69	52	52	56	60
6						1.00	68	66	45	85	81	71
7							1.00	77	65	77	78	82
8								1.00	58	75	79	82
9									1.00	64	66	78
10										1.00	91	86
11											1.00	85
12												1.00

Category E (Body Control and Balance - 7 Items)

	1	2	3	4	5	6	7
1	1.00	73	63	64	77	89	69
2		1.00	85	67	72	71	74
3			1.00	78	65	63	72
4				1.00	68	69	65
5					1.00	85	80
6						1.00	73
7							1.00

Category G (General Floor Play - 7 Items)

	1	2	3	4	5	6	7
1	1.00	63	64	62	75	75	79
2		1.00	69	60	47	68	62
3			1.00	65	69	56	65
4				1.00	72	75	76
5					1.00	73	82
6						1.00	82
7							1.00

APPENDIX F

BASKETBALL RATING SCALE

NAME OF PLAYER _____

Key to Rating Scale

HA Highly Agree the statement is descriptive of the player.

SA Slightly Agree the statement is descriptive of the player.

NN Neither Disagree nor Agree the statement is descriptive of the player.

D Slightly Disagree the statement is descriptive of the player.

HD Highly Disagree the statement is descriptive of the player.

Please choose only one response to each statement.

Please attempt to answer every statement.

Place a check (✓) mark in the space which corresponds to your judgment.

The N found in front of several statements indicates a negative statement.

NAME OF RATER _____

Shooting Ability and Offensive Moves

	HA	A	MN	D	HD
1. She is accurate in her shooting with the proper alignment of the body and shooting arm.					
2. When shooting, she has a smooth balanced hand release and follow-through.					
3. She gains an offensive advantage by using evasive moves (fakes, cuts, pivots, dribbling).					
4. The shooter takes shots when she is off balance and has not squared her body toward the basket.					
5. She uses a variety of shots.					
6. The shooter can go both left and right to successfully get the shot started from the dribble.					

Defensive Moves and Tactics

7. She uses the appropriate defensive stance to counteract the opponents' movements on offense.					
8. She works efficiently as part of the total defensive team plan by being alert for possible interceptions and aiding teammates on defense.					
9. She blocks attempted shots by her opponents.					

Ball Handling

10. She executes the dribble with her head and shoulders up and keeps the ball from bouncing too high.					
11. When dribbling the ball she uses either hand to change direction and pace efficiently.					

Ball Handling (Continued)	HA	A	NN	D	HD
12. Her passes are accurate and relevant (lob, bounce, straight) to each situation.					
Rebounding (Offensive and Defensive)					
N 13. When rebounding, she consistently jumps over a positioned defender.					
14. She is consistent in acquiring the rebound.					
Speed and Quickness					
15. She maintains her weight on the balls of her feet enabling her to move quickly.					
Body Control and Balance					
16. She maintains body control and balance through the execution of proper footwork.					
General Floor Play					
17. She is at the right place at the right time consistently.					

