McDUFFIE, RICHARD ADRIAN

AN INVESTIGATION OF PERFORMANCE CONSISTENCY OF INTERCOLLEGIATE AND INTERSCHOLASTIC BASKETBALL OFFICIALS

The University of North Carolina at Greensboro ED.D. 1980

AN INVESTIGATION OF PERFORMANCE CONSISTENCY OF INTERCOLLEGIATE AND INTERSCHOLASTIC BASKETBALL OFFICIALS

by

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

Greensboro
1980

Approved by

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APPROVAL PAGE

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May 29, 1980
Date of Acceptance by Committee

May 29, 1980
Date of Final Oral Examination

McDUFFIE, RICHARD ADRIAN. An Investigation of Performance Consistency of Intercollegiate and Interscholastic Basketball Officials. (1980); Directed by: Dr. Gail Hennis. Pp. 130.

The purpose of this study was to describe the responses of intercollegiate and interscholastic basketball officials to a filmed series of selected situations which had the potential of a foul occurrence. Twenty-seven situations were selected from Big Ten Athletic Conference basketball game film and incorporated into a master film. The film was shown to forty-five Atlantic Coast Conference basketball officials and forty-five officials of the International Association of Approved Basketball Officials, Board 134. Each official viewed the film and responded to each situation with one of three possible responses: foul on light jersey, foul on dark jersey, or no foul. Further, each subject completed a questionnaire regarding their officiating experience, age, education, other officiating activities, basketball coaching experience, and basketball playing experience.

Following review of the filmed series of situations by the ninety subjects, majority calls were established for all situations on the basis of at least fifty percent agreement by the subjects on a particular call. Six of the twenty-seven situations failed to produce a majority call, and therefore were deleted from further study. The term deviation was incorporated into the study to refer to

subject responses other than the majority calls The total subject group deviation was calculated to be 5.99, based on five hundred thirty-nine deviations out of a total of eighteen hundred ninety responses. Non-agreer status was assigned to subjects recording more than 5.99 deviations. ACC officials accounted for nineteen of the non-agreers, while the IAABO officials accounted for thirty-three. Non-agreers in both subject groups were on the average older and had more officiating experience than the majority of subjects; more non-agreers than agreers had previously coached basketball; fewer non-agreers than agreers in the ACC group had played basketball previously; IAABO non-agreers had all played previously; and non-agreers in both groups, except for ACC officials holding master's degrees, were less educated than the majority of the subjects.

In an effort to further study the subjects with respect to the demographic data collected, specific categories were set up for each variable, average deviations were calculated for each category, and comparisons drawn between categories and between subject groups. The following assumptions were substantiated by the data collected and analyzed.

1. The more experience an official has, the greater consistency he will exhibit.

2. The more education an official has, the more consistency he will exhibit.

3. Basketball officials who have coached basketball are less consistent than those who have never coached the game.

4. Basketball officials who have played on a basketball team are less consistent than those who have never played.

In conclusion, this study provided insights into the intercollegiate and interscholastic official, particularly in the demographics of the subject groups studied. Internal consistency was evidenced between officiating groups and the specific demographic categories between and within groups through cross matching subjects' responses and their demographic data.

ACKNOWLEDGMENTS

My deep gratitude goes to Dr. Gail Hennis for her guidance throughout the doctoral program, and in particular, for her perseverence through the completion of this study. Thanks also go to other committee members: Dr. Pearl Berlin, Dr. Tony Ladd, and Dr. William Noland, for their guidance throughout my program of study.

Completion of this study and attainment of the doctoral degree was made possible through the love, perseverence, and constant support of my wife, Lynn.

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CHAPTER I

INTRODUCTION

In the world of contemporary sports, officials have become the enforcement body responsible for the normal proceeding of the contest in accordance with the rules of the game. According to Thompson and Clegg, "the official's overriding goal is to promote the normal progress of a contest, as it was meant to be contested, with as little interference as possible . . ." (1974). Officials in sporting events are not meant to be dominant factors in the contest, but their role is to help provide continuous action within the rules.

Officiating an athletic contest is a difficult task to perform competently. A thorough knowledge of the rules of the game is a basic characteristic of an excellent official. However, more than knowledge of the rules is necessary to officiate proficiently. Other characteristics include ability to administer the rules, ability to command respect, judgment, and decisiveness. Regardless of one's mastery of the rules, several times during a contest an official is forced to render a judgment call. Factors which may affect that decision include position of the official conditioning by the official, players obstructing vision, speed of the contest, and particular skills of individual players. More

subtle factors may include bias for or against a particular team, player, or coach; importance of the game; crowd influence; bias for or against a particular racial or ethnic group. Through experience and conscious effort, the excellent official wards off these latter influences or prejudices. But officials are human and subject to human error and misjudgment. In the words of Thompson and Clegg, "development of good judgment is a never-ending process." (1974).

Basketball is a game which is complicated for the officials because of the environment in which it takes place. It is an active, fast-moving contest in which the officials must be alert at all times. Since it is played indoors, and limited in space, it invites close scrutiny from players and spectators. Basketball, perhaps more than many other sporting activities, calls for judgment calls on the part of the official. These judgments must be rendered without hesitation under any circumstances the game may present. Basketball officiating calls for more than mere judgments based on rules; it necessitates decisions by the official that are based on interpretations of complex actions.

Within the past decade, television coverage has become extremely sophisticated, particularly in instant replay capabilities. Modern television instant replay coverage not only replays action in slow motion, but often from a variety of angles. Since angles are an important aspect of

officiating (Hano, 1976), television viewers may often have more and better views than the officials for analyzing the action. Slow-motion instant replay and a variety of angles have given the television viewer an advantage that the official does not have, and consequently the official is scrutinized much more closely than in previous years, making his job even more difficult.

This study seeks to analyze and compare the consistency of judgments rendered by basketball officials. Further, it is concerned with the officials' demographic characteristics as outlined in this study.

Statement of the Problem

This research described the responses of both intercollegiate and interscholastic basketball officials to a filmed series of selected situations which have the potential of a foul occurrence. Assuming that officiating expertise is needed to make a judgment regarding the possible foul situations selected for this study, the inquiry seeks to identify officials' judgments of possible foul situations with respect to their specific officiating group and selected demographic data.

More specifically, the study seeks to answer the following questions:

1. Are officials with more officiating experience more or less consistent than those with less experience?

2. Are older officials more or less consistent than younger ones?
3. Are officials with more education more or less consistent than officials with less education?
4. Are officials who officiate more than one sport more or less consistent than officials who officiate only basketball?
5. Are officials who have coached basketball more or less consistent than those who have never coached basketball?
6. Are officials who have played basketball on a team more or less consistent than those who have never played?

Definition of Terms

1. Possible Foul Situation. A basketball situation involving two players in which the possibility of a foul exists. In this study, both players have the potential to commit the foul.

2. Series of Filmed Possible Foul Situations. A number of possible foul situations, extracted from actual game film, and placed in a sequential order on one master film. Each situation is separated from the next by a five-second length of blank film serving as a response time.

3. Response Time. A period of time allotted to subjects for their response to a stimulus. In this study, the time allotted was five seconds.

4. Intercollegiate Basketball Official. Any person (male in this study) employed by colleges and universities to enforce the rules of the game of basketball during an intercollegiate contest.

5. Interscholastic Basketball Official. Any person (male in this study) employed by secondary schools to enforce the rules of the game of basketball during an interscholastic contest.

6. Majority Call. A standard judgment of each situation based on the same response by more than 50% of the subjects.

7. Mean Deviation. The average number of subject

responses contrary to the majority call.

8. Non-Agreer. A subject who has recorded more responses contrary to the majority call than the mean deviation.

9. Officiating Consistency. A continual and logical pattern of judgments based on the characteristics comprising a competent official.

10. Experience. The number of years subjects have performed the duties of basketball officials.

Assumptions Underlying the Research

The following assumptions are acknowledged as fundamental to this study:

1. The possible foul situations incorporated into this study require knowledge of basketball rules and officiating expertise in order to make a judgment as to whether a foul was committed and as to who committed the foul.

2. All subjects made a serious and concerted effort in responding to the situations presented.

Scope of the Study

This study utilized male basketball officials of the Atlantic Coast Conference (ACC) who had more than eight years of officiating experience. Also included in the study were male basketball officials of the International Association of Approved Basketball Officials (IAABO), Board 134.

The sample was limited to those officials present at the ACC Basketball Officials' Clinic in Richmond, Virginia on November 15, 1976, and at the annual meeting of IAABO Officials, Board 134, in Prince George's County, Maryland, on October 17, 1977.

This study was concerned with the assessment of subjects' responses to a filmed series of possible foul situations and a comparison of the consistency of those responses between the selected officiating groups.

Significance of the Study

Since the advent of slow-motion replays, officials in many sports have come under severe criticism. Officials' decisions are crucial to the outcome of the contest, and theoretically each official should perform his duties flawlessly. Perfection has escaped all at some point, as it has basketball officials; yet, striving toward perfection has increased the quality of officiating.

Research has revealed many tests designed to aid the official in his efforts toward a high level of competence. The majority of these tests have focused on the knowledge of the rules of basketball and the application of those rules. At this point, there exists no test or instrument designed specifically to help the official ignore variables which may influence his application of the rules. These variables may include influences exerted by players, coaches, crowds, the importance of the game, the tempo of the game,

and a variety of prejudices.

