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TURNBULL, WILLIAM IVAN. The Construction of a Basketball Official's Test Presented by Videotape. (1974) Directed by: Dr. G. Hennis. Pp. 119.

The purpose of this study was to construct an objective basketball official's test through the medium of television. Seventy-one illustrated situations of basketball play were edited from twelve hours of women's college games. Seventy-one questions and separate answer sheets were constructed to accompany the illustrated situations on videotape. The questions were true-false and multiple choice with contingent parts related to the response to the first section of each question. All questions were based on the Division for Girls and Women's Sports Basketball Guide, 1973-1974 (1973).

The test was administered to forty-four subjects with a varying knowledge of and experience in basketball officiating. The knowledge and experience ranged from students in a basketball officiating class to ten nationally rated officials.

Objectivity of each illustrated situation was established by six or more of eight national officials, acting as judges, agreeing upon the correct response. An item analysis was computed by the Testan-Item analysis program on the first choice of each question and the question as a whole. Fourteen questions were rejected due to insufficient objectivity and, after the two item analyses, fifteen additional questions were rejected on the basis of poor discrimination. The reliability of the revised test found by the Kuder-Richardson formula, was 0.7899.

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Content within the final forty-two item test varied slightly from the actual game situation. A significant difference was found between the scores made by national officials and those with all other D.G.W.S. officials' ratings. Also a significant difference was found between the scores of state officials and those with all other D.G.W.S. ratings. Because of these significant differences between the groups, it was concluded that the basketball officiating test had criterion validity. In conclusion, this study showed the feasibility of using television testing in the course of measuring basketball officiating judgments.

CONSTRUCTION OF A BASKETBALL OFFICIAL'S

TEST PRESENTED BY VIDEOTAPE

by

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Thesis Advisor

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the Faculty of the Graduate School at
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Date of Acceptance by Committee

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

Each and every early civilization had a means to measure. The early Egyptians measured and plotted the land and constructed architectural wonders based upon mathematical principles and measurement. The Spartans, Athenians and many other city states developed measuring instruments to decide winners in athletic competitions. It is a fact that each civilization's advances are related directly to advances in measurement (Montoye, 1970, p. 4).

Modern testing in the field of physical education started around 1861 with Dr. Edward Hitchcock taking some fifty anthropological measurements of his students. The dynamometer, spirometer, as were many other instruments, were developed to measure physical aspects of the human performance. Recently physical educators have attempted to build measuring instruments in the affective domain including attitudes and appreciations, in the psychomotor domain measuring motor movement and fitness, and in the cognitive domain assessing knowledges and understandings.

Within the cognitive domain physical educators have been subjected to the criticisms that little more than factual knowledge was measured. Care must be taken to ensure that the test measures more than just remembering of the idea of phenomena.

It was the object of this study to develop an objective knowledge test that involved a depth of understanding. Understanding was to be inferred from the ability to deal with an abstraction in a form somewhat

different from that in which it was originally presented. To test application, there must either be situations new to the student or situations containing new elements as compared to the situation in which the abstraction was learned.

Present testing in the field of basketball officiating relies heavily upon written knowledge tests and subjective rating scales. Barrow and McGee (1971) made the comment that ". . . rating devices are neither as accurate nor as reliable as most objective tests . . ." (p. 556).

By the development of an objective basketball officiating test, using the medium of videotape, one is able to measure actual application of basketball rules in an objective situation. Objective tests are considered by many to be the most effective method of assessing overall achievement.

Videotapes are ideally suited to show basketball infractions enabling basketball officials to see fouls and violations in controlled test situations. Such a video test has the added advantage of becoming a teaching tool with instantaneous playback and slow motion.

Recognition of fouls and violations by written test questions, sketch diagrams, or isolated situations is essential in the training of basketball officials. There comes a point when the basketball official must have the experience to recognize fouls and violations accurately and quickly as they occur in competition. Construction of this basketball officiating test is an attempt to measure one's ability to recognize and interpret basketball rules in a standardized game situation.

The demand for better officials is constantly requested and a basketball official's test that can be used in a teaching manner should assist in satisfying this demand.

Definition of Terms

Measurement Terms

Achievement Test. A test that measures the extent to which a person has acquired certain information or mastered certain skills, usually as a result of specific instruction (Lennon).

Criterion. A standard by which a test may be judged or evaluated; a set of scores, ratings, etc., that a test is designed to predict or to correlate (Lennon).

Item Analysis. The process of evaluating a single test item by any of several methods. It usually involves determining the difficulty value and the discriminatory power of the item, and often its correlation with some criterion (Lennon).

Multiple-Choice Item. A test item in which the examinee's task is to choose the correct or best answer from several given options (Lennon).

Reliability. The extent to which a test is consistent in measuring whatever it does measure (Lennon).

Validity. The extent to which a test does the job for which it is designed (Lennon).

Video Terms

Electronic Edit. Electro-physical process by which video sequences from any of several sources (live camera, VTR, broadcast TV) are placed

in sequence to form a coherent production (Mattingly and Smith, 1973).

Monitor. A specially designed, high quality, television receiver employed specifically in video transmission from the television camera or videotape recorder (Mattingly and Smith, 1973).

Multiplexer. An optical system designed to direct any of the outputs of visual projectors into the lens of a television camera (Mattingly and Smith, 1973).

Switcher. A device which permits the selection of an image from any of two or more video cameras (Mattingly and Smith, 1973).

Synchronization. The process of keeping the electron beam of the television receiver or monitor locked to the action of the scanning beam of the camera pick-up tube.

UHF Ultra high frequency. A bandwidth of the electromagnetic wave frequency ranging from 300 to 3000 megahertz.

Video. That portion of a television signal which is related to the picture, its pick-up and its reproduction (Mattingly and Smith, 1973).

Videotape Recorder. Electronic device capable of recording the audio and video signals from a television system on a special magnetic tape which can be replayed immediately or stored for a later playback (Mattingly and Smith, 1973)

Videotape Recording. The magnetic tape so recorded (Mattingly and Smith, 1973).

Zoom Lens. A lens which permits a continuous change in focal length while in use (Mattingly and Smith, 1973).

CHAPTER II
REVIEW OF LITERATURE

A review of the literature related to testing by film or videotape has revealed a limited number of studies in this area. If the reader wonders why extensive work in film testing has not developed, a partial answer is perhaps that educators and psychologists with interest in film and videotape have focused on demonstrating its applicability to instruction. Educators and psychologists have virtually overlooked or ignored the applicability of film and videotape to those communications which we know as tests.

The review of literature is divided into five areas. These areas are: (a) characteristics of film and videotape, (b) other tests, (c) characteristics of a basketball official, (d) recognition of fouls and violations, and (e) present examination.

Characteristics of Film and Videotape Tests

Videotape and film testing allows one to sequence stimuli within an item, thus providing not only a fixed exposure sequence but also establishing pace and rhythm. Gibson (1947) helped design and produce twenty-one motion picture tests that presented items not replicable in paper and pencil form. Frequently these tests represented complex, sequential, and dynamic identification and discrimination tasks. Several of the films made use of animation, simulated situations, camera angle, and rate of movement. Much of school instruction, driver training, dramatics, and laboratory courses seek to develop students' perception

of and adequate response to crucial features in a complex situation. It is rarely easy to determine whether such skills have been taught, but simulated situations in videotape or film tests may help in the assessment.

Film and videotape provide for manipulation and control of within item exposure time. This is the time allowed for the response to the illustrated situation. Curtis and Kropp (1962) found that there were no significant differences between exposure of three items simultaneously and exposure to single item situation. Manipulation of within item response time has been reported in four studies. Curtis and Kropp (1961) used twenty, thirty, forty-eight, and sixty seconds for single item response times within their study but made no recommendation as to which time length was preferable. Response time in the Landis, Masonis, and Loye (1971) study was based on approximate reading time, whereas Doran, Green, and McIntyre (1974) relied on three times the reading time required of question and stem. Seibert and Snow (1966) recommended that response time for multiple choice questions be fifteen to twenty seconds, alternative choice questions be twelve to fifteen seconds. At present this characteristic of videotape and film testing has to be evaluated further.

Complementary sound accompanied the visual questions in two previous videotape test reports (Doran et al., 1974 and Landis et al., 1971). Curtis and Kropp (1961) did not use sound and this resulted in the examinees missing the start of some questions.

It has been pointed out that a videotape situational test is one that can simulate many real situations. The very strength of

videotape test is its ability to present things as they are in all their complexity. Video testing also introduces the possibilities of involving other senses to get a true picture of the student's knowledge (Hainfeld, 1968).

Videotape testing can pose problems that use kinesic, ideographic, or cinematographic principles that minimize or eliminate the use of the written or spoken language (Seibert and Snow, 1965). It has been postulated that disadvantaged or minority groups may be able to perform better on videotape test due to minimizing the language content (Landis et al., 1971).

Television and videotape can employ color to highlight important points for instructional purposes. At present, color has not been shown to have significant advantage over black and white television in classroom training (Kanner and Rosenstein, 1960). In addition there is no research on the advantages and disadvantages of color testing compared with black and white testing.

Films and videotapes not only encompass and present the advantages discussed previously but also accomplish several functions required of test administration. The most apparent of these is the need to control and standardize test conditions. If scores are to be useful, they must be derived under conditions that are comparable for all examinees (Adams, 1966, p. 149). Videotape and film testing provide opportunity for this standardization.

Other Tests

In 1966 the American Association for Health, Physical Education, and Recreation developed a training film in gymnastics judging. This

film presented compulsory and optional gymnastic routines. Accompanying the film was a manual that supplied a score for each activity and the rationale behind the score. Also developed was a standardized gymnastic examination which qualified those that passed for a D.G.W.S. official's rating (Training of Judges, 1966). At present the only other examination film used to train and rate judges is synchronized swimming (Job Analysis for Examinations, 1972). It can be assumed that the assets of the media in providing standardized rating systems for judges and officials have not been fully utilized.

The National Teacher's Examination situational videotest used short segments of classroom activity and larger segments of classroom activity as the bases for questions. In the conclusion of their study Landis et al. (1971) recommended the printing of the questions in a test booklet with each item keyed to the videotape situations.

Characteristics of a Basketball Official

In order to develop tests for basketball officiating one needs to screen out the characteristics essential for good officiating. Many authors have listed these essential qualities. These characteristics can be grouped under five separate headings: (a) knowledge, understanding and interpretation of rules; (b) ability to administer the rules; (c) ability to command respect; (d) judgment; and (e) decisiveness (Boycheff, 1961; Clark, 1966; Cowan, 1958; Koenig, 1964; O'Neill, 1960; Sanford, 1953; Steinbrecher, 1973).

It is claimed that a student who is able to recognize and identify a specific infringement is on his way to becoming a basketball official (Cowan, 1958). Basic to this ability is a thorough knowledge and

understanding of the rules (Steinbrecher, 1973), though Clark (1966) pointed out that a knowledge of the rules does not automatically make good officials.

Judgment and consistency can be placed at the upper end of the hierarchy of requirements for good officiating. According to Bunn (1963), this distinguishes officiating as an art rather than a science. Literal or mechanical application of rules may ruin a game in certain situations. For example, strict interpretation of all rules at a junior high game would result in many fouls and violations being called. Officiating should be adjusted to the skill level of the players.

Recognition of Fouls and Violations

Films, scrimmages, and games can be used to teach recognition of fouls and violations. In addition artificial situations can be set up to help achieve this recognition (Sanford, 1953; Gaynor, 1960 and Witte, 1959). A more traumatic method is to provide a whistle to the student official and place him in a game situation (O'Neil, 1960).

Recently films have been developed to assist the student official in recognizing fouls and violations (Stallings, 1961; Browne, 1962; Drum, 1963; Moyer, 1968). The content of Drum's (1963) film was developed around the fouls and violations most frequently missed at the college intramural level. Rule changes have outdated this film. Many sections within the film could still be used as a teaching device, however.

The most recent film on women's basketball officiating consisted of a variety of fouls and violations. Content of the pilot film rested on what occurred within one game and six staged infringements. Final

content of the film was dictated by the validity of each rule infraction. Eight out of ten national officials had to agree on the infringement prior to its acceptance. From this film four film loops were developed to assist the novice official in learning to recognize fouls and violations. Since the introduction of the five-player game these films have been outdated but within each loop are still many valid situations (Moyer, 1968).

Videotape and film is often being used to assist coaches today. One interesting use of the videotape was instigated at the University of Washington and the University of Illinois. Both university gymnastic teams were videotaped in local competition. The videotapes were sent to four neutral judges to be scored in the same manner as a live gymnastic meet (Hughes, 1968).

Present Examination

Questions administered in the past year's D.G.W.S. basketball official's examinations are subjected to an item analysis with the poorer items being discarded. Also discarded are questions that do not comply with the new rule changes for the coming year. At this stage the chairperson of the examination committee selects from the item bank two equal forms of questions, Form A and Form B. An attempt is made to have test content cover all important areas. The questions within the tests are not intended to be tricky, nor are they intended to be limited to unusual situations (Miller, 1958). An analysis of the 1973-74 National Theoretical Basketball Examination Questions and study questions appear in Table 1.