Name of Player _____

APPENDIX C

RAW SCORES
(Shortened Rating Scale)
N = 34

Player	Judge	Scores																
1	1	2	2	2	2	1	1	2	2	1	4	1	2	2	3	4	4	2
1	2	2	2	2	2	2	2	2	2	1	2	1	2	1	1	2	2	2
1	3	2	2	2	4	2	2	2	2	2	2	2	2	2	2	4	4	2
2	1	2	2	2	2	1	2	2	2	1	2	1	4	3	1	2	2	2
2	2	2	2	1	2	2	1	2	1	1	1	1	(3)*	1	2	2	2	2
2	3	2	2	2	2	2	2	1	2	2	2	2	2	4	2	2	2	2
3	1	2	4	2	4	4	4	2	2	1	4	4	2	2	2	4	4	2
3	2	4	2	1	4	2	1	2	2	1	4	2	2	1	1	4	4	2
3	3	2	2	1	4	4	4	2	2	2	2	2	2	2	2	4	4	2
4	1	2	2	2	2	1	2	2	2	4	4	2	4	2	4	2	2	2
4	2	2	2	2	2	2	1	2	2	2	3	1	2	1	2	2	4	2
4	3	2	1	2	2	2	1	1	2	2	2	1	2	2	2	2	2	2
5	1	2	2	1	2	2	1	2	1	2	2	2	4	2	4	2	2	1
5	2	2	2	1	2	1	1	1	1	1	1	1	1	2	1	1	2	2
5	3	2	2	1	2	2	1	2	2	1	2	1	2	2	2	1	1	1
6	1	2	2	1	2	1	1	2	2	1	2	2	2	2	4	2	2	2
6	2	2	1	2	(3)	2	1	1	2	1	1	1	(2)	1	1	2	2	2
6	3	2	2	1	4	2	1	2	2	2	2	1	2	2	2	1	1	2
7	1	2	2	2	4	1	2	2	2	1	4	2	4	2	2	4	2	2

*Estimated missing values.

Raw Scores (Revised Scale)

Player	Judge	Scores																	
7	2	1	2	2	2	2	1	2	2	1	2	2	2	1	1	4	4	2
7	3	1	1	2	2	2	2	2	2	1	2	1	2	2	2	4	4	2
8	1	2	2	2	2	4	4	4	2	1	2	4	4	2	3	4	2	4
8	2	2	2	4	2	4	2	2	2	2	2	4	4	2	3	4	2	4
8	3	2	2	4	2	2	2	4	4	2	2	1	4	1	4	2	4	4
9	1	4	4	4	4	2	2	2	4	1	2	2	2	2	4	4	4	4
9	2	2	2	1	3	2	1	4	2	1	4	2	4	2	2	4	4	2
9	3	2	2	1	4	2	2	(2)	(2)	2	2	1	2	2	2	4	4	2
10	1	2	2	4	2	1	4	2	4	2	4	2	2	2	2	4	2	2
10	2	2	2	4	4	4	2	4	4	2	4	2	4	1	2	4	4	2
10	3	2	2	2	4	4	2	2	4	2	4	2	4	2	2	4	4	2
11	1	4	2	4	2	1	2	4	4	1	2	2	4	2	4	4	4	2
11	2	2	2	4	4	2	2	4	4	2	2	2	4	1	4	4	4	2
11	3	2	2	4	4	4	2	2	2	2	2	2	4	2	2	4	4	2
12	1	4	2	4	2	2	4	2	4	1	5	4	4	1	2	4	4	2
12	2	2	2	4	4	1	2	4	4	1	1	2	4	1	4	4	4	2
12	3	2	2	4	4	4	4	2	4	2	2	4	4	1	2	4	4	2
13	1	2	2	4	2	2	4	2	4	1	4	4	4	2	4	4	2	2
13	2	4	2	4	4	4	5	5	5	2	4	4	4	1	4	5	4	2
13	3	2	2	4	4	4	4	4	4	2	4	4	4	2	4	4	4	2
14	1	4	2	4	4	1	4	4	4	1	4	4	4	2	2	4	4	2
14	2	4	4	4	4	2	2	4	5	1	4	1	4	1	(2)	5	5	2
14	3	4	4	4	4	4	4	2	4	2	4	4	4	2	2	4	4	2

Raw Scores (Revised Scale)