The primary value of this study is its ability to determine the possible existence of performance consistency within particular groups of basketball officials. Through knowledge gained from this study, officiating groups may further seek methods of obtaining or maintaining consistency of performance. It is hoped the methods used in this study will stimulate new efforts in training and evaluating officials, and thus help to alleviate controversy over judgments. Group training could provide more standardized officiating, which should aid players, coaches, and officials in their interpretations as to which actions are within the rules of the game.

CHAPTER TWO

REVIEW OF LITERATURE

In order to better understand the complexities and outcomes of the use of filmed basketball situations, a review of appropriate literature was undertaken. The three major areas reviewed were characteristics of basketball officials, the use of media in teaching and officiating, and the process of decision making. These three areas were, of course, the crux of this study. Although sufficient literature was available for each of the three general topics, very little literature with components of all three was available.

Characteristics of Basketball Officials

> Indeed, it takes a special breed of man to excel at the most difficult job in all of professional basketball, baseball, football, and hockey: officiating the game. Expertise is not enough. Simply no one in sports endures more pressure--and needs greater discipline--than the plucky, perceptive autocrats wearing 'prison stripes' or 'mortician's blue', depending on the sport. Whatever he is called, a referee, umpire, or official, such a man must be superbly skilled in his job in order to instantly interpret as many as 100 pages of complex rules. And an official often needs to outhustle the players to gain a strategic view of every frenzied battle for the ball or puck to detect player violations. (Surface, 1975).

Surface (1975), in his article on officiating, points out a number of essential characteristics an official must possess to perform his role. In his statement above, he

cites characteristics of expertise, discipline, interpretation of rules, and hustle. These are certainly vital to competent officials, yet they are by no means the complete list. Other authors (Bunn, 1968; Miller, 1979; Stewart, 1968; Thompson & Clegg, 1974) include self-confidence, judgment, decisiveness, good physical shape, impartiality, quick reaction time, superior vision, flexibility, self-acceptance, creativity, interpersonal dominance, and the love of the game.

Thompson & Clegg (1974) indicate that the official is expected to show his respect for the sport and the participants through his knowledge and interpretation of the rules. Without this knowledge, and the use of it, disorganization and unsportsmanlike conduct result.

Ability to administer the rules and proper enforcement are essential to the control and tempo of the game. According to Hano (1976), the tempo of the game is often the key to the quality of the game, and the quality of the game is partially an official's responsibility, since he can control the tempo. Surface (1975) explains that referees should not be too rigid. He states that once a decision has been made, it can be changed, if more evidence presents itself. While Surface feels an official must be flexible, Deford (1976) writes that officials have a low degree of flexibility. Surface (1975) further points out that officials must retain their composure regardless of the psychological and verbal punishment which all officials experience.

Good judgment is seen by many authors as the primary ingredient in successful officiating (Bunn, 1968; Hano, 1976; Miller, 1979; Surface, 1976; Thompson & Clegg, 1974). Thompson & Clegg (1974) state that good judgment is the foremost qualification of an official, because it enables him to make the appropriate call and be confident in making it. A thorough knowledge of the rules and knowledge gained in experience supply the basis for good judgment (Barnes 1969; Surface, 1976; Thompson & Clegg, 1974).

Deford (1976) cites a study by Henry Alker of Cornell University and John Leavy of Ithaca College on basketball officials in which officials were found to be persons of high self-acceptance and interpersonal dominance. Further, they found officiating to be a profession in which major stress comes from others' doubts of the official's competence. If one accepts their findings; self-acceptance and interpersonal dominance are not only an asset, but a requirement for good officials. Through sound judgments, the normal progress of the game can continue. The exercise of such judgment distinguishes officiating as an art rather than a science (Barnes, 1969; Miller, 1979).

A decisive call, right or wrong, can make the official appear competent in his actions. Thompson & Clegg (1974) cite decisiveness as one of the major keys to officiating. It tends to give players, coaches, and spectators a feeling of confidence in the call and in the official. Miller (1979)

States "basketball officiating requires instantaneous judgmental decisions. In order to minimize the amount of controversy generated by these decisions, they must be made with the greatest degree of decisiveness possible." The decisive official converts a close or controversial call into a good call in many cases by his ability and willingness to make a decisive call (Thompson & Clegg, 1974).

Media in Teaching and Officiating

The use of media services in education is designed to assist in the educational processes through helping learners to develop their ability to find, generate, evaluate, and apply information that can help them function more effectively as individuals and as a part of the general society (AASL & AECT, 1975; Dale, 1969; Brown, Lewis, & Harcleroad, 1973). Students acquire and improve skills in communication, observation, listening, and overall audio and visual perception (AASL & AECT, 1975; Dale, 1969). According to the publication of the American Association of School Librarians (AASL) and the Association for Educational Communications and Technology (AECT), The Media Programs (1975), the student masters skill and knowledge, improves self-motivation, discipline, and the capacity for self-evaluation. Finally, media programs in education contribute to the life experience of users and their self-fulfillment through the activity of learning (AASL & AECT,

1975; Brown, Lewis, & Harcleroad, 1973).

Specific examples of the use of media in education are large in number. Within the last two decades, the use of media in all levels of education has substantially increased. The term systematic instruction has become quite common with reference to the use of media in education. Almost without exception, a systematic instructional model evidences the need for and reliance on media systems (Brown, Lewis, & Harcleroad, 1973; Erickson & Curl, 1972). A new instructional strategy undertaken in recent years by science teachers helps students to grow intellectually by developing their inquiry skills. The inquiry method enables the student to analyze information, ask questions, and formulate creative problem-solving methods (Wittich and Schuller, 1979). The use of media in the inquiry method is essential to student involvement through the observation of films, slides, audiotapes, graphics, and other media resources. The use of self-paced materials is found in all levels of education, from elementary schools to universities (Brown, Lewis & Harcleroad, 1973; Thiagarajan, 1976; Wittich & Schuller, 1979). Such materials allow for re-test, revision, self-paced learning, and verification of learning through a specifically designed system of instruction. Media materials are prerequisites for such a systematic instructional mode, as they are in virtually all modes of education which require audio and visual perception in the learning process.

Through effective use of media resources, the teacher brings life and reality to the learner. The advent of a variety of media resources has opened infinite instructional and learning modes to the educational community, and consequently, has improved the educational experience (Butler, 1978; Gerlach & Ely, 1971; Hancock, 1977).

The educational process is so designed that a variety of valuable outcomes may result. The acquisition of a particular skill or body of knowledge is only one objective in the total scheme. Understanding of oneself and others is an indirect outcome of the learning process, yet a most vital one (Arrendondo & Throm, 1972; Erickson & Curl, 1972). The understanding of oneself and others is vital in that it produces a sense of worth in relation to society. Attitudes toward life and learning are often molded early in the educational processes (Arrendondo & Throm, 1972) and consequently, effective attention by educators to attitude development is important and essential. Development of responsible attitudes toward learning has been enhanced by the media resource escalation. The ability of various media resources to bring the subject matter closer to reality has made for more effective attitude development (Arredondo & Throm, 1972; Erickson & Curl, 1972; Gerlach & Ely, 1971). Media resources, through proper use, have enabled the teacher to involve the students in a more natural

form of learning through association. Such techniques make for more effective attitude development (Arredondo & Throm, 1972).

More specifically in tune with this study is the use of motion pictures in the educational process. The basic value of using the motion picture as an instructional resource is that the information to be learned becomes more realistic to the learner (Brown, Lewis, & Harcleroad, 1973); Erickson & Curl, 1972; Wittich & Schuller, 1979). Motion pictures enable the viewer to become closely associated with the material, since sound, movement and colors are normal parts of everyday reality. Motion pictures break the intellectual barrier to learning by providing for audio and visual perceptions in the most natural way (Brown, Lewis, & Harcleroad, 1973). The value of motion pictures is evident through the use of films to break down physical barriers (DuBey, 1978; Erickson & Curl, 1972; Oles, 1977). Not only do films bring the far away close, but they make the invisible visible.

The use of media in teaching sports skills is not of recent initiation and appears to be widespread. A variety of media resources have been used, including pictures, slides, charts, videotapes, and motion pictures. Bull (1968) used four basic media resources in teaching gymnastics through a media approach. Motion picture films of a gymnastic meet were produced and narrative added by using magnetic tapes. Professionally produced gymnastic charts were posted at each

teaching station so students would have daily reminders of the proper techniques. Bull (1968) also used an overhead projector to teach body positions in sequential phases of a particular stunt. Finally using 8mm loop films, Bull taught the more difficult stunts. By using the loop films which require no rewinding, students could view over and over a stunt they were learning.

According to Bunker, Shearer, and Hall (1976), the use of videotape feedback in the learning of motor skills aids the learner on personal performance and desired model performance. The researchers, using swimmers learning the flutter kick, divided their subjects into two groups, the auditory feedback group and the videotape feedback group. The older subjects of the videotape feedback group showed significant improvement in their performance. Further, the videotape feedback subjects were able to more accurately describe their body positions in certain phases of their performance.

In the area of officiating, a variety of media resources are employed in training officials. Dolan (1979) used pictures, charts, and film to explain or emphasize rule interpretations for the new and the experienced official. Annually, new rules and old rules which warrant study are interpreted by Dolan to officials through the use of media resources in a clinic situation. Neve (1979) used a number of motion pictures and videotapes to study new rules and interpret them for Atlantic Coast Conference basketball officials

during annual officials' conferences. Although Dolan (1979) and Neve (1979) employ media resources in training officials, the effectiveness of their methods has not been tested.