Table 1

Percentage of Rule Infringements Covered in the 1973-74
National Theoretical Examination and Study Guide Questions

Rule	%	%
Fouls		25%
Blocking	5%	
Charging	4	
Hacking	3	
Holding	0	
Pushing	0	
Pulling	1	
Tripping	0	
Others	2	
Technical	10	
Violations		36%
Field goal	0%	
Free throw	8	
Illegal dribble	4	
Jump ball	5	
Out of bounds	10	
Three second lane	1	
Tie ball	3	
Traveling	5	
Others	0	
Scorer		6%
Roles of Officials		7%
No infringements		26%

Table 1 shows that the written examination questions are predominantly concerned with fouls and violations occurring within the actual game situation. It is apparent that videotape testing could play a part in examining knowledge, recognition, and interpretation of basketball rules.

Content Validity

Identification and Content Analysis

In order to develop the basketball officiating test it was essential to develop content validity. Content validity of the test was developed around the percentage of fouls and violations occurring in actual game situations.

To develop the basketball officiating videotape test it was necessary to videotape and record a considerable number of college women's basketball games. Videotaping was carried out at the last

CHAPTER III

PROCEDURES

The purpose of this study was to develop a basketball officiating test through the medium of videotape. Women's college basketball games were chosen on the availability of sufficient games refereed by D.G.W.S. basketball officials. Seventy-one illustrated situations of basketball play were edited from twelve hours of women's college games. Seventy-one questions were constructed to accompany the illustrated situations on videotape. All questions were based on the Division for Girls and Women's Sports Basketball Guide, 1973-1974 (1973). Procedure followed in developing the basketball official's test was divided into four main areas for presentation in this study. These areas are: (a) content validity, (b) video production, (c) test information, and (d) test analysis.

Content Validity

Videotaping and Content Analysis

In order to develop the basketball officiating test it was essential to develop content validity. Content validity of the test was developed around the percentage of fouls and violations occurring in actual game situations.

To develop the basketball official's videotaped test it was necessary to videotape and record a considerable number of college women's basketball games. Videotaping was carried out at the last

twelve college women's games played at the University of North Carolina at Greensboro. Seven of these twelve games were taped at the state tournament in Greensboro, giving videotapes of highly competitive playing situations. The twelve college women's games were played under the American Association for Health, Physical Education, and Recreation Division for Girls and Women's Sports Basketball Rules, 1973-1974 (1973). The referees for all twelve games were national or state rated officials and their calls of rule infringements were observed and recorded. This information is presented in Table 2. These data served as the basis for formulating a table of specifications in the construction of the basketball official's test.

On completion of all videotaping, and the preparation of frequency distribution of rule infringements, the videotapes were previewed for the following information: (a) location of camera - leading official's position, trailing official's position, or the elevated location, (b) game number, (c) location of rule infringement on counter, (d) actual infraction, (e) number of players involved in the action, (f) position of the rule infraction in relation to the screen, and (g) what type of response would a particular situation lend itself to. Electronic editing of the specific rule infringements was undertaken to comply with the percentage of rule infractions occurring in twelve women's basketball games.

Test Content

The content of the basketball official's test was achieved by selecting and constructing questions on the basis of information found in Table 2, and in the Division for Girls and Women's Sports Basketball Guide, 1973-1974 (1973). This provided twenty-five true-false questions

Table 2

Frequency and Percentage of Rule Infringements
Occurring in Twelve Women's Basketball Games*

Rule	f	%
Fouls		
Blocking	207	11.7%
Charging	242	13.8
Hacking	245	13.9
Holding	149	8.5
Pushing	247	14.1
Pulling	0	0.0
Tripping	6	0.3
Others	0	0.0
Violations		
Field goal	0	0.0%
Free throw	26	1.5
Illegal dribble	149	8.5
Jump ball	11	0.6
Out of bounds	145	8.3
Three second lane	25	1.4
Tieball	120	6.8
Traveling	182	10.4
Others	2	0.0

*As recorded by two independent observers.

requiring corrections when necessary, twenty-three multiple-choice questions requiring two sets of choices, the second choice dependent upon the first selection, and twenty-three multiple-choice questions requiring one to choose the correct response and then to select from fifteen diagrams the ones that should accompany the choice.

The final test content of seventy-one questions is shown in Table 3. The seventy-one item basketball officials test percentages of fouls and violations were significantly similar to the percentages in Table 2. The significance of similarity was greater than the .01 level of confidence. It was concluded from this that the seventy-one item basketball test had construct validity.

Video Production

Video Equipment Utilized in this Study

In this section a verbal explanation of videotaping, video playback, electronic editing, and camera systems involved in the construction of the basketball official's test will be given.

Three separate videotape decks were used at varying times as components of electronic systems; Sony AV 3650, Panasonic NV 3120, and Panasonic NV 3130 videotape recorders were used. These videotape recorders were compatible under the Electronic Industries Associations of Japan standards. Two separate cameras, Sony portable and Sony viewfinder, were used in the recording of the women's basketball games on videotape. A third camera, Panasonic viewfinder, was used in the videotaping of the written part of the test. Two Panasonic monitors and one Sony monitor were used within the varying systems. Connecting the above equipment into electronic systems required many accessories. This study used

Table 3
 Content of Seventy-One Item Basketball
 Officials Test by Questions and Percentage

Rules	Questions	%
Fouls		
Blocking	7	12.0%
Charging	8	14.0
Hacking	8	14.0
Holding	5	8.7
Pushing	8	14.0
Pulling	0	0.0
Tripping	0	0.0
Others	0	0.0
Violations		
Field goal	0	0.0%
Free throw	1	1.8
Illegal dribble	5	8.7
Jump ball	0	0.0
Out of bounds	5	8.7
Three second lane	0	0.0
Tieball	4	7.0
Traveling	6	10.5
Others	0	0.0

A. C. cords, A. C. adapter, camera-selector, co-axial cables of many varieties, synchronization cables, tripods, and ultra high frequency cables at various times in producing the basketball officials video test.

Camera Systems Used

Three types of single camera systems were used to collect the test situations. The first system comprised of Sony 3650 videotape deck, Sony viewfinder camera, A. C. cord, and synchronization cable. Within this single camera system, the camera control panel switches are set at "ext sync" and "VTR." The videotape deck controls are set at "camera," "sync normal," "automatic levels," and "power on." At this point, the single camera system is ready for videotaping.

The second single camera system used a Panasonic NV 3120 videotape deck, Sony viewfinder camera, and a nine-inch diagonal Sony monitor. The camera was connected to the videotape recorder by an ultra high frequency cable and the videotape recorder was connected to the monitor by an eight pin co-axial cable. Power was supplied through the A. C. cord. With this single camera system all controls are the same as the first system, except that the camera control should read "int sync."

The third type of single camera system used the Panasonic viewfinder camera and the Panasonic NV 3130 videotape deck, connected in the same manner as the second single camera system.

A dual camera system was used twice and this allowed the author to select the most advantageous camera position for recording various rule infractions. This system used a Sony portable camera and A. C. Adaptor, Sony viewfinder camera, camera-selector, two Sony monitors

Sony A. V. 3650 videotape recorder, two synchronization cables, two co-axial selector cables and A. C. power cord. This dual camera system had both cameras synchronized into the camera-selector, and out of this ran one synchronization cable to the videotape deck. Two monitors were connected by co-axial cables to the camera-selector, and this allowed the author to select the play that was videotaped. All control panel procedures were the same as those in the first single camera system.

Camera Placement

In two separate studies, Frazer (1942) and Mordy (1942) found that a greater percentage of fouls and violations in women's basketball occur under or near the basket. For eight games the camera was situated ten feet behind the end line and fifteen feet in from the corner. For five of the games the camera was situated ten feet back from the side line and twenty feet away from the center. The second location was chosen after analysis of the techniques of officiating basketball, discussed in The Basketball Guide, 1973-1974 (1973). In these locations the camera height was varied from four feet six inches high to five feet six inches high. One game was videotaped from a scaffold fifteen feet above the floor to illustrate the plays within the key and circle.

Editing Procedure

Two electronic editing systems were used to construct the videotaped basketball official's test. The live camera to tape editing system was used to record all titles, warnings and questions. The live camera to tape editing system used a Panasonic viewfinder camera, Panasonic N. V. 3130 videotape recorder with electronic editing, a receiver monitor to display the picture, and connecting cables. The camera was connected to

the videotape deck by a synchronization cable where the videotape deck was connected to the monitor by ultra high frequency cable.

Live camera editing was the procedure used in placing the warning information and test instruction upon the master videotape. The following systematic system was used in live camera videotape editing: (a) set the control button at zero, (b) turn camera on, press record button, and check picture on the monitor, (c) turn record button off, (d) start the videotape recorder and let it run for twenty seconds. Then depress the video edit button and record the first set of information. After this sequence has run its course, continue to record for at least ten seconds; (e) stop the video tape and rewind to zero, then check the first sequence. If this sequence is not satisfactory, redo it, now. Once the next sequence has been added it is too late to change any of the preceding ones, and (f) repeat four and five for the next sequence.

The second procedure in producing the basketball officiating videotape used tape to tape editing. Tape to tape editing was the procedure used in placing the illustrated situations of basketball play upon the master videotape. The illustrated situations were transcribed electronically from the original basketball game tapes to the master test videotape. The tape to tape electronic editing system used a playback Panasonic N. V. 3120 videotape recorder, playback monitor, receiver monitor, Panasonic N. V. 3130 videotape recorder with electronic editing, a stopwatch, and connecting cables. The playback video is connected to the editor video by way of an editing co-axial cable. Each video recorder has its own monitor connected by ultra high frequency cables.

The following systematic system was used in tape to tape editing:

1. Record on the tape the first sequence. This came from the live camera to tape editing.
2. Advance beyond point one the editor videotape.
3. Depress the editor video record button.
4. Put the play back videotape into "play" within the next sequence to be recorded and then set the video level of the editing videotape deck.
5. With the video level set, rewind the editor videotape and select a picture cue in the first illustrated situation.
6. Locate the cue mark at least ten seconds before the point where editing should take place.
7. Time from cue point down to edit point without stopping the tape.
8. Repeat the process outlined in five, six and seven, with the original tape on the playback video recorder.
9. Return the playback recorder to the cue point.
10. Find the difference in time between the cue to edit runs of the playback and edit video recorders. At this point we have two separate times from cue to edit points. One for the playback video recorder and the other for the editor recorder.
11. Run out the difference in time on the appropriate videotape recorder. At this point both recorders will be at identical timed starting points.
12. Start both videotape recorders simultaneously.
13. Depress the edit button immediately after the edit time

has expired. The illustrated situation is their being recorded on the master tape.

14. Rewind and check.

Test Information

Test Procedure

The videotaped basketball test was developed around illustrated situations of basketball play edited onto one master tape. Preceding each illustrated situation of basketball play on videotape were the following two warnings:

Get Ready for

Question 1

Now

The "get ready for question one" portion ran for five seconds and was stated verbally. The "now" portion ran for approximately two seconds accompanied by a warning click. At the end of the situational illustration, the videotape shows the following instructions:

Read and Respond

to Question 1

Seibert and Snow (1966) indicated that multiple choice questions should allow fifteen to twenty seconds for response, completion questions fifteen to twenty seconds for response, and the alternative response question twelve to fifteen seconds.

Parallel to the videotape is a test manual with standardized instructions and procedures to follow. The basketball official's test manual includes a brief background to the test (see Appendix A), purpose, statistical analysis, instructions on how to administer the videotape

test and answer sheet. A basketball official's test booklet was developed with instructions to the examinee (see Appendix B) on the format of the test, the procedures to be followed, and the test questions. Three sample situational illustrations on the videotape are provided to accompany three sample questions in the examinee's test booklet and correct responses on the answer sheet are indicated to familiarize the examinee with the test method and response sheet (see Appendix C).

Test Administration

The basketball officiating test was administered to forty-four subjects. The examinees were chosen on the basis of basketball officiating ratings:

1. National Officials	10
2. State Officials	7
3. Apprentice Officials	8
4. Intramural Officials	10
5. No current rating	$\frac{9}{44}$

The "no current rating" group consisted of subjects who had recently finished the basketball officiating class at the University of North Carolina at Greensboro and subjects that had allowed their basketball rating to expire. The test was administered to the subjects through a twenty-three inch television monitor placed at desk height. Testing of subjects was either in pairs or singly. A copy of directions given to subjects may be found in Appendix D.

Test Analysis

Test analysis consisted of determining the objectivity of the test items using qualified judges. Eight national officials agreed to take the test. After taking the test in the previously described manner each official then reviewed the test items to determine the correct response. Test items were viewed many times by each national official and the response they would accept was recorded. Items were included in the final analysis if six or more of the eight national officials agreed upon the response.

All questions were scored on the basis of having all parts correct. If any part was incorrect then the whole question was scored as incorrect. This method was decided upon because the second and third parts to the questions were contingent upon getting the first part correct.