Player	Judge	Scores																
15	1	2	4	2	4	1	1	4	4	1	4	1	4	2	2	2	2	2
15	2	2	2	1	4	1	1	2	2	1	4	1	2	1	1	4	4	2
15	3	2	2	2	4	(1)	2	2	2	2	4	2	2	2	1	4	4	2
16	1	2	2	4	2	2	4	4	4	2	4	2	4	2	2	4	4	2
16	2	1	1	4	2	2	2	4	4	1	4	1	4	1	2	5	5	2
16	3	2	2	4	4	4	2	2	4	2	4	2	4	2	2	4	4	2
17	1	2	2	2	4	2	2	4	4	2	4	(2)	4	2	4	2	4	2
17	2	2	2	2	4	2	2	2	2	2	4	2	4	1	2	4	4	2
17	3	2	2	2	4	2	2	2	2	2	4	2	4	(1)	2	4	4	2
18	1	2	2	4	2	2	4	4	4	1	4	2	4	4	2	4	2	2
18	2	2	2	2	4	1	2	1	2	1	4	2	2	4	2	4	2	2
18	3	2	2	1	4	2	1	2	2	2	2	1	2	4	2	2	2	1
19	1	2	2	4	2	2	4	4	4	1	2	4	4	4	4	4	2	4
19	2	2	2	2	2	2	1	2	2	2	2	2	2	1	4	4	4	2
19	3	2	2	2	2	2	2	2	4	2	2	1	2	2	2	4	4	2
20	1	4	4	4	4	2	2	4	4	1	2	4	4	4	4	4	2	4
20	2	2	2	4	4	2	2	4	4	2	2	2	2	1	4	4	4	2
20	3	2	2	4	4	4	4	4	4	2	2	1	2	2	2	4	4	2
21	1	4	4	4	4	2	2	2	4	2	4	2	4	2	4	4	4	4
21	2	4	4	4	4	2	2	4	4	2	4	2	4	1	3	4	4	3
21	3	4	4	4	4	2	2	4	5	2	2	2	4	2	4	5	5	4
22	1	4	4	4	4	4	2	4	4	1	5	2	4	1	2	4	4	4
22	2	4	4	4	5	4	4	4	5	1	5	5	4	1	1	5	5	5

Raw Scores (Revised Scale)

Player	Judge	Scores																
22	3	4	4	4	4	4	4	4	5	2	4	4	5	1	2	5	5	4
23	1	2	2	4	4	2	4	4	4	2	4	2	4	2	4	4	4	2
23	2	4	2	4	4	2	2	4	4	2	4	2	4	1	5	4	4	4
23	3	4	4	4	4	4	4	4	4	2	4	2	4	2	4	4	4	4
24	1	2	4	4	4	4	2	4	4	1	4	4	4	2	2	4	4	4
24	2	4	4	4	5	4	4	4	5	2	4	4	4	1	2	4	4	4
24	3	2	2	4	4	4	4	4	4	2	5	5	5	2	2	5	5	4
25	1	2	2	2	2	2	4	4	4	2	4	2	4	2	4	4	4	4
25	2	2	2	4	2	2	2	4	4	2	3	2	4	1	4	4	5	4
25	3	2	2	2	2	2	2	2	4	2	2	2	4	2	4	4	4	2
26	1	2	2	4	2	2	2	4	4	2	2	2	4	2	4	3	2	2
26	2	2	1	1	2	2	1	2	4	2	3	1	2	2	4	4	2	2
26	3	2	2	1	2	2	2	2	2	2	2	2	2	4	2	2	2	2
27	1	4	2	4	2	2	4	2	2	1	2	4	4	2	4	4	4	2
27	2	2	2	4	2	2	2	2	2	1	2	2	4	1	2	2	2	2
27	3	2	2	1	2	2	1	2	2	2	2	1	2	2	2	2	2	2
28	1	2	2	4	4	2	2	2	2	1	4	2	4	2	1	4	4	2
28	2	1	2	4	4	2	4	2	4	2	4	4	4	1	1	5	4	2
28	3	2	2	4	4	2	4	2	2	2	4	4	4	2	2	4	4	2
29	1	2	4	4	2	4	4	4	4	1	4	4	4	1	2	4	4	4
29	2	2	2	4	2	2	4	4	4	1	4	4	4	1	1	4	4	4
29	3	2	2	4	2	2	4	2	4	2	4	4	2	2	2	4	4	2
30	1	2	2	1	2	1	2	2	2	1	2	2	3	4	4	1	2	2