Costello and Molina (1975) used videotaping in an effort to improve the level of karate officiating in the Metropolitan Intercollegiate Karate League of New York. Each subject official viewed the previous year's officials' performance, their peers' performance, and their own performance via videotapes. Subjects were to analyze critically the officials working the matches. Discussion periods on their analysis followed. The researchers found through pre- and post-test results that the officials who had participated in the training sessions improved their overall performance.

More specific to basketball is Turnbull's (1974) study involving the construction of a videotape test for basketball officials. Administering the test to forty-four subjects, Turnbull selected seventy-one situations to be included in the test. His objective was to construct an objective officials' test, using the media of television. In one of the more recent of such tests developed, Turnbull used officials of the Division of Girls and Women's Sports, rated both locally and nationally. The content of the test included twenty-five true-false questions, twenty-three multiple choice questions requiring two sets of choices--the second dependent on the first, and twenty-three multiple

choice questions requiring one to choose the correct response and then to choose from fifteen diagrams the ones matching the correct response. For the videotaped portion requiring subject responses, a get-ready time period of five seconds was allotted. Two seconds were allotted for the subject to view the situational illustration. For response time, Turnbull allowed fifteen to twenty seconds for multiple-choice questions, fifteen to twenty seconds for completion questions, and twelve to fifteen seconds for the alternative response questions. Illustrated and verbal directions were given at appropriate times throughout the test.

Although a variety of officiating tests have been developed (written, oral, television, etc.), use of some tests has been limited. Standard for officiating are paper and pencil tests, pictures, and peer evaluation. The medium of motion pictures (videotape included) has not yet been developed to the optimal. With increased attention given to instant replay and slow motion, it is speculated that new and more complex live-action training and testing, using videotape and film tests, will evolve in the near future.

Decision Making

The process of decision making is complex due to the many variables which exist and influence one's decision. A variety of research endeavors have accounted for much discussion on the influences attributing to a particular

decision made. One of the basic influences involved in the decision-making process is the aspect of knowledge or skill related to the question at hand (Brinkers, 1972; Newell & Simon, 1972). A sound grasp of the knowledge and skill necessary to make a decision in a particular situation enables one to make a decision confidently and to stave off other less desirable influential factors.

As is apparent in numerous areas of society, prejudice in a variety of forms plays an influential and often dominating role in the decision-making process (Eiser & Stroebe, 1972). Prejudice can play a major role in decision making, since some of the same variables which aid in decision making are bases for prejudice and discrimination. The psychodynamic theory of prejudice is rooted in the idea that frustration in life can lead to prejudice. As is apparent, frustration can lead to irrational or irresponsible decision making.

Eiser & Stroebe (1972) propose the idea of categorization as a major factor in the decision-making process. Inevitably, people set standards for themselves, and for others they come in contact with. Such standards are used for comparison when analyzing their actions or intents, and such use often results in categorization. Although categorization is generally accepted as an influencing factor in judgmental decision making, little agreement as to why people categorize

appears to exist (Eiser & Stroebe, 1972). One's behavior, based on a decision or decisions made, is not necessarily determined by stimuli as they actually exist, but rather by one's perception of such stimuli based on one's standards (Eiser & Stroebe, 1972; Gouran, 1974).

Sherman (Brinkers, 1972) discussed the concept of managing visual information as a prime variable in the decision-making process. Visual perception is based largely on the relationship one places on two distinct elements. The interaction between the two elements and their relationship as perceived by the individual, become primary influences in the formulation of a decision (Brinkers, 1972; Gouran, 1974). Visual cues play a large part in the formation of relationships and subsequent decisions based on perception. No two people perceive visually the same objects or situations due to the variance in their perception. Although this holds true for the general populace, consistent visual perception between two or more individuals can be enhanced through training and education (Brinkers, 1972; Gouran, 1974; Newell & Simon, 1972).

Inherent in the role of officiating is the decision-making process. Basketball officiating in particular calls for a multitude of quick judgmental decisions which have a distinct influence on the game and its participants (Thompson & Clegg, 1974). Decision making in basketball

officiating requires the official to recall instantly all knowledge and experience he has particular to a situation, and make a confident, decisive. and logical decision. Hano (1976) reports officiating to be nothing but angles and that the only intangible in making a call is common sense. Although the importance of positioning and angles in responsible officiating cannot be denied, other authors feel many other characteristics or influencing factors play major roles. Such factors are knowledge of the rules. ability to administer the rules, poise, confidence, decisiveness superior vision, pyysical fitness, impartiality, and judgment (Bunn, 1968; Deford, 1976; Hano, 1976; Miller, 1979; Thompson & Clegg, 1974; Turnbull, 1974).

Training and evaluation of officials through media resources have enabled the official to become more confident in his judgmental decisions inherent in basketball officiating (Costello & Molina, 1975). According to Deford (1976), the experienced official has a high level of self-acceptance, a low degree of flexibility, and a high level of interpersonal dominance. Such characteristics are accrued by the individual through training and experience as an official. The use of media resources should enhance the consistency of visual perception, essential for effective officiating, and aid in the normal progress of the contest.

CHAPTER III

PROCEDURES

In line with the purpose of this study, a series of filmed possible foul situations were selected from 16mm game film from Big Ten Athletic Conference schools. Big Ten game film was chosen for two reasons: (a) availability, and (b) subjects' lack of familiarity with players and teams of the Big Ten. Twenty-seven possible foul situations were chosen from twenty games. Procedures for construction of the series of filmed situations and its use were divided into five categories. The categories were: (a) preparation of film; (b) response sheet and questionnaire; (c) selection of subjects; (d) administration of the test; and (e) analysis.

Preparation of Film

Selection of Segments

Game film acquired for this study was loaned to the investigator by the following schools of the Big Ten Athletic Conference: Ohio State University, University of Wisconsin, University of Minnesota, and the University of Illinois. All films were reviewed by the investigator, and segments involving possible foul situations were designated for potential use in this study. Twenty-seven possible foul situations were ultimately chosen. Three additional situations

were selected to serve as sample segments to familiarize subjects with the procedures to be used in recording their responses.

To be included in the series, a segment had to feature at least two players of opposing teams. For a segment to be selected, each player involved in the possible foul occurrence had to have the potential to commit the foul. In addition, each situation required officiating expertise to make a judgment. The choice of segments for inclusion in the film was made by the investigator.

Incorporation of Segments Into a Master Film

The segments chosen for inclusion in the series were edited from actual game film. The portions of edited film were spliced randomly in a sequential order. Each segment ranged in time from four to six seconds. Following each segment, a five-second length of blank film was inserted as a response time to give subjects time for recording their judgment regarding the situation. Memphis Film Labs produced the copies of the spliced film which were used in this study.

Response Sheet and Questionnaire

A response sheet was provided for each subject. The response sheet included three columns of possible responses; light jersey, dark jersey, no foul. In each column, spaces were provided for thirty possible responses, three sample responses and twenty-seven others from which the data would be collected. (See Appendix A for copy of the response sheet).

A questionnaire was attached to the response sheet for subjects to complete following the filmed series. The questionnaire (See Appendix B) required responses regarding subjects' age, years of basketball officiating experience, education level, officiating experience, basketball coaching experience, and basketball playing experience.

Selection of Subjects

Subjects selected for participation in this study were intercollegiate basketball officials of the Atlantic Coast Conference and interscholastic officials of the International Association of Approved Basketball Officials, Board 134. Permission to use ACC officials as subjects was granted from Norvall Neve, ACC Supervisor of Officials. Officials of the ACC included in the study were those present at the ACC Basketball Officials Clinic on November 15, 1976. Permission to use IAABO officials of Southern Maryland, Board 134, was granted by Jack Sanford, Commissioner of Board 134. IAABO officials used in the study were those present at the annual meeting of Board 134 on October 17, 1977.

Atlantic Coast Conference officials were chosen for two reasons: (a) quality of basketball played in the ACC, and (b) availability. Basketball in the ACC was considered top quality collegiate basketball. In addition, the annual officials' clinic was held at a convenient site for the

investigator.

Board 134 officials of the International Association of Approved Basketball Officials were chosen for these reasons: (a) Board 134 has an organized training and evaluation system for its officials, and (b) availability. In addition, the annual meeting of Board 134 was held at a convenient site for the investigator.

Administration of the Test

The test instrument was constructed using illustrated possible foul situations edited onto one master 16mm film. The subjects were informed that the investigator was undertaking a study of basketball officiating, and needed their responses as a data base. The ACC subject group met in a conference room at the ACC Basketball Officials' Clinic in Richmond, Virginia on November 15, 1976. The IAABO subject group met in the cafeteria of a high school in Prince Georges County, Maryland, on October 17, 1977, for the annual meeting of IAABO Board 134. The investigator distributed materials and showed the film to the subjects. Subjects were read the following instructions:

1. You are asked to look at a number of possible foul situations and make a judgment for each as to who committed the foul if a foul was committed. Each situation focuses in on the ball and the two players playing it. Make your judgments on that part of the action.

2. The responses open to you are: foul on light jersey, foul on dark jersey, or no foul. The type of foul, if there is a foul, is unimportant.

3. There are twenty-seven situations in this film. Each situation ranges from four to six seconds in length. Following each situation, you will be given a five-second response time in which you must make a judgment and mark the appropriate space on your answer sheet. Immediately following the response time, the next situation will be presented. Please be sure to mark your answer sheet quickly and be ready for the next situation.

4. Regardless of the clarity of the situation on film or any other factor hindering you from making the call, please make a judgment regarding the situation.