The statistical calculations were computed by the Triangular Universities Computational Center, Raleigh, North Carolina. The Testan-item analysis program, APG, 7-70, within this computer data bank calculated the following statistics: (a) mean, variance, and standard deviation, (b) Kuder-Richardson 20 reliability co-efficient, (c) standard error of measurement, and (d) difficulty index, point biserial correlation, and discrimination index. The Testan program was administered in the first instance on the examinees response to the first part of each question. The Testan program was also applied to the following groups: (a) first part correct, and all contingencies correct, scored as correct, (b) first part correct, first contingency correct, second contingency incorrect, scored incorrect, (c) first part correct, first contingency incorrect, no further analysis, scored incorrect, and (d) first part incorrect, no further analysis, scored incorrect.

Item analysis by the Testan-item analysis was used to indicate areas within the test that needed revision.

Validity of the test was calculated by the following four methods:

Item analysis by the Testan-item analysis program. This program used the Flanagan upper and lower 27% method that differentiates between the better and poorer items. The differentiation is based on the difficulty index, point biserial correlation, and discrimination index of each item.

Content Validity. This was calculated by the correlation of the final test content with the actual percentage of fouls and violations occurring in game situations.

Criterion Validity. Analysis of variance between the five groups of official ratings and the final test scores were calculated. With a significant F the groupings were then tested for homogeneity (Winer, 1971, p. 207). Tukey (a) was then calculated to determine which groups were significantly different, thus showing that the test has criterion validity.

Criterion Validity. The final analysis of validity was calculated by a utility index for treatments of ratings. This gives a measure of relationships between ratings and test scores based on the variance.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

Statistical AnalysisObjectivity

Of the seventy-one test items administered to forty-four subjects, only fifty-seven of these had objectivity, based upon judges' agreement, sufficiently high to be scored for the remaining analysis. The eight judges agreed unanimously on the correct response for twenty-two of these items. Twenty-six of the fifty-seven items had seven out of the eight judges agree upon the correct response. The last nine items included in the final analysis had agreement from six of the eight national officials. In total, the fifty-seven item responses were agreed upon by the judges 90% of the time.

Descriptive Data

The statistical computations for the total test scores were calculated on forty-four examinees. The mean was found to be 32.477, median 31.24, and mode 31.00. The standard deviation was 5.924 and the standard error was .893. A maximum score of forty-seven and minimum score of nineteen gave a range of twenty-eight. The descriptive statistics were representative of the normal curve as the Kurtosis was only negative .180 and Skewness was .306. Table 4 indicates the frequency of cases to the particular score.

Table 4
 Frequency Distribution of Raw Scores
 on Fifty-Seven Item Basketball Officiating Test

Test Score	Absolute Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adjusted Frequency (Percent)
19.00	1	2.3	2.3
23.00	1	2.3	4.5
24.00	1	2.3	6.8
25.00	1	2.3	9.1
26.00	1	2.3	11.4
27.00	3	6.8	18.2
28.00	2	4.5	22.7
29.00	5	11.4	34.1
30.00	2	4.5	38.6
31.00	7	15.9	54.5
32.00	2	4.5	59.1
33.00	3	6.8	65.9
36.00	3	6.8	72.7
37.00	1	2.3	75.0
38.00	5	11.4	86.4
40.00	2	4.5	90.9
42.00	2	4.5	95.5
44.00	1	2.3	97.7
47.00	<u>1</u>	<u>2.3</u>	<u>100.00</u>
Total	44	100.0	100.0

The Testan-item analysis program on the subjects' selection of first responses ignoring the contingency produced the following descriptive statistics:

Mean	36.0454
Variance	23.8584
Standard Deviation	4.8845
Reliability (KR - 20)	0.5686
Standard Error of Measurement	3.2081
Ideal Mean	35.6250

The subjects were divided into upper and lower groups by percentile as shown in the following Table 5.

Due to percentile grouping the lower group has one less case than the upper group but this is taken into account on the individual item computation of discrimination index, point biserial and difficulty index. The difficulty rating for the first choice selection, disregarding the contingency, was accepted between 10% and 93%.

The Testan-item analysis program on the subjects scored as to how they answered each question and its contingency produced the following descriptive statistics:

Mean	32.205
Variance	37.2828
Standard Deviation	6.1060
Reliability (KR-20)	0.7107
Standard Error of Measurement	3.2081
Ideal Mean	35.625

Table 5

Frequency Distribution and Percentiles
on First Choice of Fifty-seven Item Basketball Officiating Test

Score	Percentile	Frequency
29	0.09	4)
30	0.16	3)
31	0.20	2)
32	0.30	4)
33	0.36	3
34	0.41	2
35	0.43	1
36	0.57	6
37	0.61	2
38	0.68	3
39	0.75	3)
40	0.80	2)
41	0.89	4)
42	0.91	1)
43	0.95	2)
47	0.98	1)
48	1.00	1)

13 lower

14 upper

The subjects were divided into upper and lower groups by percentile as shown in the following Table 6.

Table 6
Frequency Distribution and Percentiles on Total
Score of Fifty-seven Item Basketball Officiating Test

Score	Percentile	Frequency
19	0.02	1)
23	0.05	1)
24	0.07	1)
25	0.09	1)
26	0.11	1)
27	0.18	3)
28	0.30	5)
29	0.39	4
30	0.45	3
31	0.59	6
32	0.64	2
33	0.68	2)
36	0.70	1)
38	0.86	5)
40	0.91	2)
42	0.95	2)
46	0.98	1)
47	1.00	1)

Lower 13

Upper 14

In this analysis both groups were comprised of the same number of subjects. In the second analysis the items had a range of difficulty from 13% to 93%. Fifteen items had a discrimination index lower than .1500. These items were eliminated and the items that discriminated better than .1500 were retained in the final test.

Reliability

The reliability was calculated by the Kuder-Richardson 20 formula. Calculating reliability by the Kuder-Richardson method requires only one administration of the test (Barrow and McGee, 1971, p. 407). Kuder-Richardson 20 formula probably underestimates the reliability of a test (Guilford, 1973, p. 418). This method of calculating reliability bases the reliability on internal consistency of each item with the total test variance. Rejection of those items that correlate poorly with the total test usually increases the Kuder-Richardson reliability. The reliability of the forty-two item test was .7899 based on the following descriptive statistics:

Mean	24.000
Variance	36.2325
Standard Deviation	6.0193
Standard Error of Measurement	2.7592
Ideal Mean	26.250

Test Questions, Correct Responses and Item Analysis

The following is a compilation of the information given by the Testan-item analysis program on each item. The first part to each item is the analysis based on the examinee's response to the first part of each question. The second part is the analysis of the total score of the examinee considering the contingency presented.

The first item analysis looked at the choices to the illustrated situation. The second item analysis shows: (a) first choice correct, first contingency correct, second contingency correct and the item is scored correct, (b) first choice correct, first contingency correct, second contingency incorrect and the item is scored incorrect, (c) first choice correct, first contingency incorrect, no further analysis and the item is scored incorrect, and (d) first choice incorrect, no further analysis and the item is scored incorrect. The functioning of the first choices was indicated in the first item analysis. Functioning of the contingencies to the first choice was analyzed by hand.

Item 1

Illegal dribble by white

First analysis

Discrimination index	0.4066	Response	T	F
Point biserial	0.2805	Upper	10	4
Difficulty index	0.5682	Lower	4	9
Correct response	T	Total	25	19

Second analysis

Discrimination index	0.2308	Response	a	b	c	d
Point biserial	0.1795	Upper	10	0	0	3
Difficulty index	0.5682	Lower	7	0	0	6
Correct responses	a	Total	25	0	0	19

*T F Correction _____

Eight out of the eight judges agreed upon the correct response.
This question discriminated very effectively on the selection of true

or false but this discrimination index decreased on the second analysis that included the contingency of correction. The difficulty index was close to the idea .500. Both responses functioned.

Item 2

Foul on white - pushing

First analysis

Discrimination index	0.3077	Response	T	F
Point biserial	0.3699	Upper	0	14
Difficulty index	0.8864	Lower	4	9
Correct response	F	Total	5	39

Second analysis

Discrimination index	0.0	Response	a	b	c	d
Point biserial	0.0714	Upper	4	0	8	1
Difficulty index	0.2727	Lower	4	0	5	4
Correct response	a	Total	12	0	26	6

T *F Correction Dark hacking

Seven out of the eight judges agreed upon the correct response. This question discriminated effectively on the selection of true or false. Discrimination index became zero with the correction contingency included. This statement thus discriminated but rule terminology did not discriminate. It could be said that the official would have called the foul on dark. Indication of what type of foul ranged from hacking, blocking and holding. This question was rejected due to this fault. The difficulty index was acceptable in both analyses. Both responses functioned. This question was deleted when calculating the final reliability.

Item 3

Line violation by white

First analysis

Discrimination index	0.2363	Response	T	F
Point biserial	0.1692	Upper	1	13
Difficulty index	0.7045	Lower	4	9
Correct response	F	Total	13	31

Second analysis

Discrimination index	0.3846	Response	a	b	c	d
Point biserial	0.2706	Upper	11	0	0	2
Difficulty index	0.6818	Lower	6	0	1	6
Correct response	a	Total	30	0	1	13

T *F Correction No infraction

All eight of the judges agreed upon the correct response.

This question had acceptable discrimination on the selection of true or false. The discrimination index improved with the correction contingency. The difficulty index was acceptable in both analyses. Both responses functioned.

Item 4

Foul on 24 black - blocking

First analysis

Discrimination index	0.1154	Response	T	F
Point biserial	0.1910	Upper	7	7
Difficulty index	0.5909	Lower	5	8
Correct response	F	Total	18	26

Second analysis

Discrimination index	0.0	Response	a	b	c	d
Point biserial	0.0367	Upper	5	0	2	6
Difficulty index	0.4318	Lower	5	0	2	6
Correct response	a	Total	19	0	6	19
	T	*F	Correction	<u>Black pushing</u>		

Six out of the eight judges agreed upon the correct response. This question's discrimination index in both analyses was below the acceptable level. Difficulty index was satisfactory in both analyses. Both response functioned. The television illustrated situation definitely showed a foul being committed. The above response shows the wide variations in interpretations of the rules at present. This question was deleted when calculating the final reliability.

Item 5

Foul on Gray - pushing

T F Correction _____

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 6

White ball from the side

T F Correction _____

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 7

Foul on white charging

T F Correction _____

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 8

White ball from the side

First analysis

Discrimination index	0.1209	Response	T	F
Point biserial	0.1036	Upper	6	8
Difficulty index	0.4545	Lower	4	9
Correct response	T	Total	20	24

Second analysis

Discrimination index	0.0	Response	a	b	c	d
Point biserial	-0.0082	Upper	5	0	0	8
Difficulty index	0.4545	Lower	5	0	0	8
Correct response	a	Total	20	0	0	24

*T F Correction _____

Seven out of the eight judges agreed upon the correct response. This question did not discriminate sufficiently at either level to warrant inclusion in the final calculation of reliability. The difficulty index for both analyses was within the acceptable range. Both responses functioned.

Item 9

Foul on white - holding

First analysis

Discrimination index	0.2418	Response	T	F
Point biserial	0.2251	Upper	2	12
Difficulty index	0.7273	Lower	5	8
Correct response	F	Total	12	32

Second analysis

Discrimination index	0.0	Response	a	b	c	d
Point biserial	0.1369	Upper	5	0	5	3
Difficulty index	0.3182	Lower	5	0	5	3
Correct response	a	Total	14	0	18	12

T *F Correction Pushing

Seven out of the eight judges agreed upon the correct response. This question discriminated at an acceptable level on the selection of true or false. The discrimination decreased with the correction contingency to a point where this question was rejected in final calculations of reliability. Difficulty index for both analyses was within the acceptable range. Both responses functioned.

Item 10

Foul on white - blocking

First analysis

Discrimination index	0.2473	Response	T	F
Point biserial	0.2005	Upper	3	11
Difficulty index	0.6364	Lower	6	7
Correct response	F	Total	16	28

Second analysis

Discrimination index	0.3846	Response	a	b	c	d
Point biserial	0.3077	Upper	10	0	1	2
Difficulty index	0.5227	Lower	5	0	3	5
Correct response	a	Total	23	0	4	17

T *F Correction Black charging

Seven out of the eight judges agreed upon the correct response. This question discriminated effectively on the selection of true or false. The discrimination index improved with the correction contingency. Difficulty index was close to the ideal level of .500. Both responses functioned.

Item 11

Foul on gray - pushing

First analysis

Discrimination index	0.1923	Response	T	F
Point biserial	0.2345	Upper	7	7
Difficulty index	0.4545	Lower	9	4
Correct response	F	Total	24	20

Second analysis

Discrimination index	0.2308	Response	a	b	c	d
Point biserial	0.3389	Upper	6	0	0	7
Difficulty index	0.2727	Lower	3	0	3	7
Correct response	a	Total	12	0	8	24

T *F Correction Black - blocking

Six out of the eight judges agreed upon the correct response. This question discriminated at the acceptable level in both analyses. Item difficulty was average in the true false selection, but more difficult with the correction contingency. All responses functioned.