Raw Scores (Revised Scale)

Player	Judge	Scores																
30	2	2	2	1	2	2	1	1	2	1	3	3	2	2	1	1	1	1
30	3	2	2	1	2	2	1	2	2	2	2	1	2	4	2	2	2	2
31	1	2	2	4	2	2	4	2	4	1	4	4	4	2	4	4	2	2
31	2	2	1	1	2	2	1	2	2	1	2	2	2	2	2	2	1	2
31	3	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
32	1	2	2	2	4	1	2	2	2	1	4	2	4	1	2	2	4	2
32	2	3	3	1	3	1	1	2	2	1	2	1	2	1	1	2	2	2
32	3	2	2	1	4	1	1	2	2	2	2	2	2	4	2	2	2	2
33	1	2	2	2	(1)	2	2	2	2	1	2	1	2	2	2	2	2	2
33	2	1	2	2	(1)	2	1	1	1	1	2	1	2	2	1	2	2	2
33	3	2	2	1	2	2	2	2	2	2	2	1	2	4	2	2	2	2
34	1	2	1	2	2	2	1	4	2	1	2	1	2	4	4	4	2	2
34	2	2	2	2	2	4	2	2	2	2	2	2	2	2	4	4	2	2
34	3	1	1	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2

APPENDIX H

JUDGES' TOTAL SCORES, RANKINGS OF JUDGES' SCORES, SUBJECTIVE RANKINGS OF PLAYERS, TOTAL POINTS SCORED BY INDIVIDUAL PLAYERS AND RANKINGS

Player	Total Score Three Judges	Rank of Judges' Scores	Sub. Ranking Two Judges	Points Scored During Tour.	Rank of Total Pts.
1	107	27	27	18	24
2	96	30.5	31	19	21
3	131	17.5	29	24	17.5
4	102	29	12	19	21
5	84	34	21	16	26.5
6	90	33	28	24	17.5
7	108	26	22	10	30.5
8	141	15	7	49	3
9	131	17.5	26	15	28
10	142	14	20	19	21
11	143	13	5	31	10
12	148	9.5	23	18	24
13	170	4.5	9	32	9
14	166	6	16	7	32.5
15	117	22	14	25	15.5
16	145	12	13	26	14
17	134	16	6	10	30.5
18	122	20	19	16	26.5
19	130	19	8	44	5
20	153	8	15	29	12
21	170	4.5	11	25	15.5
22	188	1	45	45	4
23	172	3	4	34	8
24	183	2	3	30	11
25	147	11	2	40	6
26	119	21	25	7	32.5
27	116	23	10	51	1
28	148	9.5	24	22	19
29	155	7	18	38	7
30	96	30.5	30	27	13
31	111	24	32	12.	29
32	104	28	34	0	34
33	91	32	33	18	24
34	109	25	17	50	2

APPENDIX I

FACTOR ANALYSIS - RATINGS OF COLLEGIATE PLAYERS

ESTIMATED COMMUNALITIES, EIGENVALUES, PERCENTAGE OF VARIANCE, CUMULATIVE PERCENTAGE OF VARIANCE AND UNROTATED FACTOR STRUCTURE
N = 14