5. Upon completion of the film, please turn to page two and complete appropriately.

Analysis

To analyze the data associated with this study, a five-step approach was used. The first step was to determine for which situations there was a majority agreement call. All calls for each official were recorded, and a total subject majority call for each situation was obtained. The second step involved determination of an average number of deviations for the total subject group. Based upon the average number of deviations, those subjects who deviated in their calls at a higher rate than the average were cate-

gorized as non-agreers. An analysis of the demographic data for the total group, those classified as non-agreers and agreers, was made. Conclusions were drawn concerning each subject group in relation to the questions posed.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

It was the purpose of this study to describe the responses of intercollegiate and interscholastic basketball officials to a filmed series of selected situations which had the potential of a foul occurrence. In fulfilling this purpose, the investigator attempted to answer the following questions and sought agreement or disagreement with the stated hypotheses.

Questions

1. How frequently did the intercollegiate official record:
    a. a no foul when the majority recorded foul on dark jersey?
    b. a no foul when the majority recorded foul on light jersey?
    c. a foul on dark jersey when the majority recorded a no foul?
    d. a foul on dark jersey when the majority recorded foul on light jersey?
    e. a foul on light jersey when the majority recorded no foul?
    f. a foul on light jersey when the majority recorded foul on dark jersey?

2. How frequently did the interscholastic official record:

a. a no foul when the majority recorded foul on light jersey?

b. a no foul when the majority recorded foul on dark jersey?

c. a foul on light jersey when the majority recorded a no foul?

d. a foul on light jersey when the majority recorded foul on dark jersey?

e. a foul on dark jersey when the majority recorded no foul?

f. a foul on dark jersey when the majority recorded foul on light jersey?

HYPOTHESIS

1. The more experience an official has, the greater consistency he will exhibit.

2. Older officials are more consistent than young officials.

3. Officials with more education are more consistent than officials with less education.

4. Basketball officials who officiate more than one sport are more consistent than officials who officiate only basketball.

5. Basketball officials who have coached basketball are less consistent than those who have never coached before.

6. Basketball officials who have played on a basketball team are less consistent than those who have never played.

To obtain data for the study, a film consisting of a series of possible foul situations was constructed using 16mm game film from Big Ten Athletic Conference schools. Big Ten game film was chosen for two reasons: (a) availability, and (b) subjects' lack of familiarity with players and teams of the Big Ten. Twenty-seven possible foul situations were chosen from twenty games.

The filmed series was viewed by basketball officials from the Atlantic Coast Conference and the International Association of Approved Basketball Officials, Board 134. For each film segment, subjects were asked to judge whether or not a foul occurred, and, if so, on which player. In addition, the officials responded to questions concerning their age, officiating experience, coaching experience, playing experience, and education.

General Information

Ninety subjects (forty-five ACC and forty-five IAABO Officials) viewed the film and responded as officials to each of the twenty-seven situations presented. Each viewer had the option of deciding that no foul (NF) had been committed, or that indeed a foul had been committed by either the player in the light (L) or dark (D) jersey. Agreement was established when more than forty-five

subjects (>50%) selected the same response. On six of the items (numbers 5, 6, 11, 12, 19, and 22), there was clearly no agreement. In all but two (situations 2 and 8) of the remaining twenty-one situations, there was agreement by more than sixty percent of the respondents. This agreement by more than forty-five or 50% of the subjects on a particular response established a majority call for each situation. The majority call served as the basis for further analysis and interpretation of the data collected. The six situations (numbers 5, 6, 11, 12, 19 and 22) showing no agreement in response were deleted from the total, and were no longer considered as viable situations for the total subject group. The fact that six of the situations did not elicit agreement is, however, noteworthy with respect to the decision-making process. A table in Appendix C shows the number and percentage of responses for each situation, categorized by response choice and subject groupings. The majority call for each situation can be determined by identifying those percentage figures exceeding fifty percent (50%). The data in Appendix C enables one to identify not only which situations have a legitimate majority call (over 50% agreement), but also the extent of agreement, and further, those situations falling short of a majority call (i.e., 50% or less agreement).

Deviation Determination

As indicated previously, on only twenty-one situations was agreement found for the total subject group. Therefore, only responses related to those twenty-one situations were used to determine deviation from the norm. Of the eighteen hundred ninety responses for the twenty-one situations, subjects deviated from the majority call five hundred thirty-nine times. This represented a 28.52 percent deviation. Deviation was determined by identifying those responses to a particular situation which were not consistent with the majority call. An average deviation for each subject was determined by tabulating the total number of deviations and dividing that total by the number of subjects. For the total number of subjects, ninety, there were five hundred thirty-nine deviations, for an average of 5.99. The figure 5.99 represents the average number of deviations from majority calls for the total group of officials. In the case of the ACC subject group, there were two hundred eight deviations for the forty-five subjects. The forty-five IAABO subjects deviated three hundred thirty-one times. These data are reflected in Table 1. The figure 5.99 was the standard used to compare individual subjects, both within their respective group and the total group. A subject showing more deviations than the average for either his respective group or the total group hence becomes a non-agreer within that particular subject group.

TABLE 1

Number of Deviations in Situation Responses by Subject Group

Subject Group	Number of Deviations	Number of Subjects	Mean Deviation
ACC	208	45	4.62
IAABO	331	45	7.36
TOTAL	539	90	5.99

Identification of Non-Agreers

When using the total subject group majority call, fifty-two of the ninety subjects were found to be non-agreers. As discussed earlier, non-agreers were determined by identifying those subjects who had more deviations than the mean. The ACC subject group produced nineteen non-agreers when using the total subject group majority call and the average deviation. The IAABO subject group produced thirty-three non-agreers when using the total subject group call and average deviation. Table 2 and Appendixes F and G reflect these data.

Deviations From the Majority Calls

In studying the responses of the officials to the filmed situation series, it was important to study those responses contrary to the majority calls. In this way, the degree of disagreement could be identified in each deviation from the majority calls.

The intercollegiate officials (ACC) responded with a no foul decision, in contrast to the majority call of foul on dark jersey, three times out of a total of one hundred eighty or 1.67% of the time. The same group of officials responded with a no foul decision when the majority call was foul on light jersey, sixty-nine out of nine hundred times, or 7.67%. Foul on dark jersey decisions were recorded thirty-seven out of eight hundred ten times, or 4.57%, when the majority call indicated no

TABLE 2

Analysis of Non-Agreers by Subject Group
Based Upon Total Subject Group Majority Call

Subject Group	Number of Subjects	Number of Non-Agreers Total Majority Call
TOTAL	90	52
ACC	45	19
IAABO	45	33

foul. Foul on dark jersey decisions, when the majority call was foul on light jersey, occurred thirty-nine times out of a possible nine hundred, or 4.33%. The same group responded to foul on light jersey fifty-two times out of eight hundred ten or 6.42% when the majority call was no foul. A foul on light jersey decision was recorded eight out of one hundred eighty times, or 4.44%, when the majority call indicated foul on dark jersey.

The interscholastic officials (IAABO) responded with a no foul decision, in contrast to the majority call of foul on light jersey, fifty-five out of a total of nine hundred times, or 6.11% of the time. The same officials responded with a no foul call seven out of one hundred eighty times, or 3.89%, contrasting the majority call of foul on dark jersey. Foul on light jersey decisions occurred seventy-eight out of eight hundred ten times, or 9.63%, when the majority call was no foul. The same group recorded foul on light jersey decisions, when the majority call was foul on dark jersey, twenty-two out of one hundred eighty times, or 12.22%. A foul on dark jersey was recorded ninety-seven of eight hundred ten times, or 11.98%, when the majority call indicated no foul. Finally, a foul on dark jersey was recorded seventy-seven times out of a possible nine hundred, or 8.55% of the time, when the majority call was foul on light jersey.

The comparison of percentage deviations between the ACC and IAABO officials revealed several interesting facts. When the majority call was light jersey, the IAABO officials recorded fouls (dark jersey calls) at a higher percentage rate than the ACC officials; 8.55% of the time as compared to 4.33%. When the majority call was dark jersey, the IAABO officials recorded fouls (light jersey calls) at a higher percentage rate than the ACC officials; 12.22% as compared to 4.14%. When the majority call was no foul, the IAABO officials recorded fouls (light and dark jersey responses) at a higher percentage rate than the ACC officials; 9.63% to 6.42% for the light jersey responses and 11.98% to 4.57% for the dark jersey responses. Evidently, when IAABO officials deviated from the majority, they recorded more fouls than did the ACC officials.

Table 3 reflects these data.

TABLE 3

Deviations from the Majority Calls

ACC Responses

Majority Call	L		D		NF	
	n	%	n	%	n	%
Light	---	---	39/900	4.33	69/900	7.67
Dark	8/180	4.44	---	---	3/180	1.67
No Foul	52/810	6.42	37/810	4.57	---	---

IAABO Responses

Majority Call	L		D		NF	
	n	%	n	%	n	%
Light	---	---	77/900	8.55	55/900	6.11
Dark	22/180	12.22	---	---	7/180	3.89
No Foul	78/810	9.63	97/810	11.98	---	---

Analysis of Demographic Data

In order to effectively analyze and interpret the demographic data collected, the following steps were taken: (1) each of the officiating groups' demographic data were tallied; (2) the demographic data for those categorized as non-agreers were tallied separately, and (3) the demographic data for each of the majority calls were recorded separately. Tables 4 and 5 show percentages of the total for all categories, except Age and Experience, where average number of years is shown.