Item 12

No rule infringement

First analysis

Discrimination index	-0.1099	Response	T	F
Point biserial	-0.0191	Upper	8	6
Difficulty index	0.5227	Lower	6	7
Correct response	F	Total	21	23

Second analysis

Discrimination index	0.0769	Response	a	b	c	d
Point biserial	0.0484	Upper	7	0	0	6
Difficulty index	0.5000	Lower	6	9	9	7
Correct response	a	Total	22	0	1	21

T * F Correction Gray - traveling

Eight out of the eight judges agreed upon the correct response. This question had unacceptable discrimination index in both analyses. Difficulty index was at the ideal level of .500. All response functioned. This item was not included in calculating the final test reliability.

Item 13

No rule infringement

First analysis

Discrimination index	0.2418	Response	T	F
Point biserial	0.2875	Upper	12	2
Difficulty index	0.6364	Lower	8	5
Correct response	T	Total	28	16

Second analysis

Discrimination index	0.4615	Response	a	b	c	d
Point biserial	0.3348	Upper	11	0	0	2
Difficulty index	0.6364	Lower	5	0	0	8
Correct response	a	Total	28	0	0	16

*T F Correction _____

All eight of the judges agreed upon the correct response. Discrimination index was acceptable in the true false selection. With the analysis of the contingency the discrimination index became very acceptable. Difficulty index was satisfactory. All responses functioned.

Item 14

Foul on 10 white - pushing

T F Correction _____

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 15

Black ball from the side

First analysis

Discrimination index	0.3407	Response	T	F
Point biserial	0.2054	Upper	8	6
Difficulty index	0.4773	Lower	3	10
Correct response	T	Total	21	23

Second analysis

Discrimination index	0.0769	Response	a	b	c	d
Point biserial	0.1543	Upper	7	0	0	6
Difficulty index	0.4773	Lower	6	0	0	7
Correct response	a	Total	21	0	0	23

*T F Correction _____

Seven out of the eight judges agreed upon the correct response. On the scoring of the true false selection this item had good discrimination but on the overall analysis the discrimination was unacceptable. Difficulty index was satisfactory. All responses functioned. This item was eliminated on the computation of the final reliability.

Item 16

Foul on black - hacking

T F Correction _____

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 17

Palming ball violation - white

First analysis

Discrimination index	0.0110	Response	T	F
Point biserial	0.0717	Upper	12	2
Difficulty index	0.7727	Lower	11	2
Correct response	T	Total	34	10

Second analysis

Discrimination index	0.2308	Response	a	b	c	d
Point biserial	0.2085	Upper	12	0	0	1
Difficulty index	0.7500	Lower	9	0	0	4
Correct response	a	Total	33	0	0	11

*T F Correction _____

Seven out of the eight judges agreed upon the correct response. This question had low discrimination on the true false selection. Discrimination improved to an acceptable level with the complete analysis of the test. The item was rather easy. All responses functioned.

Item 18

Foul on black - pushing

T F Correction _____

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 19

Foul on white - holding

T F Correction _____

This question was also deleted at the objectivity stage due to lack of agreement on the part of the judges. No further analysis was made on this question.

Item 20

No rule infringements

First analysis

Discrimination index	0.0934	Response	T	F
Point biserial	0.1777	Upper	11	3
Difficulty index	0.7955	Lower	9	4
Correct response	T	Total	35	9

Second analysis

Discrimination index	0.1538	Response	a	b	c	d
Point biserial	0.2015	Upper	11	0	0	2
Difficulty index	0.7955	Lower	9	0	0	4
Correct response	a	Total	35	0	0	9

*T F Correction _____

Seven out of the eight judges agreed upon the correct response. In the final analysis this question had acceptable discrimination. The item was quite easy as is indicated by the difficulty index. All responses functioned.

Item 21

No rule infringements

First analysis

Discrimination index	0.0165	Response	T	F
Point biserial	0.0876	Upper	11	3
Difficulty index	0.7045	Lower	10	3
Correct response	T	Total	31	13

Second analysis

Discrimination index	0.1538	Response	a	b	c	d
Point biserial	0.1033	Upper	11	0	0	2
Difficulty index	0.7045	Lower	9	0	0	4
Correct response	a	Total	31	0	0	13

*T F Correction _____

Seven out of the eight judges agreed upon the correct response.

In the final analysis this question had acceptable discrimination.

Difficulty index was acceptable. All responses functioned.

Item 22

Foul on white - pushing

T F Correction _____

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 23

Traveling violation by white

First analysis

Discrimination index	0.2363	Response	T	F
Point biserial	0.3392	Upper	1	13
Difficulty index	0.7955	Lower	4	9
Correct response	F	Total	9	35

Second analysis

Discrimination index	0.2308	Response	a	b	c	d
Point biserial	0.1780	Upper	11	0	1	1
Difficulty index	0.7727	Lower	8	0	0	5
Correct response	a	Total	34	0	2	8
	T	*F	Correction	<u>No infraction</u>		

Six out of the eight judges agreed upon the correct response. Discrimination on the true false decision and the correction contingency was satisfactory. Although the question was a little easy, all responses functioned.

Item 24

Foul on black - hacking

T F Correction _____

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 25

Foul on white - charging

T F Correction _____

Because there was lack of agreement among the judges this question was deleted at the objectivity stage. No further analysis was made on this question.

Item 26

Which decision would you make?

- a. Tieball.
- *b. Foul on gray - blocking.
- c. Foul on black - pushing.

Which penalty would accompany your choice?

1FT 2FT OB N
(*)()()()

First analysis

Discrimination index	0.1209	Response	A	B	C
Point biserial	0.0897	Upper	6	6	2
Difficulty index	0.3636	Lower	7	4	2
Correct response	B	Total	22	16	6

Second analysis

Discrimination index	0.3077	Response	a	b	c	d
Point biserial	0.2636	Upper	6	0	0	7
Difficulty index	0.2727	Lower	2	0	4	7
Correct response	a	Total	12	0	4	28

All eight of the judges agreed upon the correct response. Discrimination on the first choice was at a low level but analysis of the contingency selection made this acceptable. Question difficulty was satisfactory. All responses functioned.

Item 27

Which decision would you make?

- a. Foul on black - charging.
- b. Traveling violation on black.
- *c. Foul on gray - blocking.

Which penalty would accompany your choice?

1FT 2FT OB N
 (*)() () ()

First analysis

Discrimination index	0.1264	Response	A	B	C
Point biserial	0.2450	Upper	3	6	5
Difficulty index	0.2727	Lower	5	5	3
Correct response	C	Total	11	21	12

Second analysis

Discrimination index	0.1538	Response	a	b	c	d
Point biserial	0.2128	Upper	4	0	0	9
Difficulty index	0.2273	Lower	2	0	0	11
Correct response	a	Total	10	0	2	32

All of the eight judges agreed upon the correct response. This question had low discrimination on the first selection of responses and it improved to an acceptable level for this study with the contingency analysis. This question was rather hard. All responses functioned.

Item 28

Which decision would you make?

- a. Out of bounds violation on white.
- b. Foul on white - charging.
- *c. Illegal dribble on white.

Which penalty would accompany your choice?

1FT 2FT OB N
 () () (*) ()

First analysis

Discrimination index	0.1593	Response	A	B	C
Point biserial	0.1827	Upper	1	0	13
Difficulty index	0.7727	Lower	0	3	10
Correct response	C	Total	3	7	34

Second analysis

Discrimination index	0.3077	Response	a	b	c	d
Point biserial	0.3113	Upper	12	0	0	1
Difficulty index	0.7727	Lower	8	0	0	5
Correct response	a	Total	34	0	0	10

Six out of the eight judges agreed upon the correct response. This question discriminated at a low level on the first part. Discrimination improved to an acceptable level with the analysis of the contingencies. The item was a little easy. All responses functioned.

Item 29

Which decision would you make?

- a. Foul on white - hacking.
- b. Foul on black - pushing.
- *c. No rule infringement.

Which penalty would accompany your choice?

1FT 2FT OB N
 () () () (*)

First analysis

Discrimination index	0.1593	Response	A	B	C
Point biserial	0.1353	Upper	0	1	13
Difficulty index	0.8864	Lower	3	0	10
Correct response	C	Total	3	2	39

Second analysis

Discrimination index	0.0	Response	a	b	c	d
Point biserial	0.0350	Upper	12	0	0	1
Difficulty index	0.8636	Lower	12	0	0	1
Correct response	a	Total	38	0	1	5

Six out of the eight judges agreed upon the correct response. Discrimination on the first part of the question was low and this became unacceptable with the analysis of the contingency. The question was rather easy. All responses functioned. This question was deleted in calculating the final reliability.

Item 30

Which decision would you make?

- a. Foul on white - hacking.
- *b. No rule infringement.
- c. Traveling violation on black.

Which penalty would accompany your choice?

1FT 2FT OB N
 () () () (*)

First analysis

Discrimination index	0.1648	Response	A	B	C
Point biserial	0.1949	Upper	1	12	1
Difficulty index	0.8409	Lower	2	9	2
Correct response	B	Total	4	37	3

Second analysis

Discrimination index	0.3846	Response	a	b	c	d
Point biserial	0.1646	Upper	11	0	0	2
Difficulty index	0.7955	Lower	6	0	2	5
Correct response	a	Total	35	0	2	7

Seven out of the eight judges agreed upon the correct response. Discrimination on the first selection was low. Analysis of the contingency question raised the discrimination index to very acceptable level. Total question difficulty remained a little on the easy side. All responses functioned.

Item 31

Which decision would you make?

- a. Foul on white - charging.
- *b. Foul on 24 black - blocking.
- c. Tieball

Which penalty would accompany your choice

1FT 2FT OB N
 (*)() () ()

First analysis

Discrimination index	0.1868	Response	A	B	C
Point biserial	0.1410	Upper	2	8	4
Difficulty index	0.4545	Lower	3	5	5
Correct response	B	Total	8	20	16

Second analysis

Discrimination index	0.1538	Response	a	b	c	d
Point biserial	0.2610	Upper	8	0	0	5
Difficulty index	0.4545	Lower	6	0	1	6
Correct response	a	Total	20	0	1	23

Seven out of the eight judges agreed upon the correct response.

Discrimination index in both analyses was low but accepted for this study. Question difficulty was close to the ideal .500 and all responses functioned.

Item 32

Which decision would you make?

- a. Kicking ball violation on black.
- b. Traveling violation on black.
- *c. Illegal dribble on white.

Which penalty would accompany your choice?

1FT 2FT OB N
() () (*) ()

First analysis

Discrimination index	0.3462	Response	A	B	C
Point biserial	0.4122	Upper	7	0	7
Difficulty index	0.2727	Lower	11	0	2
Correct response	C	Total	30	2	12

Second analysis

Discrimination index	0.4615	Response	a	b	c	d
Point biserial	0.4678	Upper	7	0	0	6
Difficulty index	0.2955	Lower	1	0	0	12
Correct response	a	Total	13	0	0	31

Seven out of the eight judges agreed upon the correct response.

The discrimination in both analyses was very good. All responses functioned with this difficult question.

Item 33

Which decision would you make?

- *a. Traveling violation on white.
- b. Foul on black - hacking.
- c. Foul on white - pushing.

Which penalty would accompany your choice?

1FT 2FT OB N
 () () (*) ()

First analysis

Discrimination index	0.2308	Response	A	B	C
Point biserial	0.2884	Upper	14	0	0
Difficulty index	0.8636	Lower	10	3	0
Correct response	A	Total	38	5	1

Second analysis

Discrimination index	0.3077	Response	a	b	c	d
Point biserial	0.2200	Upper	13	0	0	0
Difficulty index	0.7955	Lower	9	0	1	3
Correct response	a	Total	35	0	2	7

Seven out of the eight judges agreed upon the correct response. This question discriminated at an acceptable level on both analyses. The question was a little easy. All responses functioned.

Item 34

Which decision would you make?

- a. Foul on black - hacking.
- b. Traveling violation on white.
- *c. No rule infringement.

Which penalty would accompany your choice?

1FT 2FT OB N
() () () (*)

First analysis

Discrimination index	0.0055	Response	A	B	C
Point biserial	0.0677	Upper	1	0	13
Difficulty index	0.9091	Lower	1	0	12
Correct response	C	Total	3	1	40

Second analysis

Discrimination index	0.1538	Response	a	b	c	d
Point biserial	0.1863	Upper	13	0	0	0
Difficulty index	0.9318	Lower	11	0	0	2
Correct response	a	Total	40	0	0	4

All of the eight judges agreed upon the correct response. This question had low discrimination in the first analysis, but acceptable discrimination taking the contingency into account. This question was very easy. All responses functioned. Although this question was not completely adequate it was still retained in the final analysis.

Item 35

Which decision would you make?

- *a. Foul on white - charging.
- b. Foul on white - hacking.
- c. Foul on black - blocking.

Which penalty would accompany your choice?

1FT 2FT OB N
(*)()()()

First analysis

Discrimination index	0.1923	Response	A	B	C
Point biserial	0.1834	Upper	7	6	1
Difficulty index	0.3182	Lower	4	9	0
Correct response	A	Total	14	27	3

Second analysis

Discrimination index	0.3077	Response	a	b	c	d
Point biserial	0.3367	Upper	7	0	0	6
Difficulty index	0.3182	Lower	3	0	0	10
Correct response	a	Total	14	0	0	30

Seven out of the eight judges agreed upon the correct response. Question discrimination in both analyses was at an acceptable level. Difficulty was acceptable. All responses functioned.