Category A (Shooting Ability and Offense Moves)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1	Factor 2	Factor 3	Factor 4
1	.89	14.74	64.1	64.1	*- 82	- 24	- 20	- 05
2	.94	3.05	13.2	77.3	- 87	- 36	- 28	- 01
3	.91	1.33	5.8	83.1	- 96	- 09	07	- 04
4	.94	1.11	4.8	87.9	- 83	- 44	- 12	02
5	.94	.84	3.7	91.6	- 90	- 36	05	06
6	.80	.58	2.5	94.1	- 70	- 25	11	03
7	.92	.46	2.0	96.1	- 84	26	40	04
8	.88	.34	1.5	97.6	- 84	25	10	- 30
9	.94	.20	0.9	98.5	- 86	- 32	- 22	10
10	.87	.12	0.5	99.0	- 85	- 31	- 01	24
11	.51	.11	0.5	99.5	01	- 42	38	- 32
12	.94	.06	0.3	99.8	- 88	- 32	- 11	- 16
13	.87	.04	0.2	100.0	- 84	- 26	18	19
14	.91	.00	0.0	100.0	- 88	- 09	00	20
15	.93	.00	0.0	100.0	- 84	45	25	- 18
16	.94	.00	0.0	100.0	- 76	47	04	- 25
17	.84	.00	0.0	100.0	- 79	58	- 01	- 14
18	.88	.00	0.0	100.0	- 86	- 19	06	- 32
19	.84	- .00	- 0.0	100.0	- 78	41	10	06
20	.76	- .00	- 0.0	100.0	- 50	68	- 47	30
21	.80	- .00	- 0.0	100.0	- 70	39	- 45	- 18
22	.91	- .00	- 0.0	100.0	- 95	07	- 11	05
23	.84	- .00	- 0.0	100.0	- 70	33	39	47

*Decimal points omitted.

Category B (Defensive Moves and Tactics)

Item	Est. Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1	Factor 2	Factor 3
1	.91	12.21	61.0	61.0	*- 91	- 03	- 13
2	.75	2.59	13.0	74.0	- 97	11	08
3	.75	1.74	8.7	82.7	- 89	01	- 57
4	.87	.97	4.8	87.6	- 81	10	- 11
5	.75	.81	4.1	91.6	- 75	- 36	29
6	.76	.56	2.8	94.4	- 65	18	- 42
7	.91	.34	1.7	96.2	- 72	47	- 01
8	.91	.28	1.4	97.6	- 83	29	21
9	.85	.24	1.2	98.7	- 79	39	25
10	.91	.11	0.5	99.3	- 94	01	- 03
11	.98	.08	0.4	99.7	- 05	58	09
12	.94	.05	0.3	99.9	- 93	28	06
13	.92	.01	0.1	100.0	- 72	- 36	- 36
14	.82	.00	0.0	100.0	- 80	05	35
15	.91	.00	0.0	100.0	- 94	- 17	12
16	.98	.00	0.0	100.0	- 86	07	38
17	.75	.00	0.0	100.0	- 30	37	- 64
18	.75	.00	0.0	100.0	- 46	- 74	14
19	.92	.00	0.0	100.0	- 88	- 45	- 22
20	.85	.00	0.0	100.0	- 85	- 27	08

*Decimal points omitted.

Category C (Ball Handling)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1	Factor 2
1	.95	10.60	70.5	70.7	*- 93	- 25
2	.86	1.50	10.0	80.7	- 81	- 44
3	.90	.81	5.4	86.1	- 82	- 28
4	.78	.66	4.4	90.5	- 77	04
5	.88	.46	3.1	93.5	- 95	- 07
6	.82	.36	2.4	95.9	- 73	32
7	.95	.20	1.4	97.3	- 85	- 39
8	.90	.15	1.0	98.3	- 76	- 43
9	.88	.12	0.8	99.1	- 85	20
10	.80	.09	0.6	99.6	- 85	45
11	.85	.03	0.2	99.8	- 88	- 03
12	.87	.02	0.1	100.0	- 84	25
13	.87	.00	0.0	100.0	- 78	18
14	.88	- .00	- 0.0	100.0	- 86	27
15	.88	- .00	- 0.0	100.0	- 93	27

*Decimal points omitted.