The non-agreers of the IAABO subject group averaged 8.2 years of experience in officiating as compared to the rest of the IAABO group, which reflected only 6.52 years of officiating experience. The non-agreers averaged 38.5 years of age as compared to the rest of the IAABO group, which averaged 23.0 years. The majority (55.5%) of the non-agreers from the IAABO group had only a high school diploma, while 44.4% of the rest of the group had high school diplomas as well. Only 16.6% of the non-agreers had four-year college degrees, and 27.7% had Master's degrees. The rest of the IAABO group reflected 44.4% high school graduates, 44.4% baccalaureate graduates, and 11.1% with Master's degrees.

Fifty percent of the IAABO subject group non-agreers have officiated more than just the sport of basketball, while only 29.6% of the remainder of the group have offici-

TABLE 4

IAABO Subject Group Demographics,
Total Group Non-Agreers and Remainder of Group

	Total N=45	Non-Agreers N=33	Remainder of Group N=12
Experience in Officiating (Mean)	7.2 yrs.	8.2 yrs.	6.5 yrs.
Age (Mean)	29.2 yrs.	38.5 yrs.	23.0 yrs.
Education:			
High School Diploma	48.9%	55.5%	44.4%
Four-Year Degree	33.3%	16.6%	44.4%
Master's Degree	17.7%	27.7%	11.1%
Doctorate	0.0%	0.0%	0.0%
Officiate More Than One Sport	37.7%	50.0%	29.6%
Coached Basketball	53.3%	55.5%	51.8%
Played Basketball	86.6%	83.3%	88.9%

TABLE 5

ACC Subject Group Demographics,
Total Group Non-Agreers and Majority of Group

	Total N=45	Non-Agreers N=19	Majority of Group N=26
Experience in Officiating (Mean)	14.9 yrs.	16.8 yrs.	13.5 yrs.
Age (Mean)	38.3 yrs.	39.2 yrs.	37.7 yrs.
Education:			
High School Diploma	28.9%	26.3%	30.8%
Four-Year Degree	33.3%	31.6%	34.6%
Master's Degree	31.1%	26.3%	34.6%
Doctorate	6.7%	15.8%	0.0%
Officiate More Than One Sport	57.8%	57.9%	57.7%
Coached Basketball	51.1%	57.9%	46.1%
Played Basketball	93.3%	100.0%	88.5%

ated more than one sport. Of the non-agreers from the IAABO group, 55.5% of them have coached basketball, and 83.3% have played basketball, while the rest of the group reflect 51.8% who have coached basketball before, and 88.9% have played previously.

The non-agreers of the ACC subject group averaged 16.8 years of experience in officiating as compared to the rest of the ACC subject group, which reflected only 13.5 years of officiating experience. The non-agreers averaged 39.2 years of age, as compared to the rest of the ACC group, which averaged 37.7 years.

As for education levels, little difference existed between the non-agreers of the ACC group and the rest of the group. The non-agreers reflected 26.3% with high school diplomas, 31.6% with four-year degrees, 26.3% with master's degrees, and 15.8% with doctorates. The rest of the group had 30.8% with high school diplomas, 34.6% with four-year degrees, 34.6% with master's degrees, and no one with the doctorate degree.

The ACC non-agreer group and the rest of the group were virtually the same with respect to officiating more than one sport. The percentages were 57.9 and 57.7 respectively. Of the non-agreers from the ACC group, 57.9% of them have coached basketball, and 100% have played basketball, while the rest of the group reflect 46.1% who have coached basketball before, and 88.5% have played previously.

The comparison of the demographic data of the ACC officials and the IAABO officials in Tables 4 and 5 evidenced several interesting comparisons. ACC officials have an average of 7.7 years more experience than the IAABO officials. The difference of 7.7 years experience was relatively consistent between agreers and non-agreers. Non-agreers in both subject groups were approximately the same age: ACC non-agreers averaged 39.2 years, IAABO non-agreers averaged 38.5 years. The closeness of age for non-agreers was not consistent with the remainder of officials which showed the ACC to be considerably older than IAABO officials (37.7 years old as compared to 23.0 years, respectively), while the total for ACC officials was an average of 9.1 years older than the total for IAABO officials. In comparing education lyvels, the ACC officials were overall better educated with 71.1% of the officials holding a four-year degree, while only 51% of the IAABO officials held the four-year degree. The largest difference in education levels occurred in the high school diploma level, where the IAABO officials recorded 48.9%, while the ACC officials recorded only 28.9%. Non-agreer education levels follow approximately the same pattern with the biggest difference again in the high school diploma level: ACC 26.3%, IAABO 55.5%. Although no IAABO officials hold the doctorate, it was interesting to note 15.8% of the ACC non-agreers held the doctorate. Only 37.7% of the IAABO officials officiate more than one sport, while 57.8% of the

ACC officials officiate more than one sport. Non-agreers in the IAABO and ACC officiating groups officiate other sports at a rate of 50% and 57.9%, respectively. There appeared to be little difference between ACC and IAABO officials regarding experience in coaching basketball. In the category of playing experience in basketball, little difference existed between the two officiating groups, with the exception of the non-agreers. All ACC non-agreers had played basketball, while only 83.3% of the IAABO non-agreers had played. A comparison of characteristics which made up the non-agreer category for both officiating groups was interesting. The ACC non-agreer was considerably older than the IAABO non-agreer, had only .7 years more experience, was better educated, officiated other sports as did the IAABO non-agreers, and both coached and played basketball.

Experience As A Factor

In an effort to study the factor of years of officiating experience on subjects' responses, specific experience categories were formed for the two subject groups and the total group. Beginning with the least amount of experience, one year, experience categories were formed, using five-year increments. The categories were as follows: 1-5 years, 6-10 years, 11-15 years, 16-20 years, and 21 years and over. Each subject was placed into a category, based upon the number of years of basketball officiating experience.

In addition, subjects were categorized as to the extent of their disagreement with the majority calls. Categories based on number of deviations were set up as follows: <3, >3 <6, >6 <9, >9 <12, and >12 <15. Categories of years of experience and number of subjects and their deviations were cross-matched to identify degrees of disagreement within levels of experience. Further, average deviations were established for each experience category, each deviation category, and for each subject group.

In comparing the ACC subject group and the IAABO subject group, the latter showed a higher degree of deviation by experience category and deviation category in almost every instance. The ACC group posted average deviations of 4.00, 4.13, 4.72, 3.40, and 6.71 for the years of experience categories, while the IAABO group recorded average deviations of 7.13, 8.30, 6.50, 0.00 (no subjects in the 16 - 20 year category), and 8.33, respectively. Further, the ACC group posted average deviations in the deviation categories of 1.50, 3.50, 6.57, 10.00, and 0.00 (no deviations recorded in the >12 <15 category), while the IAABO group recorded average deviations of 2.00, 4.67, 7.00, 10.00, and 12.40 in the same categories, respectively. Finally, the ACC group experienced a lower average deviation, 4.62, than the IAABO group, 7.36. The above data are reflected in Tables 6 and 7.

TABLE 6

Years of Officiating Experience
Compared to Number of Deviations---ACC Subject Group

Years of Officiating Experience

Deviations	1 - 5		6 - 10		11 - 15		16 - 20		21 & Over		Total		Avg. Dev.
	n	f	n	f	n	f	n	f	n	f	n	f	
< 3	1	1	2	3	6	10	2	3	1	1	12	18	1.50
> 3 < 6	0	0	4	14	4	17	6	18	0	0	14	49	3.50
> 6 < 9	1	7	1	7	6	39	2	13	4	26	14	92	6.57
> 9 < 12	0	0	1	9	2	19	0	0	2	20	5	48	9.60
> 12 < 15	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	2	8	8	33	18	85	10	34	7	47	45	208	4.62
AVG. DEV.	4.00		4.13		4.72		3.40		6.71				

TABLE 7

Years of Officiating Experience
Compared to Number of Deviations---IAABO Subject Group

	Years of Officiating Experience												
	1 - 5		6 - 10		11 - 15		16 - 20		21 & Over		Total		Avg. Dev.
Deviations	n	f	n	f	n	f	n	f	n	f	n	f	
<3	1	2	0	0	0	0	0	0	0	0	1	2	2.0
>3 <6	5	24	2	10	3	13	0	0	0	0	10	47	4.67
>6 <9	14	99	4	26	4	28	0	0	2	15	24	168	7.00
>9 <12	1	9	2	22	1	11	0	0	1	10	5	52	10.40
>12 <15	3	37	2	25	0	0	0	0	0	0	5	62	12.40
TOTALS	24	171	10	83	8	52	0	0	3	25	45	331	7.36
AVG. DEV.	7.13		8.30		6.50		0.0		8.33				

In the total group, years of experience categories 1-5 and 21-and-over posted the highest levels of deviation, 6.88 and 7.20, respectively. Three experience categories showed a pattern of decline in average deviations as the years increased: 6-10 (6.44), 11-15 (5.23), 16-20 (3.50), yet the final experience category, 21-and-over, showed a significant increase in the average deviation (7.20). As one might expect, average deviation figured in the deviation categories increased as the number of deviations by category increased: 3 (1.69), 3 6 (3.96), 6 9 (6.84), 9 12 (10.00), 12 15 (12.40). The average deviation for the total group was 5.99. In comparing the total group average deviation of 5.99 to the various experience categories and deviation categories, it was found the experience 1-15 years and 16-20 years and deviation categories 3 and 3 6 recorded lower than average mean deviations. From this, one might conclude that officials with 11-20 years of experience are more consistent than officials with less experience. The above data are reflected in Table 8.