Item 36

Which decision would you make?

- a. Foul on white - hacking.
- *b. No rule infringement.
- c. Foul on black - hacking.

Which penalty would accompany your decision?

1FT 2FT OB N
() () () (*)

First analysis

Discrimination index	0.3077	Response	A	B	C
Point biserial	0.3291	Upper	0	14	0
Difficulty index	0.8636	Lower	3	9	1
Correct response	B	Total	5	38	1

Second analysis

Discrimination index	0.3077	Response	a	b	c	d
Point biserial	0.2474	Upper	13	0	0	0
Difficulty index	0.8182	Lower	9	0	2	2
Correct response	a	Total	36	0	2	6

Eight out of the eight judges agreed upon the correct response. Discrimination index in both analyses was acceptable. All responses functioned with this easy question.

Item 37

Which decision would you make?

- a. Traveling violation on black.
- *b. Illegal dribble on black.
- c. No rule infringement.

Which penalty would accompany your choice?

1FT 2FT OB N
 () () (*) ()

First analysis

Discrimination index	0.0110	Response	A	B	C
Point biserial	0.1130	Upper	1	12	1
Difficulty index	0.8182	Lower	2	11	0
Correct response	B	Total	5	36	3

Second analysis

Discrimination index	0.0769	Response	a	b	c	d
Point biserial	0.1923	Upper	11	0	0	2
Difficulty index	0.7955	Lower	10	0	0	3
Correct response	a	Total	35	0	1	8

All of the eight judges agreed upon the correct response. Discrimination on the first choice was low and unacceptable. Discrimination improved with the analysis of the contingency but not to an acceptable level. The question was easy. All responses functioned. This item was not included in calculating the final test reliability.

Item 38

Which decision would you make?

- a. Foul on black - hacking.
- b. Traveling violation on white.
- *c. Foul on black - holding.

Which penalty would accompany your choice?

1FT 2FT OB N
() (*) () ()

First analysis

Discrimination index	0.2033	Response	A	B	C
Point biserial	0.1301	Upper	8	1	5
Difficulty index	0.2727	Lower	10	1	2
Correct response	C	Total	29	3	12

Second analysis

Discrimination index	0.2308	Response	a	b	c	d
Point biserial	0.1928	Upper	4	0	0	9
Difficulty index	0.1364	Lower	1	0	2	10
Correct response	a	Total	6	0	6	32

Seven out of the eight judges agreed upon the correct response. Discrimination on both analyses was at an acceptable level. This question was the most difficult in the test. All responses functioned.

Item 39

Which decision would you make?

- a. Free throw violation.
- *b. Tieball.
- c. Foul on white - holding

Which penalty would accompany your choice?

1FT 2FT OB N
() () () (*)

First analysis

Discrimination index	0.1593	Response	A	B	C
Point biserial	0.2215	Upper	0	13	1
Difficulty index	0.8182	Lower	2	10	1
Correct response	B	Total	5	36	3

Second analysis

Discrimination index	0.1538	Response	a	b	c	d
Point biserial	0.1739	Upper	12	0	0	1
Difficulty index	0.7955	Lower	10	0	0	3
Correct response	a	Total	35	0	0	9

Seven out of the eight judges agreed upon the correct response. Discrimination on both analyses was low but acceptable. All responses functioned with this easy question.

Item 40

Which decision would you make?

- * a. No rule infringement.
- b. Foul on 10 black - holding.
- c. Foul on 21 black - hacking.

Which penalty would accompany your choice?

1FT 2FT OB N
() () () (*)

First analysis

Discrimination index	0.0	Response	A	B	C
Point biserial	-0.0294	Upper	14	0	0
Difficulty index	0.9091	Lower	13	0	0
Correct response	A	Total	40	2	2

Second analysis

Discrimination index	0.2308	Response	a	b	c	d
Point biserial	0.2283	Upper	13	0	0	0
Difficulty index	0.8409	Lower	10	0	3	0
Correct response	a	Total	37	0	3	4

All of the eight judges agreed upon the correct response. This question did not discriminate on the first choice. Discrimination on the contingency analysis made it acceptable. The question was rather easy. All responses functioned.

Item 41

Which decision would you make?

- a. Foul on black - hacking.
- b. Foul on black - blocking.
- *c. Foul on gray - charging.

Which penalty would accompany your choice?

1FT 2FT OB N
 (*)()()()

First analysis

Discrimination index	0.3516	Response	A	B	C
Point biserial	0.3990	Upper	0	8	6
Difficulty index	0.2045	Lower	3	9	1
Correct response	C	Total	5	30	9

Second analysis

Discrimination index	0.2308	Response	a	b	c	d
Point biserial	0.3706	Upper	5	0	0	8
Difficulty index	0.2045	Lower	2	0	1	10
Correct response	a	Total	9	0	1	34

Seven out of the eight judges agreed upon the correct response. Item discrimination on the first choice was very acceptable. Discrimination decreased on the analysis of the contingency to an acceptable level. This question was very difficult. All responses functioned.

Item 42

Which decision would you make?

- a. Traveling violation on gray.
- b. Foul on black - blocking.
- *c. Foul on gray - charging.

Which penalty would accompany your choice?

1FT 2FT OB N
(*)(*)(*)(*)

First analysis

Discrimination index	0.2033	Response	A	B	C
Point biserial	0.1834	Upper	4	5	5
Difficulty index	0.3182	Lower	7	4	2
Correct response	c	Total	17	13	14

Second analysis

Discrimination index	0.0769	Response	a	b	c	d
Point biserial	0.0331	Upper	5	0	0	8
Difficulty index	0.3182	Lower	4	0	0	9
Correct response	a	Total	14	0	0	30

All of the eight judges agreed upon the correct response. The discrimination index on the first part of the question was good. Discrimination on the whole question was unacceptable. The question had satisfactory difficulty. All responses functioned. This question was deleted in calculation of final reliability.

Item 43

Which decision would you make?

- a. Foul on black - blocking.
- *b. No rule infringement.
- c. Foul on white - charging.

Which penalty would accompany your choice?

1FT 2FT OB N
() () () (*)

First analysis

Discrimination index	-0.0659	Response	A	B	C
Point biserial	-0.1048	Upper	1	12	1
Difficulty index	0.8636	Lower	0	12	1
Correct response	B	Total	1	38	5

Second analysis

Discrimination index	0.0769	Response	a	b	c	d
Point biserial	0.0816	Upper	10	0	0	3
Difficulty index	0.7955	Lower	9	0	2	2
Correct response	a	Total	35	0	2	7

All of the eight judges agreed upon the correct response.

The discrimination value was unacceptable in both analysis. The question was too easy. All responses functioned. This question was eliminated in the final calculations on reliability.

Item 44

Which decision would you make?

- a. Foul on black - charging.
- b. Illegal dribble on black.
- *c. Foul on white - hacking.

Which penalty would accompany your choice?

1FT 2FT OB N
 ()(*)() ()

First analysis

Discrimination index	0.0769	Response	A	B	C
Point biserial	0.1871	Upper	0	0	14
Difficulty index	0.9318	Lower	1	0	12
Correct response	C	Total	2	1	41

Second analysis

Discrimination index	0.1538	Response	a	b	c	d
Point biserial	0.1922	Upper	12	0	1	0
Difficulty index	0.8182	Lower	12	0	1	2
Correct response	a	Total	36	0	5	3

Seven out of the eight judges agreed upon the correct response. Discrimination on the first choice was poor. Discrimination on the complete analysis of the question became acceptable for this study. The question was easy and all responses functioned.

Item 45

Which decision would you make?

- *a. Foul on 20 gray - blocking.
- b. Foul on 31 black - charging.
- c. Foul on 21 black - pushing.

Which penalty would accompany your choice?

1FT 2FT OB N
(*)(*)(*)(*)

First analysis

Discrimination index	0.4176	Response	A	B	C
Point biserial	0.3557	Upper	8	5	1
Difficulty index	0.3864	Lower	2	7	4
Correct response	A	Total	17	21	6

Second analysis

Discrimination index	0.1538	Response	a	b	c	d
Point biserial	0.3021	Upper	6	0	0	7
Difficulty index	0.3864	Lower	4	0	0	9
Correct response	a	Total	17	0	0	27

Six out of the eight judges agreed upon the correct response. The discrimination value on the first selection was very acceptable but on total analysis it decreased to a low acceptable level for this study. The question was at a satisfactory difficulty level. All responses functioned.

Item 46

Which decision would you make?

- a. Traveling violation on white.
- *b. Tieball.
- c. Foul on black - hacking.

Which penalty would accompany your choice?

1FT 2FT OB N
() () () (*)

First analysis

		Response	A	B	C
Discrimination index	0.4066	Upper	3	10	1
Point biserial	0.2884	Lower	7	4	2
Difficulty index	0.5227	Total	13	23	8
Correct response	B				

Second analysis

		Response	a	b	c	d
Discrimination index	0.3077	Upper	9	0	0	4
Point biserial	0.3406	Lower	5	0	1	7
Difficulty index	0.4773	Total	21	0	2	21
Correct response	a					

Six out of the eight judges agreed upon the correct response. The discrimination index in both analyses was very acceptable. The difficulty of the question approached the most desirable figure .500. All responses functioned.

Item 47

Which decision would you make?

- *a. No rule infringement.
- b. Traveling violation.
- c. Foul on gray - hacking.

Which penalty would accompany your choice?

1FT 2FT OB N
() () () (*)

First analysis

Discrimination index	0.1593	Response	A	B	C
Point biserial	0.1694	Upper	13	0	1
Difficulty index	0.8409	Lower	10	0	3
Correct response	A	Total	38	2	5

Second analysis

Discrimination index	0.3077	Response	a	b	c	d
Point biserial	0.2313	Upper	12	0	0	1
Difficulty index	0.7727	Lower	8	0	2	3
Correct response	a	Total	34	0	3	7

Seven out of the eight judges agreed upon the correct response. The discrimination index on the first choice was fairly low but improved to an acceptable level on the analysis of the contingency question. The question was relatively easy. All responses functioned.

Item 48

Which decision would you make?

- a. Moving violation - gray.
- *b. No rule infringement.
- c. Foul on gray - hacking.

Which penalty would accompany your choice?

1FT 2FT OB N
() () () (*)

First analysis

Discrimination index	0.7033	Response	A	B	C
Point biserial	0.5770	Upper	2	12	0
Difficulty index	0.5000	Lower	6	2	5
Correct response	B	Total	11	22	11

Second analysis

Discrimination index	0.3846	Response	a	b	c	d
Point biserial	0.3972	Upper	10	0	0	3
Difficulty index	0.5227	Lower	5	0	0	8
Correct response	a	Total	23	0	1	20

Seven out of the eight judges agreed upon the correct response. This item had excellent discrimination in the first analysis. Discrimination was very acceptable on the overall analysis. Item difficulty was close to perfection. All responses functioned.

Item 49

Which decision would you make?

- *a. Tieball.
- b. Traveling violation on black.
- c. Foul on gray - hacking.

Which official signal(s) would you use to accompany this decision?

*2 Time-out, no foul. 14 Jump ball

First analysis

Discrimination index	0.3516	Response	A	B	C
Point biserial	0.3600	Upper	6	1	7
Difficulty index	0.2500	Lower	1	1	11
Correct response	A	Total	11	4	29

Second analysis

Discrimination index	0.3846	Response	a	b	c	d
Point biserial	0.5350	Upper	6	0	0	7
Difficulty index	0.1591	Lower	1	0	2	10
Correct response	a	Total	7	0	4	33

Six out of the eight judges agreed upon the correct response.

In both analyses the discrimination value was acceptable. All responses functioned with this very difficult question.

Item 50

Which decision would you make?

- a. Traveling violation on black.
- b. Illegal dribble on black.
- *c. No rule infringement.

Which official signal(s) would you use to accompany this decision?

*17 Incidental contact or None.

First analysis

Discrimination index	0.4725	Response	A	B	C
Point biserial	0.3359	Upper	2	0	12
Difficulty index	0.6364	Lower	7	1	5
Correct response	C	Total	13	3	28

Second analysis

Discrimination index	0.3077	Response	a	b	c	d
Point biserial	0.2253	Upper	9	1	0	3
Difficulty index	0.6136	Lower	5	0	0	8
Correct response	a	Total	27	1	0	16

All of the eight judges agreed upon the correct response. The discrimination index in both analyses was acceptable. The question had average difficulty. All responses functioned.

Item 51

Which decision would you make?

- a. Foul on black - hacking.
- *b. Out of bounds violation - black.
- c. Traveling violation on white.

Which official signal(s) would you use to accompany this decision?

*2 Time-out, no foul.

First analysis

Discrimination index	0.0934	Response	A	B	C
Point biserial	0.1206	Upper	3	11	0
Difficulty index	0.7273	Lower	4	9	0
Correct response	B	Total	12	32	0

Second analysis

Discrimination index	0.5385	Response	a	b	c	d
Point biserial	0.4791	Upper	11	0	0	2
Difficulty index	0.5455	Lower	4	1	4	4
Correct response	a	Total	24	1	7	12

Eight out of the eight judges agreed upon the correct response. This question had unacceptable discrimination on the first analysis but excellent discrimination overall. The question was average in difficulty. This question did not function in alternative three, a more appropriate alternative needed to be found. In the final calculation of reliability this question was still included.