Category D (Rebounding)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1
1	.96	10.56	88.0	88.0	*- 97
2	.94	.37	3.1	91.1	- - 94
3	.90	.32	2.6	93.8	- - 88
4	.88	.22	1.8	95.6	- - 87
5	.96	.19	1.6	97.2	- - 97
6	.93	.15	1.2	98.4	- - 95
7	.95	.06	0.5	98.9	- - 96
8	.92	.05	0.4	99.4	- - 94
9	.95	.04	0.3	99.7	- - 98
10	.95	.02	0.1	99.8	- - 96
11	.85	.02	0.1	99.9	- - 85
12	.94	.01	0.1	100.0	- - 94

*Decimal points omitted.

Category E (Speed and Quickness)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1	Factor 2
1	.95	9.39	78.2	78.2	*- 91	- 18
2	.92	1.01	8.4	86.6	- 90	- 19
3	.94	.61	5.1	91.7	- 95	- 00
4	.89	.35	2.9	94.6	- 93	28
5	.69	.30	2.5	97.1	- 56	- 33
6	.93	.14	1.1	98.2	- 96	11
7	.87	.09	0.7	99.0	- 65	- 04
8	.86	.05	0.4	99.4	- 85	- 31
9	.77	.04	0.3	99.7	- 59	57
10	.98	.03	0.2	99.9	- 95	15
11	.98	.01	0.1	100.0	- 95	07
12	.92	.00	0.0	100.0	- 95	- 05

*Decimal points omitted.

Category F (Body Control and Balance)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1
1	.87	5.38	76.9	76.9	*- 83
2	.90	.76	10.8	87.8	- 96
3	.89	.42	6.0	93.7	- 88
4	.75	.18	2.6	96.4	- 71
5	.82	.14	2.0	98.4	- 91
6	.93	.07	1.1	99.4	- 97
7	.72	.04	0.6	100.0	- 69

*Decimal points omitted.

Category G (General Floor Play)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1
1	.89	5.31	75.9	75.9	*- 90
2	.92	.77	10.9	86.8	- 89
3	.72	.41	5.9	92.7	- 54
4	.77	.31	4.5	97.2	- 84
5	.90	.09	1.2	98.5	- 95
6	.94	.08	1.2	99.6	- 86
7	.89	.03	0.4	100.0	- 92

*Decimal points omitted.

APPENDIX J

VARIMAX ROTATED FACTOR MATRIX
(Collegiate Players - N = 14)

Category A (Shooting Ability and Offensive Moves)

Item	Factor 1	Factor 2	Factor 3	Factor 4
1	*82	32	- 01	11
2	94	24	- 05	13
3	76	54	23	02
4	93	19	07	- 01
5	89	17	20	- 13
6	65	27	23	- 07
7	40	70	54	00
8	45	80	10	01
9	89	24	14	09
10	86	18	32	10
11	15	- 04	- 07	- 58
12	83	38	- 02	- 04
13	77	27	41	- 04
14	74	36	33	18
15	29	90	32	08
16	27	87	11	19
17	24	88	17	34
18	70	54	- 01	- 18
19	33	69	35	28
20	16	40	09	84
21	39	66	- 21	51
22	71	55	20	27
23	29	43	80	24

*Decimal points omitted.

Category B (Defensive Moves and Tactics)

Item	Factor 1	Factor 2	Factor 3
1	*79	30	35
2	83	40	24
3	27	81	28
4	63	49	21
5	62	05	58
6	36	70	10
7	76	49	-15
8	86	27	01
9	87	24	-10
10	75	46	33
11	23	08	-53
12	86	44	07
13	25	50	81
14	79	16	24
15	78	28	49
16	91	08	21
17	19	87	-12
18	25	-09	84
19	40	43	72
20	65	24	54

*Decimal points omitted.

Category C (Ball Handling)

Item	Factor 1	Factor 2
1	*50	82
2	27	88
3	40	77
4	59	50
5	64	71
6	75	28
7	34	87
8	25	84
9	74	43
10	78	12
11	61	63
12	78	40
13	69	41
14	81	41
15	87	47

*Decimal points omitted.