Age As A Factor

In an effort to study the factor of official's age on subjects' responses, specific age categories were formed for the two subject groups and the total group. Beginning with the youngest official, twenty years old, age categories were formed, using ten-year increments. The categories were formed, using ten-year increments. The categories were as

TABLE 8

Years of Officiating Experience
Compared to Number of Deviations---Total Subject Group

	Years of Officiating Experience											
	1 - 5		6 - 10		11 - 15		16 - 20		21 & Over		Total		AVG. DEV.
Deviations	n	f	n	f	n	f	n	f	n	f	n	f	
<3	2	3	2	3	6	10	2	4	1	1	13	22	1.69
>3 <6	5	24	6	24	7	29	6	18	0	0	24	95	3.96
>6 <9	15	106	5	33	10	67	2	13	6	41	38	260	6.84
>9 <12	1	9	3	31	3	30	0	0	3	30	10	100	10.00
>12 <15	3	37	2	25	0	0	0	0	0	0	5	62	12.4
TOTALS	26	179	18	116	26	136	10	35	10	72	90	539	5.99
AVG. DEV.	6.88		6.44		5.23		3.50		7.20				

follows: 20-29 years, 30-39 years, 40-49 years, and 50 years and over. Each subject was placed into a category depending on his age. In addition, subjects were categorized as to the extent of their disagreement with the majority calls. Categories based on number of deviations were set up as follows: 3, 3 6, 6 9, 9 12, and 12 15. Categories of age in years and number of subjects and their deviations were cross-matched to identify degrees of disagreement within levels of age. Further, average deviations were established for each age category, each deviation category, and for each subject group.

In comparing the ACC subject group and the IAABO subject group, the latter showed a higher degree of deviation by age category and deviation category in every instance. The ACC group posted average deviations of 4.17, 5.19, 3.54, and 5.40 for the age in years categories, while the IAABO group recorded average deviations of 6.79, 6.31, 9.00, and 9.00 respectively. Further, the ACC group posted average deviations in the deviation categories of 1.50, 3 57, 6.57, 9.60, and 0.00 (no subjects recorded deviations in the 12 15 category), while the IAABO group recorded average deviations of 2.00, 4.70, 7.00, 10.40, and 12.40 in the same categories, respectively. Finally, the ACC group experienced a lower average deviation, 4.62, than the IAABO group, 7.36. The above data are reflected in Tables 9 and 10.

TABLE 9

Officials' Ages Compared to Number of Deviations---ACC Subject Group

	AGE										
	20 - 29		30 - 39		40 - 49		50 & Over		Total		AVG.
Deviations	n	f	n	f	n	f	n	f	n	f	DEV.
<3	2	3	4	7	5	7	1	1	12	18	1.50
>3 <6	2	8	6	22	5	16	1	3	14	50	3.57
>6 <9	2	14	8	52	2	14	2	12	14	92	6.57
>9 <12	0	0	3	28	1	9	1	11	5	48	9.60
>12 <15	0	0	0	0	0	0	0	0	0	0	0.00
TOTALS	6	25	21	109	13	46	5	27	45	208	4.62
AVG. DEV.	4.17		5.19		3.54		5.40				

TABLE 10

Officials' Ages Compared to Number of Deviations---IAABO Subject Group

	AGE											
	20 - 29		30 - 39		40 - 49		50 & Over		Total		AVG.
Deviations	n	f	n	f	n	f	n	f	n	f	DEV.
<3	0	0	1	2	0	0	0	0	1	2	2.00
>3 <6	3	14	6	28	1	5	0	0	10	47	4.70
>6 <9	10	68	7	50	6	43	1	7	24	168	7.00
>9 <12	0	0	1	9	3	32	1	11	5	52	10.40
>12 <15	1	13	1	12	3	37	0	0	5	62	12.40
TOTALS	14	95	16	101	13	117	2	18	45	331	7.36
AVG. DEV.	6.79		6.31		9.00		9.00				

In the total group, age in years categories 40-49 and 50 and over posted the highest levels of deviation, 6.27 and 6.57 respectively. Three of the four age categories showed a pattern of increased deviation as the age in years increased: 30 - 39 (5.68), 40 - 49 (6.27), and 50 and over (6.57). The 20 - 29 category recorded a 6.00 average deviation. As one might expect, average deviation figures in the deviation categories increased as the number of deviations by category increased: <3 (1.54), >3 <6 (4.00), >6 <9 (6.84), >9 <12 (10.00), and >12 <15 (12.40). The average deviation for the total group was 5.99. In comparing the total group average deviation of 5.99 to the various age categories and deviation categories, it was found that the age category 30 - 39 years and deviation categories <3 and >3 <6 recorded lower than average mean deviations. From this, one might conclude that officials between ages 30 - 39 years are more consistent than older officials. The above data are reflected in Table 11.

Education As A Factor

In an effort to study the factor of officials' education level on subjects' responses, specific education categories were formed for the two subject groups and the total group. Beginning with the lowest level of education attained by a member of the subject group, high school diploma, education categories were formed, using four levels of attainment. The categories were as follows: High School Diploma, Four-Year Degree, Master's Degree, and the Doctorate. Each subject

TABLE 11

Officials' Ages As Compared to Number of Deviations---Total Subject Group

Deviations	AGE 20 - 29 n	20 - 29 f	30 - 39 n	30 - 39 f	40 - 49 n	40 - 49 f	50 & Over n	50 & Over f	TOTAL n	TOTAL f	AVG. DEV.
<3	2	3	5	9	5	7	1	1	13	20	1.54
>3 <6	5	22	12	50	6	21	1	3	24	96	4.00
>6 <9	12	82	15	102	8	57	3	20	28	261	6.84
>9 <12	0	0	4	37	4	41	2	22	10	100	10.00
>12 <15	1	13	1	12	3	37	0	0	5	62	12.40
TOTALS	20	120	37	210	26	163	7	46	90	539	5.99
AVG. DEV.	6.00		5.68		6.27		6.57				

was placed into a category depending on his education level attained. In addition, subjects were categorized as to the extent of their disagreement with the majority calls. Categories based on number of deviations were set up as follows: <3, >3 <6, >6 <9, >9 <12, and >12 <15. Categories of education level attained and number of subjects and their deviations were cross-matched to identify degrees of disagreement within levels of education attained. Further, average deviations were established for each education category, each deviation category, and for each subject group.

In comparing the ACC subject group and the IAABO subject group, the latter showed a higher degree of deviation by education category in every instance (except in the doctorate category, where no IAABO holds the doctorate). The ACC group posted average deviations of 5.58, 4.40, 3.80, and 6.00 for the education attained categories, while the IAABO group recorded average deviations of 7.91, 6.60, 7.00, and 0.00, respectively. Further, the ACC group posted average deviations in the deviation categories of 1.50, 3.57, 6.57, 9.60, and 0.00 (no subjects recorded deviations in the >12 <15 category), while the IAABO group recorded average deviations of 2.00, 4.70, 7.00, 10.40, and 12.40 in the same categories, respectively. Finally, the ACC group experienced a lower average deviation, 4.62, than the IAABO group, 7.36. The above data are reflected in Tables 12 and 13.

TABLE 12

Officials' Education Levels Compared to Number of Deviations---ACC Subject Group

	High School Diploma		Four-Year Degree		Master's		Doctorate		Total		AVG. DEV.
Deviations	n	f	n	f	n	f	n	f	n	f	
<3	1	1	6	10	5	7	0	0	12	18	1.50
>3 <6	6	24	2	6	5	17	1	3	14	50	3.57
>6 <9	2	13	6	40	5	33	1	6	14	92	6.57
>9 <12	3	29	1	10	0	0	1	9	5	48	9.60
>12 <15	0	0	0	0	0	0	0	0	0	0	0.00
TOTALS	12	67	15	66	15	57	3	18	45	208	4.62
AVG. DEV.	5.58		4.40		3.80		6.00				

TABLE 13

Officials' Education Levels As Compared to Number of Deviations---IAABO Subject Group

Deviations	High School Diploma		Four-Year Degree		Master's		Doctorate		Total		AVG. DEV.
	n	f	n	f	n	f	n	f	n	f	
<3	0	0	0	0	1	2	0	0	1	2	2.00
>3 <6	4	19	4	18	2	10	0	0	10	47	4.70
>6 <9	12	87	9	61	4	27	0	0	25	175	7.00
>9 <12	1	11	2	20	1	11	0	0	4	42	10.40
>12 <15	4	49	0	0	1	13	0	0	5	62	12.40
TOTALS	21	166	15	99	9	63	0	0	45	331	7.36
AVG. DEV.	7.91		6.60		7.00		0.00				

In the total group, education-attained categories, high school diploma and doctorate posted the highest levels of deviation, 7.06 and 6.00 (only three subjects in this category), respectively. Three of the four categories showed a decrease in deviation as the education level increased: high school diploma (7.06), four-year degree (5.50), and Master's Degree (5.00). The doctorate level increased in average deviation (6.00), but that category included only three subjects. As one might expect, average deviation figures in the deviation categories increased as the number of deviations by category increased: <3 (1.54), >3 <6 (4.00), >6 <9 (6.84), >9 <12 (10.00), and >12 <15 (12.40). The average deviation for the total group was 5.99. In comparing the total group average deviation of 5.99 to the various education attained categories and deviation categories, it was found that the education-attained categories four-year degree and Master's Degree and deviation categories <3 and >3 <6 recorded lower than average mean deviations. From this, one might conclude that officials with four-year degrees and Master's Degrees are more consistent than less educated officials. Due to the number of officials in the Doctorate category (three), no speculation for that category was warranted. The above data are reflected in Table 14.