Item 52

Which decision would you make?

- *a. Foul on white 10 - hacking.
- b. Tieball.
- c. Foul on white 10 - holding.

Which official signal(s) would you use to accompany this decision?

- *1 Time-out, foul. 16 illegal use of hands - hacking

First analysis

Discrimination index	0.3901	Response	A	B	C
Point biserial	0.2564	Upper	13	0	1
Difficulty index	0.7273	Lower	7	1	5
Correct response	A	Total	32	2	10

Second analysis

Discrimination index	0.3846	Response	a	b	c	d
Point biserial	0.3505	Upper	13	0	0	0
Difficulty index	0.6818	Lower	8	2	0	3
Correct response	a	Total	30	2	0	12

All of the eight judges agreed upon the correct response. Discrimination index in both analyses was very acceptable. The question was a little easy. All responses functioned.

Item 53

Which decision would you make?

- *a. Traveling violation on white.
- b. Three second violation white.
- c. Foul on black - blocking.

Which official signal(s) would you use to accompany this decision?

*2 Time-out, no foul. 12 Traveling.

First analysis

Discrimination index	0.4066	Response	A	B	C
Point biserial	0.2697	Upper	10	3	1
Difficulty index	0.5227	Lower	4	7	2
Correct response	A	Total	23	17	4

Second analysis

Discrimination index	0.6154	Response	a	b	c	d
Point biserial	0.4300	Upper	10	0	0	3
Difficulty index	0.4773	Lower	2	0	2	9
Correct response	a	Total	21	0	2	21

Seven out of the eight judges agreed upon the correct response. Discrimination index was very acceptable in the first analysis and excellent in the second analysis. Question difficulty was acceptable with all responses functioning.

Item 54

Which decision would you make?

- a. Traveling violation on black.
- b. Foul on white - hacking.
- *c. Tieball.

Which official signal(s) would you use to accompany this decision?

*2 Time-out, no foul. 14 Jump ball.

First analysis

Discrimination index	0.2418	Response	A	B	C
Point biserial	0.1462	Upper	0	2	12
Difficulty index	0.6818	Lower	1	4	8
Correct response	C	Total	3	11	30

Second analysis

Discrimination index	0.7692	Response	a	b	c	d
Point biserial	0.5413	Upper	11	0	1	1
Difficulty index	0.3409	Lower	1	0	8	4
Correct response	a	Total	15	0	15	14

Eight out of the eight judges agreed upon the correct responses. The discrimination value on the analysis of contingencies was excellent. This question had acceptable difficulty. All responses functioned.

Item 55

Which decision would you make?

- a. Traveling violation on black.
- b. Foul on white - holding.
- *c. Foul on black - pushing.

Which official signal(s) would you use to accompany this decision?

1 Time-out, foul. 9 Pushing or charging.

First analysis

Discrimination index	-0.0714	Response	A	B	C
Point biserial	-0.2171	Upper	0	1	13
Difficulty index	0.9773	Lower	0	0	13
Correct response	C	Total	0	1	43

Second analysis

Discrimination index	-0.0769	Response	a	b	c	d
Point biserial	-0.0352	Upper	12	0	0	1
Difficulty index	0.9318	Lower	13	0	0	0
Correct response	a	Total	41	1	0	2

All of the eight judges agreed upon the correct response.

Both analyses discriminated negatively and therefore the question was unacceptable. The question was too easy. Response A did not function. This question was not used in calculating the final reliability.

Item 56

Which decision would you make?

- a. Foul on white - charging.
- *b. Foul on gray - blocking.
- c. Foul on gray - hacking.

Which official signal(s) would you use to accompany this decision?

*1 Time-out, foul. 10 Blocking.

First analysis

Discrimination index	0.4725	Response	A	B	C
Point biserial	0.3895	Upper	1	12	1
Difficulty index	0.6591	Lower	5	5	3
Correct response	B	Total	8	29	7

Second analysis

Discrimination index	0.3846	Response	a	b	c	d
Point biserial	0.3985	Upper	12	0	0	1
Difficulty index	0.6818	Lower	7	0	0	6
Correct response	a	Total	30	0	1	13

All of the eight judges agreed upon the correct response. This question had average difficulty. In both analyses the question discriminated very effectively. All responses functioned.

Item 57

Which decision would you make?

- a. No rule infringement.
- b. Foul on white - pushing.
- c. Foul on black - blocking.

Which official signal(s) would you use to accompany this decision?

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 58

Which decision would you make?

- a. Foul on 14 white - hacking.
- b. Foul on 10 black - hacking.
- *c. Foul on 20 white - hacking.

Which official signal(s) would you use to accompany this decision?

- *1 Time-out, foul. 16 illegal use of hands - hacking.

First analysis

Discrimination index	-0.0110	Response	A	B	C
Point biserial	0.0439	Upper	2	10	2
Difficulty index	0.1818	Lower	1	10	2
Correct response	C	Total	5	31	8

Second analysis

Discrimination index	0.0	Response	a	b	c	d
Point biserial	-0.0625	Upper	3	0	0	10
Difficulty index	0.2955	Lower	3	0	0	10
Correct response	a	Total	13	0	0	31

Six out of the eight judges agreed upon the correct response. This question was unacceptable due to negative discrimination in both analysis. All responses functioned with this difficult question. This item was eliminated on the computation of the final reliability.

Item 59

Which decision would you make?

- a. Foul on black - blocking.
- b. No rule infringement.
- *c. Foul on white - charging.

Which official signal(s) would you use to accompany this decision?

*1 Time out, foul. 9 Pushing or charging.

First analysis

Discrimination index	-0.1923	Response	A	B	C
Point biserial	-0.1435	Upper	4	3	7
Difficulty index	0.6818	Lower	2	2	9
Correct response	C	Total	8	6	30

Second analysis

Discrimination index	0.0	Response	a	b	c	d
Point biserial	0.0203	Upper	7	0	0	6
Difficulty index	0.5909	Lower	7	1	2	3
Correct response	a	Total	26	1	2	15

Seven out of the eight judges agreed upon the correct response. This question had negative discrimination on the first set of choices and no discrimination on the analysis of the contingencies. This question had average difficulty. All responses functioned. Computation of the final reliability did not include this question.

Item 60

Which decision would you make?

- a. Foul on black - pushing.
- b. Foul on white - pushing.
- c. Traveling violation on white.

Which official signal(s) would you use to accompany this decision?

Lack of consensus by the judges eliminated this question.

Item 61

Which decision would you make?

- a. Foul on white - hacking.
- *b. No rule infringement.
- c. Traveling violation on white.

Which official signal(s) would you use to accompany this decision?

*17 Incidental contact or none.

First analysis

Discrimination index	0.0824	Response	A	B	C
Point biserial	0.1257	Upper	1	13	0
Difficulty index	0.8636	Lower	2	11	0
Correct response	B	Total	4	38	2

Second analysis

Discrimination index	0.2308	Response	a	b	c	d
Point biserial	0.2181	Upper	13	0	0	0
Difficulty index	0.8409	Lower	10	0	0	3
Correct response	a	Total	37	0	0	7

All of the eight judges agreed upon the correct response.

The discrimination index on the first part of the question was poor. The second analysis gave an acceptable discrimination index. This question was relatively easy with all responses functioning.

Item 62

Which decision would you make?

- *a. Foul on white - holding.
- b. Foul on white - hacking.
- c. Traveling violation on black.

Which official signal(s) would you use to accompany this decision?

*1 Time-out, foul. 8 Holding.

First analysis

Discrimination index	0.1209	Response	A	B	C
Point biserial	0.1264	Upper	6	8	0
Difficulty index	0.3864	Lower	4	6	3
Correct response	A	Total	17	20	7

Second analysis

Discrimination index	0.0	Response	a	b	c	d
Point biserial	-0.0162	Upper	4	1	0	8
Difficulty index	0.3409	Lower	4	0	0	9
Correct response	a	Total	15	1	0	28

Seven out of the eight judges agreed upon the correct response.

This question had low discrimination in both analyses. Difficulty rating was satisfactory. All responses functioned. This question was not used in calculating the final reliability.

Item 63

Which decision would you make?

- a. Foul on 10 white - hacking.
- b. No rule infringement.
- *c. Foul on 25 black - pushing.

Which official signal(s) would you use to accompany this decision?

*1 Time-out, foul. 9 pushing or charging.

First analysis

Discrimination index	0.0879	Response	A	B	C
Point biserial	0.0715	Upper	1	1	12
Difficulty index	0.8636	Lower	1	2	10
Correct response	C	Total	3	3	38

Second analysis

Discrimination index	-0.0769	Response	a	b	c	d
Point biserial	-0.0614	Upper	10	0	1	2
Difficulty index	0.8182	Lower	11	0	0	2
Correct response	a	Total	36	0	1	7

All of the eight judges agreed upon the correct response. Discrimination index was not acceptable in either analyses. The question was easy and all responses functioned. This question was not included in the final analysis of reliability.

Item 64

Which decision would you make?

- *a. Traveling violation on white.
- b. Tieball.
- c. No rule infringement.

Which official signal(s) would you use to accompany this decision?

- *2 Time-out, no foul. 12 traveling.

First analysis

Discrimination index	0.4176	Response	A	B	C
Point biserial	0.3329	Upper	8	1	5
Difficulty index	0.4091	Lower	2	3	8
Correct response	A	Total	18	4	22

Second analysis

Discrimination index	0.3846	Response	a	b	c	d
Point biserial	0.3862	Upper	6	0	1	6
Difficulty index	0.2955	Lower	1	0	3	9
Correct response	a	Total	13	0	6	25

All of the eight judges agreed upon the correct response. This question had very acceptable discrimination in both analyses. Question difficulty overall was satisfactory. All responses functioned.

Item 65

Which decision would you make?

- a. Foul on black - hacking.
- *b. Out of bounds violation.
- c. Traveling violation on white.

Which official signal(s) would you use to accompany this decision?

*2 Time-out, no foul.

First analysis

Discrimination index	0.0824	Response	A	B	C
Point biserial	0.2134	Upper	0	13	1
Difficulty index	0.9091	Lower	1	11	1
Correct response	B	Total	1	40	3

Second analysis

Discrimination index	0.4615	Response	a	b	c	d
Point biserial	0.3905	Upper	11	0	1	1
Difficulty index	0.6818	Lower	5	0	5	3
Correct response	a	Total	30	0	8	6

Seven out of the eight judges agreed upon the correct response. This question had poor discrimination on the first choice. Discrimination was very acceptable on the analysis of consequences. The overall question has average difficulty. All responses functioned.

Item 66

Which decision would you make?

- *a. Foul on gray - blocking.
- b. Foul on gray - hacking.
- c. Foul on white - charging.

Which official signal(s) would you use to accompany this decision?

- *1 Time-out, foul. 10 Blocking.

First analysis

Discrimination index	0.2473	Response	A	B	C
Point biserial	0.1862	Upper	11	2	1
Difficulty index	0.6818	Lower	7	4	2
Correct response	A	Total	30	10	4

Second analysis

Discrimination index	0.3077	Response	a	b	c	d
Point biserial	0.3383	Upper	10	0	0	3
Difficulty index	0.5909	Lower	6	1	0	6
Correct response	a	Total	26	2	0	16

Seven out of the eight judges agreed upon the correct response. Discrimination in both analyses was acceptable. The degree of difficulty was average and all responses functioned.

Item 67

Which decision would you make?

- a. Traveling violation on white.
- b. No rule infringement.
- c. Foul on white - hacking.

Which official signal(s) would you use to accompany this decision?

This question was deleted at the objectivity stage as the judges had no consensus on the correct response. No further analysis was made on this question.

Item 68

Which decision would you make?

- *a. No rule infringement.
- b. Foul on white - hacking.
- c. Traveling violation on black.

Which official signal(s) would you use to accompany this decision?

*17 Incidental contact or none.

First analysis

		Response	A	B	C
Discrimination index	0.3901				
Point biserial	0.2961	Upper	13	1	0
Difficulty index	0.6818	Lower	7	2	4
Correct response	A	Total	30	3	11

Second analysis

		Response	a	b	c	d
Discrimination index	0.6154					
Point biserial	0.3390	Upper	12	0	0	1
Difficulty index	0.6364	Lower	4	0	0	9
Correct response	a	Total	28	0	0	16

All of the eight judges agreed upon the correct response. The index of discrimination on the first part was very acceptable. Discrimination improved on the contingency to become excellent. This question had average difficulty. All responses functioned.

Item 69

Which decision would you make?

- a. Tieball.
- b. Foul on white - hacking.
- c. Traveling violation on black.

Which official signal(s) would you use to accompany this decision?

This question was also deleted at the objectivity stage due to lack of agreement on the part of the judges. No further analysis was made on this question.

Item 70

Which decision would you make?

- a. Traveling violation on white.
- *b. Foul on black - hacking.
- c. Foul on white - hacking.