Category E (Speed and Quickness)

Item	Factor 1	Factor 2
1	*84	41
2	83	39
3	76	58
4	57	78
5	72	14
6	69	67
7	69	48
8	86	27
9	12	81
10	66	70
11	71	63
12	79	53

*Decimal points omitted.

APPENDIX K

FACTOR ANALYSIS OF RATINGS OF ALL PLAYERS

ESTIMATED COMMUNALITIES, EIGENVALUES, PERCENTAGE OF VARIANCE, CUMULATIVE PERCENTAGE OF VARIANCE AND UNROTATED FACTOR STRUCTURE
N = 58

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1	Factor 2	Factor 3
1	.82	15.63	67.9	67.9	*80	- 14	02
2	.98	1.81	7.9	75.8	90	- 35	- 02
3	.92	1.26	5.5	81.3	85	- 06	15
4	.91	.69	3.0	84.3	85	- 37	00
5	.98	.64	2.8	87.1	90	- 35	- 08
6	.85	.49	2.1	89.2	77	- 14	32
7	.90	.41	1.8	91.0	73	- 11	31
8	.85	.36	1.6	92.5	67	- 07	30
9	.95	.34	1.5	94.1	84	- 37	09
10	.93	.27	1.2	95.2	86	- 28	- 13
11	.76	.23	1.0	96.3	73	- 10	- 20
12	.97	.17	0.8	97.0	93	- 22	- 00
13	.95	.15	0.7	97.7	91	- 12	- 09
14	.93	.12	0.5	98.2	85	13	- 33
15	.93	.09	0.4	98.6	89	29	- 09
16	.96	.08	0.4	99.0	89	34	- 09
17	.95	.07	0.3	99.3	79	37	21
18	.81	.05	0.2	99.5	72	- 00	- 30
19	.89	.04	0.2	99.7	65	45	33
20	.87	.03	0.1	99.8	82	22	- 05
21	.91	.02	0.1	99.9	79	34	- 14
22	.96	.02	0.1	100.0	88	20	- 21
23	.91	.01	0.0	100.0	75	44	07

*Decimal points omitted.

Category B (Defensive Moves and Tactics)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1	Factor 2	Factor 3
1	.90	13.22	66.1	66.1	*86	- 19	04
2	.92	1.35	6.7	72.8	92	- 04	01
3	.62	1.03	5.1	78.0	45	13	11
4	.87	.92	4.6	82.6	86	05	09
5	.70	.62	3.1	85.6	63	26	57
6	.82	.52	2.6	88.3	78	24	- 05
7	.78	.40	2.0	90.2	76	35	- 09
8	.82	.34	1.7	91.9	78	39	- 10
9	.95	.25	1.3	93.2	90	- 16	- 10
10	.89	.25	1.3	94.4	84	- 12	- 17
11	.72	.25	1.2	95.6	71	- 06	- 52
12	.95	.21	1.1	96.7	94	06	- 17
13	.86	.16	0.8	97.5	77	- 22	29
14	.84	.14	0.7	98.1	75	- 37	10
15	.83	.11	0.5	98.7	74	46	06
16	.93	.08	0.4	99.1	94	03	- 06
17	.76	.07	0.4	99.4	79	- 14	- 13
18	.86	.05	0.2	99.7	81	- 14	16
19	.90	.04	0.2	99.9	86	- 31	01
20	.89	.02	0.1	100.0	88	- 02	25

*Decimal points omitted.

Category C (Ball Handling)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1	Factor 2
1	.91	9.42	62.8	62.8	*86	- 28
2	.89	1.75	11.7	74.5	85	- 26
3	.75	.92	6.1	80.6	77	- 16
4	.78	.62	4.1	84.7	75	- 28
5	.91	.50	3.3	88.1	83	- 31
6	.65	.36	2.4	90.5	63	- 06
7	.82	.33	2.2	92.7	81	- 41
8	.82	.27	1.8	94.5	78	- 22
9	.78	.22	1.5	96.0	72	15
10	.77	.17	1.1	97.1	74	46
11	.79	.14	0.9	98.1	78	07
12	.91	.11	0.8	98.8	90	04
13	.78	.08	0.6	99.4	70	50
14	.84	.05	0.4	99.7	75	43
15	.88	.04	0.3	100.0	75	54

*Decimal points omitted.