TABLE 14

Officials' Education Levels As Compared to Number of Deviations---Total Subject Group

Deviations	High School Diploma		Four-Year Degree		Master's		Doctorate		Total		AVG. DEV.
	n	f	n	f	n	f	n	f	n	f	
<3	1	1	6	10	6	9	0	0	13	20	1.54
>3 <6	10	43	6	24	7	27	1	3	24	96	4.00
>6 <9	14	100	15	101	9	60	1	6	38	261	6.84
>9 <12	4	40	3	30	1	11	1	9	10	100	10.00
>12 <15	4	49	0	0	1	13	0	0	5	62	12.40
TOTALS	33	233	30	165	24	120	3	18	90	539	5.99
AVG. DEV.	7.06		5.50		5.00		6.00				

Officiating One or More Sports as a Factor

In an effort to study the factor of officiating one or more sports on subjects' responses, two specific categories of subjects were formed for the two subject groups and the total group. The two categories, only basketball and other sports also, separated officials into those who officiate other sports as well. In addition, subjects were categorized as to the extent of their disagreement with the majority calls. Categories based on number of deviations were set up as follows: <3, >3 <6, >6 <9, >9 <12, and >12 <15. Categories of officiating practices and number of subjects and their deviations were cross-matched to identify degrees of disagreement within officiating practices. Further, average deviations were established for both officiating practices categories, each deviation category, and for each subject group.

In comparing the ACC subject group and the IAABO subject group, the latter showed a higher degree of deviation by officiating practices categories and deviation categories in every instance. The ACC group posted average deviations of 4.37 and 4.81 for the officiating practices categories, while the IAABO group recorded average deviations of 6.00 and 9.59, respectively. Further, the ACC group posted average deviations in the deviation categories of 1.50, 3.57, 6.57, 9.60, and 0.00 (no subjects recorded deviations in the >12 <15 category), while the IAABO group recor-

ded average deviations of 2.00, 4.70, 7.00, 10.40, and 12.40 in the same categories respectively. Finally, the ACC group experienced a lower average deviation, 4.62, than the IAABO group, 7.36. The above data are reflected in Tables 15 and 16.

In the total group, officiating practices category other sports also posted a higher level of deviation, 6.70, than did the category only basketball, 5.34. As one might expect, average deviation figures in the deviation categories increased as the number of deviations by category increased: <3 (1.54), >3 <6 (4.00), >6 <9 (6.84), >9 <12 (10.00), and >12 <15 (12.40). The average deviation for the total group was 5.99. When comparing the total group average deviation of 5.99 to the two officiating practices categories and deviation categories, it was found that the categories only basketball, <3, and >3 <6 recorded lower than average mean deviations; 5.34, 1.54, and 4.00 respectively. From this, one might conclude that officials who officiate only basketball are more consistent than those who officiate other sports as well. The above data are reflected in Table 17.

Basketball Coaching Experience As A Factor

In an effort to study the factor of basketball coaching experience on subjects' responses, two specific categories of subjects were formed for the two subject groups and the total group. The two categories, coaching experience

TABLE 15

Officials' Officiating Practices As Compared to Number of Deviations---ACC Subject Group

Deviations	Only Basketball		Other Sports Also		Total		AVERAGE DEVIATION
	n	f	n	f	n	f	
<3	6	9	6	9	12	18	1.50
>3 <6	5	17	9	33	14	50	3.57
>6 <9	6	39	8	53	14	92	6.57
>9 <12	2	18	3	30	5	48	9.60
>12 <15	0	0	0	0	0	0	0.00
TOTALS	19	83	26	125	45	208	4.62
AVG. DEV.	4.37		4.81				

TABLE 16

Officials' Officiating Practices As Compared to Number of Deviations---IAABO Subject Group

Deviations	Only Basketball		Other Sports Also		Total		AVERAGE DEVIATION
	n	f	n	f	n	f	
<3	1	2	0	0	1	2	2.00
>3 <6	7	34	3	13	10	47	4.70
>6 <9	14	62	10	106	24	168	7.00
>9 <12	2	20	3	32	5	52	10.40
>12 <15	4	50	1	12	5	62	12.40
TOTALS	28	168	17	163	45	331	7.36
AVG. DEV.	6.00		9.59				

TABLE 17

Officials' Officiating Practices As Compared to Number of Deviations---Total Subject Group

Deviations	Only Basketball n	Only Basketball f	Other Sports Also n	Other Sports Also f	Total n	Total f	AVERAGE DEVIATION
<3	7	11	6	9	13	20	1.54
>3 <6	12	51	12	46	24	96	4.00
>6 <9	20	101	18	159	38	261	6.84
>9 <12	4	38	6	62	10	100	10.00
>12 <15	4	50	1	12	5	62	12.40
TOTALS	47	251	43	288	90	539	5.99
AVG. DEV.	5.34		6.70				

and no coaching experience, separated officials into those who have coached basketball previously and those who have not. In addition, subjects were categorized as to the extent of their disagreement with the majority calls. Categories based on number of deviations were set up as follows: <3, >3 <6, >6 <9, >9 <12, and >12 <15. Categories of coaching experience and number of subjects and their deviations were cross-matched to identify degrees of disagreement within coaching experiences. Further, average deviations were established for both coaching experience categories, each deviation category, and for each subject group.

In comparing the ACC subject group and the IAABO subject group, the latter showed a higher degree of deviation by coaching experience categories and deviation categories in every instance. The ACC group posted average deviations of 4.64 and 4.61 for the coaching experience categories, while the IAABO group recorded average deviations of 7.58 and 7.10 respectively. Further, the ACC group posted average deviations in the deviation categories of 1.50, 3.57, 6.57, 9.60, and 0.00 (no subjects recorded deviations in the >12 <15 category), while the IAABO group recorded average deviations of 2.00, 4.70, 7.00, 10.40, and 12.40 in the same categories, respectively. Finally, the ACC group experienced a lower average deviation, 4.62, than the IAABO group, 7.36. The above data are reflected in Tables 18 and 19.

TABLE 18

Officials' Basketball Coaching Experience
Compared to Number of Deviations---ACC Subject Group

Deviations	Coaching Experience n	Coaching Experience f	No Coaching Experience n	No Coaching Experience f	Total n	Total f	AVG. DEV.
<3	5	6	7	12	12	18	1.50
>3 <6	6	20	8	30	14	50	3.57
>6 <9	10	65	4	27	14	92	6.57
>9 <12	1	11	4	37	5	48	9.60
>12 <15	0	0	0	0	0	0	0.00
TOTALS	22	102	23	106	45	208	4.62
AVG. DEV.	4.64		4.61				

TABLE 19

Officials' Basketball Coaching Experience
Compared to Number of Deviations---IAABO Subject Group

Deviations	Coaching Experience n	Coaching Experience f	No Coaching Experience n	No Coaching Experience f	Total n	Total f	AVG. DEV.
<3	0	0	1	2	1	2	2.00
>3 <6	5	25	5	22	10	47	4.70
>6 <9	13	89	11	79	24	168	7.00
>9 <12	3	31	2	21	5	52	10.40
>12 <15	3	37	2	25	5	62	12.40
TOTALS	24	182	21	149	45	331	7.36
AVG. DEV.	7.58		7.10				

In the total group, the coaching experience category posted a higher level of deviation, 6.17, than did the no coaching experience category, 5.80. As one might expect, average deviation figures in the deviation categories increased as the number of deviations by category increased: <3 (1.54), >3 <6 (4.00), >6 <9 (6.84), >9 <12 (10.00), and >12 <15 (12.40). The average deviation for the total group was 5.99. When comparing the total group average deviation of 5.99 to the two coaching experience categories and deviation categories, it was found that the categories no coaching experience, <3, and >3 <6 recorded lower than average mean deviations; 5.80, 1.54, and 4.00 respectively. From this, one might conclude that officials without basketball coaching experience are more consistent than those who have coached basketball previously. The above data are reflected in Table 20.

Basketball Playing Experience As A Factor

In an effort to study the factor of basketball playing experience on subjects' responses, two specific categories were formed for the two subject groups and the total group. The two categories, playing experience and no playing experience, separated officials into those who have played basketball on a team previously, and those who have never played basketball on a team. In addition, subjects were categorized as to the extent of their disagreement with the majority calls. Categories based on number of deviations were set up as follows: <3, >3 <6, >6 <9,

TABLE 20

Officials' Basketball Coaching Experience
Compared to Number of Deviations---Total Subject Group

Deviations	Coaching Experience n	f	No Coaching Experience n	f	Total n	f	AVG. DEV.
<3	5	6	8	14	13	20	1.54
>3 <6	11	45	13	52	24	96	4.00
>6 <9	23	154	15	106	38	261	6.84
>9 <12	4	42	6	58	10	100	10.00
>12 <15	3	37	2	25	5	62	12.40
TOTALS	46	284	44	255	90	539	5.99
AVG. DEV.	6.17		5.80				

>9 <12, and >12 <15. Categories of playing experience and number of subjects and their deviations were cross-matched to identify degrees of disagreement within the subjects' playing experience. Further, average deviations were established for both playing experience categories, each deviation category, and for each subject group.

In comparing the ACC subject group and the IAABO subject group, the latter showed a higher degree of deviation by playing experience categories and deviation categories in every instance. It was noted that the ACC no playing experience category recorded only three subjects, which of course, made data used from that particular category suspect.

The ACC group posted average deviations of 4.79 and 2.33 for the playing experience categories, while the IAABO group recorded average deviations of 7.75 and 5.78 respectively. Further, the ACC group posted average deviations in the deviation categories of 1.50, 3.57, 6.57, 9.60, and 0.00 (no subjects recorded deviations in the >12 <15 category), while the IAABO group recorded average deviations of 2.00, 4.70, 7.00, 10.40, and 12.40 in the same categories, respectively. Finally, the ACC experienced a lower average deviation, 4.62, than the IAABO group, 7.36. The above data are reflected in Tables 21 and 22.