Which official signal(s) would you use to accompany this decision?

*1 Time-out, foul. 16 Illegal use of hands - hacking.

First analysis

Discrimination index	0.4176	Response	A	B	C
Point biserial	0.3637	Upper	5	8	1
Difficulty index	0.4773	Lower	2	2	9
Correct response	B	Total	8	21	15

Second analysis

Discrimination index	0.3077	Response	a	b	c	d
Point biserial	0.2864	Upper	7	0	0	6
Difficulty index	0.4318	Lower	3	0	0	10
Correct response	a	Total	19	1	0	24

Seven out of the eight judges agreed upon the correct response. In both analyses this question had very acceptable discrimination. The difficulty of this question was acceptable. All responses functioned.

Item 71

Which decision would you make?

- *a. No rule infringement.
- b. Line violation on white.
- c. Line violation on gray.

Which official signal(s) would you use to accompany your choice?

*5 Point scored or Blank.

First analysis

Discrimination index	0.1593	Response	A	B	C
Point biserial	0.2239	Upper	13	1	0
Difficulty index	0.7955	Lower	10	3	0
Correct response	A	Total	35	8	1

Second analysis

Discrimination index	0.6923	Response	a	b	c	d
Point biserial	0.5343	Upper	13	0	0	0
Difficulty index	0.6818	Lower	4	0	2	7
Correct response	a	Total	30	0	2	12

Seven out of the eight judges agreed upon the correct response. Item discrimination was at a very acceptable level in the final analysis. Difficulty level was acceptable and all responses functioned. This picture was one of the hardest to see. It was retained in the final analysis but would be rejected if a better illustration had been available.

Validity

Content Validity

The forty-two items that remained in the final test provided the content breakdown shown in Table 7.

Fifteen questions required the response of no infraction when, in fact, they were measuring one's knowledge of basketball officiating. Predominantly these fifteen questions were on the easy side but they all discriminated between the upper and lower groups. The final content does not exactly parallel the original content. Correlation of the percentage of rule infringements occurring in twelve women's basketball games with the content of the forty-two item test gave a relationship of .8449. The content of the final test is significantly related to the percentage of violations and fouls occurring in women's college basketball games at the .01 level of confidence.

Criterion Validity

The descriptive statistics on the forty-two item test gave a total mean of 24.0. The means and standard deviations for the D.G.W.S. official rating groupings are in Table 8.

The intramural and apprentice group means placed these two groups in the opposite order from where their current ratings would put them.

Table 7
 Fouls and Violations Being Measured
 in the Forty-two Item Test

Rule	Questions	%
Fouls		
Blocking	7	25.9%
Charging	3	11.1
Hacking	3	11.1
Holding	1	3.7
Pushing	0	0.0
Pulling	0	0.0
Tripping	0	0.0
Others	0	0.0
Violations		
Field goal	0	0.0 %
Free throw	0	0.0
Illegal dribble	4	14.8
Jumpball	0	0.0
Out of bounds	2	7.4
Three second lane	0	0.0
Tieball	4	14.8
Traveling	3	11.1
Others	0	0.0

Table 8

Means and Standard Deviations
of the Five D.G.W.S. Basketball Groups

	N	Mean	Standard Deviation
National Officials	10	32.00000	3.88730
State Officials	7	27.14285	3.93398
Intramural Officials	10	22.20000	3.45768
Apprentice Officials	8	20.25000	2.05187
No Rating	9	18.88889	3.51584
Total	44	24.00000	6.01930

The standard error and adjusted means for the five groups are presented in Table 9.

The adjusted group means and standard error of measurement were used in the calculation of the analysis of variance. See Table 10 for these data.

The D.G.W.S. rating was the dependent variable and the independent variable was the basketball officiating test. The homogeneity of the group was found to be acceptable (Guilford, 1973, pp. 409-410). The F of 22.8152 indicated that one or more groups were significantly different. Further treatment of the data to find out which groups are significantly different utilized the Tukey (a) method and shown in Table 11 (Weber and Lamb, 1970, pp. 109-110).

Table 11 shows that the basketball officiating test did discriminate effectively among the D.G.W.S. rating groups. Lack of significance in differences between those with no ratings, apprentice and intramural ratings may be due to the overall difficulty of the test. A conclusion was drawn that the basketball officiating test has criterion validity with the present D.G.W.S. ratings.

Finally, calculation of a fixed factor utility index revealed 66% of the treatment accounted for. This means that the relationship between the basketball officiating test and D.G.W.S. ratings is 0.8152. One may interpret this as revealing high criterion validity.

Discussion of Findings in Relation to Previous Research

The Kruder-Richardson 20 reliability of .7899 was considerably higher than that found by Landis et al. (1971) in the national teacher's examination project. Landis et al. (1971) used thirty-seven subjects and

Table 9
Descriptive Statistics on the Five
D.G.W.S. Basketball Official Rating Groupings

Group	N	Adj. Grp. Mean	Std. Err.
National	10	31.99995	1.09175
State	7	27.14284	1.30488
Intramural	10	22.19997	1.09175
Assoc.	8	20.24998	1.22061
No Rating	9	18.88885	1.15080

Table 10

Analysis of Variance between D.G.W.S. Ratings
and the Basketball Officiating Test

Source of Variance	D.F.	Sum of Sq.	Mean Sq.	F-Value
Equality of Adj. Cell Means	4	1087.7456	171.9363	22.8152
Error	39	464.8442	11.9191	

Table 11
 Identification of Differences that are
 Significant between the D.G.W.S. Groups Means

		No Ratings	Apprentice	Intramural	State	National
	Adjusted Means	18.88885	20.24998	22.19997	27.14284	31.99995
No Ratings	18.88855	-	1.3611	3.3111	8.2540**	13.1111**
Apprentice	20.24998		-	1.9500	6.8929**	11.7500**
Intramural	22.19997			-	4.9429*	9.8000**
State	27.14284				-	4.8571**
National	31.99995					-

* < .05 level of significance

** < .01 level of significance

had thirty-one illustrated situations. The basketball officiating test was approximately 2.3 times longer than the national teacher's examination (Landis et al., 1971).

Presentation of the illustrated situation by videotape prior to the examinee seeing the question was very effective. Many examinees commented on how realistic this was to an actual game situation.

Response time of fifteen seconds between the illustrated situations was sufficient for all examinees in this study. Verbal warning and the next click sound were found to be sufficient in cueing the examinee for the next illustrated situation on videotape.

Open ended questions as presented in the true-false items with correction contingency discriminated effectively on the first selection in most instances. The true-false question failed generally when the examinee had to state the correction. The failure was not on the major decision of calling the foul but on the type or naming of the foul. Rule interpretations varied so much on the actual call that many questions had to be rejected. Multiple choice questions of three alternatives removed part of the rule interpretation by having the correct response and distractors that often were completely different infringements.

The general consensus of the judges was that this test did measure basketball officiating. It was also felt that there was a need for such an instrument to help in rule interpretation. Finally it was pointed out time and again the value such a test would have as a teaching tool for basketball officials.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this study was to construct an objective basketball official's test through the medium of television. Twelve hours of women's basketball were videotaped and seventy-one illustrated situations were edited onto one master videotape. Seventy-one questions were constructed to accompany the illustrated situations. The questions were true-false and multiple-choice types with contingent parts related to the response to the first section of each question. The basketball officiating test was comprised of illustrated situations on tape and the seventy-one questions in the accompanying booklet. Accompanying the tape and the booklet was an answer sheet especially constructed for this test. The tape ran continuously with the illustrated situations placed fifteen seconds apart.

The test was administered to forty-four subjects with varying ratings in basketball officiating. The subjects were divided into five distinct groups based on their D.G.W.S. basketball ratings. The groups were national officials, state officials, apprentice officials, intramural officials and those with no present rating.

The objectivity standard of each illustrated situation was set at six or more of eight national officials agreeing on the one response as correct. After this statistical treatment, fifty-seven questions remained for further analysis. The remaining fifty-seven items were subjected to a Testan-item analysis program twice. The first program looked

at how the first set of responses functioned and the second program analyzed the questions as a whole. After these two item analyses, fifteen more questions were rejected on the basis of poor discrimination. Forty-two items remained in the final test. The final test had a Kuder-Richardson reliability coefficient of 0.7899. Content within the final forty-two item test correlated significantly with the percentage of fouls and violations occurring within twelve women's basketball games.

A significant difference on test scores was found between the national officials and all other groups. Also a significant difference was found between the test scores of the state officials and all other groups. With these significant differences, it was concluded that the basketball officiating test had criterion validity. The amount of variance the test measures was found to be sixty-six percent and the relationship between D.G.W.S. ratings and the basketball official's test was 0.8152.

In conclusion, this study showed the feasibility of using television testing in the course of measuring basketball officiating judgments. The test in no instance was perfect due to technical problems encountered within its construction. With objectivity at 90% on the first fifty-seven items, reliability at 0.7899 on the remaining forty-two questions and four forms of validity all acceptable, the author is prepared to suggest that this technique of testing could be used to replace part of the current paper and pencil test used for D.G.W.S. ratings.

Limitations of the Study

Limitations occurred in the construction of the basketball official's test that were not originally anticipated. Results and conclusions shown in this study were limited by the following points:

1. Videotaping of the games were not of the highest quality due to poor lighting within the gymnasium.
2. Cameras need to be placed further away from the basketball play to avoid the effect that the moving players had on the light meter reading.
3. More sophisticated equipment would have improved the edit portions within the tape.
4. Due to the uniqueness of the testing method, it became obvious that more example questions were needed.
5. The number of subjects taking the test was restricted and this limited the overall analysis of data.

Recommendations

It is recommended that:

1. The present study be repeated in its entirety with the limitations rectified.
2. Such tests be developed in other areas to assist in standardization of rule interpretations.
3. Such tests could be used on national television to provide the viewing audience a chance to test their own knowledge and to become more appreciative of the demands placed upon officials.
4. Such tapes be developed as teaching instruments to help standardize the official's interpretation of the rules.

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Appendix A

Basketball Officiating Test Manual

Purpose: To measure one's ability to recognize and interpret D.G.W.S. basketball rules, 1973-1974.

Background: This test was developed to provide a standard measure of basketball officiating. By providing illustrated situations of basketball play, the test is able to measure abilities of understanding and application of basketball rules in an objective manner.

Statistical Treatment:

Objectivity: Six or more of eight national officials had to agree upon the correct response.

Total objectivity: 90% agreement.

Reliability: Kuder-Richardson formula 20.

$$r = .7899$$

Validity: Content: Correlation of the percentage of fouls and violations occurring in twelve games with the final forty-two item basketball officials test. This correlation was significant at the .01 level of confidence.

Criterion: Analysis of variance between national, state, apprentice, intramural and officials with no rating showed that the test discriminated very effectively at the national and state levels of ratings against the other three levels.

There was a relationship of .81 between the basketball rating groups and the basketball officiating test scores. This relationship was obtained by a fixed factor utility index.

Item Analysis: Items that did not discriminate were rejected prior to this. All items retained functioned, discriminated and had an acceptable range of difficulty.

Administration:

Equipment: One videotape recorder
One twenty-three inch television monitor
Test videotape
Test booklets
Test answer sheets

Time: approximately forty-five minutes

Directions: Read aloud to the examinees. "You are about to participate in a videotaped basketball official's test administered under the American Association for Health, Physical Education, and Recreation, Division for Girls and Women's Sports, Basketball Rules, 1973-74. This test shows standard illustrated situations of basketball play that require you to identify the rule infraction, if any, that occurred.

Seventy-one illustrated basketball situations will be shown to you through the television monitor. Each basketball situation requires you to turn the

page; read the question, and select your choice by marking the accompanying answer sheet. After twelve seconds you will be visually and verbally warned 'Get ready for Question 1' and after five seconds 'Now' will appear visually and a 'click' will warn you of the impending illustration due to start.

Read general directions and directions true-false.

Have you any questions regarding the test?

Remember, it is the first infringement of rules that stops play. Do not turn the question page until after you have seen the illustrate situation on the television."

Start the tape.

Example A.

Example B.

Repeat example A and B if needed to familiarize the examinees with the test method.

Questions 1 to 25

Read your test booklet.

Example C.

Question 26 to 48.

Stop tape, look at second part of example C.

Study page two of the answer sheet.

One minute - start tape.

Questions 49 to 71.

Finish

Score the forty-two items that comprise the final test.

Appendix B
Basketball Officiating Test
(D.G.W.S. Rules)

General Directions

This is a test of basketball officiating using the medium of television. Throughout the test you will observe basketball play on the television monitor for short periods of time. After observing the illustrated situation you will go to your booklet and read the question associated with the play. Accompanying the test booklet is a separate answer sheet for your response.

Example

A. Tieball.

Correction _____.

B. Foul on dark-blocking.

Correction _____.

1. Illegal dribble by white.
2. Foul on white - pushing.
3. Line violation by white.
4. Foul on 24 black - blocking.
5. Foul on gray - pushing.
6. White ball from the side.
7. Foul on white charging.
8. White ball from the side.