Category D (Rebounding)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1
1	.79	8.65	72.0	72.0	*85
2	.84	.85	7.0	79.1	85
3	.82	.59	4.9	84.0	86
4	.65	.54	4.5	88.5	66
5	.88	.45	3.6	92.1	91
6	.89	.29	2.4	94.5	88
7	.91	.18	1.5	95.9	91
8	.65	.16	1.3	97.3	74
9	.87	.11	1.0	98.2	90
10	.87	.10	0.9	99.1	87
11	.91	.06	0.5	99.6	89
12	.46	.05	0.4	100.0	60

*Decimal points omitted.

Category E (Speed and Quickness)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1
1	.90	9.08	75.6	75.6	*92
2	.87	.84	7.0	82.7	91
3	.84	.60	5.0	87.6	89
4	.82	.37	3.1	90.7	85
5	.66	.29	2.4	93.1	66
6	.75	.19	1.6	94.7	80
7	.84	.17	1.4	96.1	89
8	.82	.13	1.1	97.2	86
9	.59	.11	0.9	98.1	67
10	.89	.09	0.8	98.9	92
11	.88	.09	0.7	99.6	92
12	.91	.05	0.4	100.0	94

*Decimal points omitted.

Category F (Body Control and Balance)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1
1	.83	5.35	76.5	76.5	*86
2	.80	.64	9.1	85.6	87
3	.86	.36	5.1	90.7	84
4	.72	.31	4.4	95.1	78
5	.83	.18	2.5	97.7	88
6	.87	.10	1.5	99.1	87
7	.78	.06	0.9	100.0	86

*Decimal points omitted.

Category G (General Floor Play)

Item	Est Comm	Eigenvalue	Pct of Var	Cum Pct	Factor 1
1	.70	5.13	73.2	73.2	*84
2	.71	.61	8.7	81.9	72
3	.70	.44	6.3	88.2	77
4	.66	.38	5.5	93.6	82
5	.80	.19	2.8	96.4	89
6	.80	.15	2.1	98.5	86
7	.81	.10	1.5	100.0	92

*Decimal points omitted.

APPENDIX L

VARIMAX ROTATED FACTOR MATRIX
N = 38

Category A (Shooting Ability and Offensive Moves)

Item	Factor 1	Factor 2	Factor 3
1	*62	36	38
2	82	26	44
3	56	42	50
4	80	21	44
5	80	34	37
6	47	30	64
7	33	28	78
8	36	30	57
9	74	19	51
10	83	31	26
11	64	38	16
12	76	38	44
13	73	46	33
14	65	65	06
15	47	77	25
16	45	81	25
17	22	73	46
18	63	47	05
19	03	70	50
20	44	66	29
21	40	75	16
22	57	71	16
23	22	78	31

*Decimal points omitted.

Category B (Defensive Moves and Tactics)

Item	Factor 1	Factor 2	Factor 3
1	*71	36	39
2	63	50	44
3	23	43	11
4	58	54	33
5	40	67	- 03
6	34	62	41
7	24	69	43
8	22	72	44
9	65	36	53
10	56	35	57
11	30	22	80
12	51	54	60
13	77	35	13
14	77	18	29
15	22	79	29
16	58	54	50
17	55	31	50
18	69	40	25
19	77	26	42
20	70	56	21

*Decimal points omitted.

Category C (Ball Handling)

Item	Factor 1	Factor 2
1	*85	31
2	83	32
3	70	36
4	75	24
5	88	30
6	53	35
7	89	19
8	75	31
9	49	56
10	30	82
11	57	54
12	68	59
13	23	82
14	32	80
15	25	89

*Decimal points omitted.