9. Foul on white - holding.
10. Foul on white - blocking.
11. Foul on gray - pushing.
12. No rule infringement.
13. No rule infringement.
14. Foul on 10 white - pushing.
15. Black ball from the side.
16. Foul on black - hacking.
17. Palming ball violation - white.
18. Foul on black - pushing.
19. Foul on white - holding.
20. No rule infringements.
21. No rule infringements.
22. Foul on white - pushing.
23. Traveling violation by white.
24. Foul on black - hacking.
25. Foul on white - charging.

Multiple Choice Questions

Watch each illustration carefully. Read each question carefully. Place an X in the proper column on the separate answer sheet to indicate the correct response.

Questions 26 through 48 require you to choose the penalty, if any, that would accompany your decision. Record in the appropriate column with an X.

1 FT - One free throw.

2 FT - Two free throws.

OB - Out of bounds.

N - None.

Example C Illustration

C. Which decision would you make?

- a. Foul on white - pushing.
- b. Foul on black - pushing.
- c. Foul on black - holding.

Which penalty would accompany your choice?

A B C 1FT 2FT OB N
 C. () () (x), () () () () .

Get ready for question 26.

26. Which decision would you make?

- a. Tieball.
- b. Foul on gray - blocking.
- c. Foul on black - pushing.

Which penalty would accompany your choice?

27. Which decision would you make?

- a. Foul on black - charging.
- b. Traveling violation on black.
- c. Foul on gray - blocking.

Which penalty would accompany your choice?

28. Which decision would you make?

- a. Out of bounds violation on white.

- b. Foul on white - charging.
- c. Illegal dribble on white.

Which penalty would accompany your choice?

29. Which decision would you make?

- a. Foul on white - hacking.
- b. Foul on black - pushing.
- c. No rule infringement.

Which penalty would accompany your choice?

30. Which decision would you make?

- a. Foul on white - hacking.
- b. No rule infringement.
- c. Traveling violation on black.

Which penalty would accompany your choice?

31. Which decision would you make?

- a. Foul on white - charging.
- b. Foul on 24 black - blocking.
- c. Tieball

Which penalty would accompany your choice?

32. Which decision would you make?

- a. Kicking ball violation on black.
- b. Traveling violation on black.
- c. Illegal dribble on white.

Which penalty would accompany your choice?

33. Which decision would you make?

- a. Traveling violation on white.
- b. Foul on black - hacking.

c. Foul on white - pushing.

Which penalty would accompany your choice?

34. Which decision would you make?

a. Foul on black - hacking.

b. Traveling violation on white.

c. No rule infringement.

Which penalty would accompany your choice?

35. Which decision would you make?

a. Foul on white - charging.

b. Foul on white - hacking.

c. Foul on black - blocking.

Which penalty would accompany your choice?

36. Which decision would you make?

a. Foul on white - hacking.

b. No rule infringement.

c. Foul on black - hacking.

Which penalty would accompany your decision?

37. Which decision would you make?

a. Traveling violation on black.

b. Illegal dribble on black.

c. No rule infringement.

Which penalty would accompany your choice?

38. Which decision would you make?

a. Foul on black - hacking.

b. Traveling violation on white.

c. Foul on black - holding.

Which penalty would accompany your choice?

39. Which decision would you make?

- a. Free throw violation.
- b. Tieball.
- c. Foul on white - holding.

Which penalty would accompany your choice?

40. Which decision would you make?

- a. No rule infringement.
- b. Foul on 10 black - holding.
- c. Foul on 21 black - hacking.

Which penalty would accompany your choice?

41. Which decision would you make?

- a. Foul on black - hacking.
- b. Foul on black - blocking.
- c. Foul on gray - charging.

Which penalty would accompany your choice?

42. Which decision would you make?

- a. Traveling violation on gray.
- b. Foul on black - blocking.
- c. Foul on gray - charging.

Which penalty would accompany your choice?

43. Which decision would you make?

- a. Foul on black - blocking.
- b. No rule infringement.
- c. Foul on white - charging.

Which penalty would accompany your choice?

44. Which decision would you make?

- a. Foul on black - charging.
- b. Illegal dribble on black.
- c. Foul on white - hacking.

Which penalty would accompany your choice?

45. Which decision would you make?

- a. Foul on 20 gray - blocking.
- b. Foul on 31 black - charging.
- c. Foul on 21 black - pushing.

Which penalty would accompany your choice?

46. Which decision would you make?

- a. Traveling violation on white.
- b. Tieball.
- c. Foul on black - hacking.

Which penalty would accompany your choice?

47. Which decision would you make?

- a. No rule infringement.
- b. Traveling violation on black.
- c. Foul on gray - hacking.

Which penalty would accompany your choice?

48. Which decision would you make?

- a. Moving violation - gray.
- b. No rule infringement.
- c. Foul on gray - hacking.

Which penalty would accompany your choice?

The answer for Example C was "foul on black - holding." Questions 49 through 71 require you to select, from the diagrams on your response sheet, which signal(s) would accompany your decision.

	A	B	C	Signal(s)
C.	()	()	(x)	<u>1</u> , <u>8</u> , _____.

Get ready for question 49.

49. Which decision would you make?

- a. Tieball.
- b. Traveling violation on black.
- c. Foul on gray - hacking.

Which official signal(s) would you use to accompany this decision?

50. Which decision would you make?

- a. Traveling violation on black.
- b. Illegal dribble on black.
- c. No rule infringement.

Which official signal(s) would you use to accompany this decision?

51. Which decision would you make?

- a. Foul on black - hacking.
- b. Out of bounds violation - black.
- c. Traveling violation on white.

Which official signal(s) would you use to accompany this decision?

52. Which decision would you make?

- a. Foul on white 10 - hacking.
- b. Tieball.
- c. Foul on white 10 - holding.

Which official signal(s) would you use to accompany this decision?

53. Which decision would you make?

- a. Traveling violation on white.
- b. Three second violation white.
- c. Foul on black - blocking.

Which official signal(s) would you use to accompany this decision?

54. Which decision would you make?

- a. Traveling violation on black.
- b. Foul on white - hacking.
- c. Tieball.

Which official signal(s) would you use to accompany this decision?

55. Which decision would you make?

- a. Traveling violation on black.
- b. Foul on white - holding.
- c. Foul on black - pushing.

Which official signal(s) would you use to accompany this decision?

56. Which decision would you make?

- a. Foul on white - charging.
- b. Foul on gray - blocking.
- c. Foul on gray - hacking.

Which official signal(s) would you use to accompany this decision?

57. Which decision would you make?

- a. No rule infringement.
- b. Foul on white - pushing.
- c. Foul on black - blocking.

Which official signal(s) would you use to accompany this decision?

58. Which decision would you make?

- a. Foul on 14 white - hacking.
- b. Foul on 10 black - hacking.
- c. Foul on 20 white - hacking.

Which official signal(s) would you use to accompany this decision?

59. Which decision would you make?

- a. Foul on black - blocking.
- b. No rule infringement.
- c. Foul on white - charging.

Which official signal(s) would you use to accompany this decision?

60. Which decision would you make?

- a. Foul on black - pushing.
- b. Foul on white - pushing.
- c. Traveling violation on white.

Which official signal(s) would you use to accompany this decision?

61. Which decision would you make?

- a. Foul on white - hacking.
- b. No rule infringement.
- c. Traveling violation on white.

Which official signal(s) would you use to accompany this decision?

62. Which decision would you make?

- a. Foul on white - holding.
- b. Foul on white - hacking.
- c. Traveling violation on black.

Which official signal(s) would you use to accompany this decision?

63. Which decision would you make?

- a. Foul on 10 white - hacking.
- b. No rule infringement.
- c. Foul on 25 black - pushing.

Which official signal(s) would you use to accompany this decision?

64. Which decision would you make?

- a. Traveling violation on white.
- b. Tieball.
- c. No rule infringement.

Which official signal(s) would you use to accompany this decision?

65. Which decision would you make?

- a. Foul on black - hacking.
- b. Out of bounds violation.
- c. Traveling violation on white.

Which official signal(s) would you use to accompany this decision?

66. Which decision would you make?

- a. Foul on gray - blocking.
- b. Foul on gray - hacking.
- c. Foul on white - charging.

Which official signal(s) would you use to accompany this decision?

67. Which decision would you make?

- a. Traveling violation on white.
- b. No rule infringement.
- c. Foul on white - hacking.

Which official signal(s) would you use to accompany this decision?

68. Which decision would you make?

- a. No rule infringement.
- b. Foul on white - hacking.
- c. Traveling violation on black

Which official signal(s) would you use to accompany this decision?

69. Which decision would you make?

- a. Tieball.
- b. Foul on white - hacking.
- c. Traveling violation on black.

Which official signal(s) would you use to accompany this decision?

70. Which decision would you make?

- a. Traveling violation on white.
- b. Foul on black - hacking.
- c. Foul on white - hacking.

Which official signal(s) would you use to accompany this decision?

71. Which decision would you make?

- a. No rule infringement.
- b. Line violation on white.
- c. Line violation on gray.

Which official signal(s) would you use to accompany this decision?

Appendix C

Basketball Officiating Test Answer Sheet

Answer Sheet

Name _____

Sex _____

The information requested below is to assist in the validation of the basketball test.

1. What is your D.G.W.S. rating? _____
2. What was your first written exam grade? _____
3. What were your other written exam grades? _____
4. How many years did you play basketball
 - _____ High School level? _____
 - _____ College level? _____
 - _____ Club level? _____
5. Estimate how many basketball games you have refereed in your life? _____
 - _____ High School level? _____
 - _____ College level? _____
 - _____ Club level? _____
 - _____ Intramural level? _____

ANSWER SHEET

- T F CORRECTION
- A. (x)(), _____.
- B. () (x), light-charging _____.
1. () (), _____.
2. () (), _____.
3. () (), _____.
4. () (), _____.
5. () (), _____.
6. () (), _____.
7. () (), _____.
8. () (), _____.
9. () (), _____.
10. () (), _____.
11. () (), _____.
- T F CORRECTION
12. () (), _____.
13. () (), _____.
14. () (), _____.
15. () (), _____.
16. () (), _____.
17. () (), _____.
18. () (), _____.
19. () (), _____.
20. () (), _____.
21. () (), _____.
22. () (), _____.
23. () (), _____.
24. () (), _____.
25. () (), _____.

- A B C 1FT 2FT OB N
- C. () () (x), (x) () () ().
26. () () (), () () () ().
27. () () (), () () () ().
28. () () (), () () () ().
29. () () (), () () () ().
30. () () (), () () () ().
31. () () (), () () () ().
32. () () (), () () () ().
33. () () (), () () () ().
34. () () (), () () () ().
35. () () (), () () () ().
36. () () (), () () () ().
37. () () (), () () () ().
- A B C 1FT 2FT OB N
38. () () (), () () () ().
39. () () (), () () () ().
40. () () (), () () () ().
41. () () (), () () () ().
42. () () (), () () () ().
43. () () (), () () () ().
44. () () (), () () () ().
45. () () (), () () () ().
46. () () (), () () () ().
47. () () (), () () () ().
48. () () (), () () () ().

ANSWER SHEET

- A B C Signal(s)
 C. () () (x), 1, 8, ___.
49. () () () , ___ , ___ , ___ .
50. () () () , ___ , ___ , ___ .
51. () () () , ___ , ___ , ___ .
52. () () () , ___ , ___ , ___ .
53. () () () , ___ , ___ , ___ .
54. () () () , ___ , ___ , ___ .
55. () () () , ___ , ___ , ___ .
56. () () () , ___ , ___ , ___ .
57. () () () , ___ , ___ , ___ .
58. () () () , ___ , ___ , ___ .
59. () () () , ___ , ___ , ___ .
60. () () () , ___ , ___ , ___ .
61. () () () , ___ , ___ , ___ .
62. () () () , ___ , ___ , ___ .
63. () () () , ___ , ___ , ___ .
64. () () () , ___ , ___ , ___ .
65. () () () , ___ , ___ , ___ .
66. () () () , ___ , ___ , ___ .
67. () () () , ___ , ___ , ___ .
68. () () () , ___ , ___ , ___ .
69. () () () , ___ , ___ , ___ .
70. () () () , ___ , ___ , ___ .
71. () () () , ___ , ___ , ___ .



Appendix D

Administration Directions

"You are about to participate in a videotaped Basketball Official's Test, administered under the American Association for Health, Physical Education, and Recreation, Division for Girls and Women's Sports, Basketball Rules, 1973-1974 (1973). This test is an experiment to develop an objective test on officiating by bringing standard illustrated situations of basketball play requiring you to identify the rule infraction, if any, that occurred.

Twenty-three of the questions require you to choose which penalty occurred. A second set of twenty-three questions requires you to choose which signal(s) should accompany your choice.

Seventy-one illustrated basketball situations will be shown to you through the television monitor. Each basketball situation requires you to turn the page, read the question, and select your choice by marking the accompanying answer sheet. After twelve seconds you will be visually and verbally warned 'Get ready for question 1,' and after five seconds, 'Now' will appear visually and a click will warn you that the impending illustration is due to start.

At the end of question 48 I will stop the video tape for one minute, allowing you time to read example C and familiarize yourself with the answer sheet for the next section.

Have you any questions regarding the test or information request page?"