TABLE 21

Officials' Basketball Playing Experience
Compared to Number of Deviations---ACC Subject Group

Deviations	Playing Experience n	Playing Experience f	No Playing Experience n	No Playing Experience f	Total n	Total f	AVG. DEV.
<3	10	15	2	3	12	18	1.50
>3 <6	13	46	1	4	14	50	3.57
>6 <9	14	92	0	0	14	92	6.57
>9 <12	5	48	0	0	5	5	9.60
>12 <15	0	0	0	0	0	0	0.00
TOTALS	42	201	3	7	45	45	4.62
AVG. DEV.	4.79		2.33				

TABLE 22

Officials' Basketball Playing Experience
Compared to Number of Deviations---IAABO Subject Group

Deviations	Playing Experience n	f	No Playing Experience n	f	Total n	f	AVG. DEV.
<3	0	0	1	2	1	2	2.00
>3 <6	8	37	2	10	10	47	4.70
>6 <9	21	150	3	18	24	168	7.00
>9 <12	3	42	2	10	5	52	10.40
>12 <15	4	50	1	12	5	62	12.40
TOTALS	36	279	9	52	45	331	7.36
AVG. DEV.	7.75		5.78				

In the total group, playing experience category no playing experience posted a lower level of deviation, 4.92, than did the playing experience category, 6.15. As one might expect, average deviation figures in the deviation figures in the deviation categories increased as the number of deviations by category increased: <3 (1.54), >3 <6 (4.00), >6 <9 (6.84), >9 <12 (10.00), and >12 <15 (12.40). The average deviation for the total group was 5.99. When comparing the total group average deviation of 5.99 to the two playing experience categories and deviation categories, it was found that the categories of no playing experience, <3, and >3 <6 recorded lower than average mean deviations--4.92, 1.54, and 4.00 respectively. From this, one might conclude that officials who have not had playing experience on a team are more consistent than those who have played previously. It must be remembered that data from the playing experience category of no playing experience, was suspect due to the low number of subjects (12) in comparison to those subjects who had playing experience (78). The above data are reflected in Table 23.

TABLE 23

Officials' Basketball Playing Experience
Compared to Number of Deviations---Total Subject Group

Deviations	Playing Experience n	Playing Experience f	No Playing Experience n	No Playing Experience f	Total n	Total f	AVG. DEV.
<3	10	15	3	5	13	20	1.54
>3 <6	21	82	3	14	24	96	4.00
>6 <9	35	243	3	18	38	261	6.84
>9 <12	8	90	2	10	10	100	10.00
>12 <15	4	50	1	12	5	62	12.40
TOTALS	78	480	12	59	90	539	5.99
AVG. DEV.	6.15		4.92				

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary and Conclusions

The purpose of this study was to describe the responses of intercollegiate and interscholastic basketball officials to a basketball film consisting of selected game situations which had the potential of a foul occurrence. Twenty-seven situations were selected from Big Ten Athletic Conference basketball game film and incorporated into the master film. The film was shown to forty-five Atlantic Coast Conference basketball officials and forty-five officials of the International Association of Approved Basketball Officials, Board 134. Each official viewing the film responded to each situation with one of three possible responses: foul on light jersey, foul on dark jersey, or no foul. Further, each subject provided information regarding their basketball officiating experience, age, education, other officiating activities, basketball coaching experience, and basketball playing experience.

Following review of the responses of the ninety subjects to the filmed situations, majority calls were established for those situations for which there had been at least fifty percent agreement by the subjects on a particular call. Six of the situations failed to meet that

criterion and, therefore, were deleted from the study. The term deviation referred to subject responses which differed from the majority calls. The total subject group deviation was calculated to be 5.99 based on five hundred thirty-nine deviations out of a total of eighteen hundred ninety responses. Non-agreer status was assigned to subjects recording more than 5.99 deviations.

In response to the filmed series, the intercollegiate officials (ACC) responded with a no foul decision, in contrast to the majority call of foul on dark jersey, three times out of a total of one hundred eighty. The same officials responded with a no foul on light jersey sixty-nine out of nine hundred times. Foul on dark jersey decisions were recorded thirty-seven out of eight hundred ten times when the majority call was no foul. Foul on dark jersey decisions, when the majority call was foul on light jersey, occurred thirty-nine times out of a possible nine hundred. The same group responded to foul on light jersey fifty-two times out of eight hundred ten when the majority call was no foul. A foul on light jersey decision was recorded eight out of one hundred eighty times when the majority call indicated foul on dark jersey.

The interscholastic officials (IAABO) responded with a no foul decision, in contrast to the majority call of foul on light jersey, fifty-five out of a total of nine hundred times. The same officials responded with a no foul call seven

out of one hundred eighty times, contrasting the majority call of foul on dark jersey. Foul on light jersey decisions occurred seventy-eight out of eight hundred ten times when the majority call was no foul. The same group recorded foul on light jersey decisions when the majority call was foul on dark jersey, twenty-two out of one hundred eighty times. A foul on dark jersey was recorded ninety-seven of eight hundred ten times when the majority call indicated no foul. Finally, a foul on dark jersey was recorded seventy-seven times out of a possible nine hundred when the majority call was foul on light jersey.

ACC officials accounted for nineteen non-agreers, while the IAABO officials accounted for thirty-three. Non-agreers in both subject groups were on the average older and had more basketball officiating experience than their majority counterparts; more non-agreers than the agreers had previously coached basketball; fewer non-agreers than agreers in the ACC group had played basketball previously; all IAABO non-agreers had previously played basketball; and non-agreers in both groups, except for ACC officials holding master's degrees, had less formal education than the majority subjects.

In an effort to further study the demographic data collected, specific categories were established for each variable, average deviations were calculated for each category, and comparisons were drawn between categories and

between subject groups. The following hypotheses appeared to be substantiated by the data collected and analyzed from the subjects used in this study.

1. The more experience an official has the greater consistency he will exhibit. There was a downward trend in average deviations as officiating experience increased, with the exception of ten subjects in the twenty-one and over years of experience category. This group recorded a higher average deviation than all other experience categories. The researcher could not account for the sudden and substantial increase by that particular group of subjects.

2. The more education an official has, the more consistency he will exhibit. A definite decrease in average deviations was recorded as the level of education increased, with the exception of those subjects holding the doctorate. Since only three subjects held the doctorate, this was too small a sample from which to draw conclusions.

3. Basketball officials who have coached basketball are less consistent than those who have never coached the game.

4. Basketball officials who have played on a basketball team are less consistent than those who have never played.

The following hypotheses were not substantiated by the data collected and analyzed:

1. Older officials are more consistent than young officials.

2. Basketball officials who officiate more than one sport are more consistent than officials who officiate only basketball.

ACC officials were found to be more consistent than the IAABO officials in all experience, age, and education categories. In each instance the IAABO officials recorded higher deviations than the ACC officials. Further, IAABO officials were found to be less consistent than the ACC officials in the categories of officiating one or more sports, coaching experience, and playing experience. In each instance, the IAABO officials recorded higher deviations than the ACC officials. From this, one might conclude that ACC officials as a group are more consistent than IAABO officials.

This study revealed new insights into the intercollegiate and interscholastic basketball official, particularly in the demographics of the subject groups studied. Internal consistency was evidenced between officiating groups and the specific demographic categories between and within groups. Since the primary goal of this study was to evidence consistency or the lack of it, the author encourages officiating organizations to study the data recorded and the information revealed in an effort to achieve optimal consistency.

Recommendations

As a result of the findings of this study, the investigator recommends for consideration that:

1. The present study be repeated using officiating groups from the major intercollegiate conferences and interscholastic officiating groups from the south, west, midwest, and northeast. In this way, regional or conference influences or biases could be identified.

2. The present study be repeated, using black officials and white officials as the two subject groups.

3. Officiating bodies increase the use of instant replay and slow motion in their training and evaluation of officials.

4. Further research be initiated to include all types of officials used in sporting contests.

BIBLIOGRAPHY

Alderson, C. J. Officials, coaches are on the same team. Journal of Health, Physical Education, and Recreation, 1963, 34, 40-43.

American Association of School Librarians & Association for Educational Communications and Technology. Media Programs. Chicago: American Library Association, 1975.

Arredondo, D. & Throm, S. Utilizing multi-media in teaching for attitude changes. AV Guide, 1972, 51, 9-11.

Barnes, M. et al. Handbook for teaching basketball officiating. Washington, D.C.: Division for Girls and Women's Sports of the American Association for Health, Physical Education, and Recreation, 1969.

Bell, R. I., & Coplans, J. Decisions, decisions: Game theory and you. New York: Norton, 1976.

Bernhard, F. Visualize your program. Journal of Health, Physical Education, and Recreation, 1944, 15, 432-434.

Bernhard, F. Writing scripts for better teaching films. Journal of Health, Physical Education, and Recreation, 1945, 16, 492-493, 528-530.

Brim, O. G. Personality and decision processes: Stanford, California: Stanford University Press, 1962.

Brinkers, H. S. Decision making. Columbus: Ohio State University Press, 1972.

Brown, H., & Messersmith, L. An experiment in teaching tumbling with and without motion pictures. Research Quarterly, 1948, 19, 304-307.

Brown, J. W., Lewis, R. B., & Harcleroad, F. F. AV instruction. New York: McGraw-Hill, 1973.

Bull, F. T. Audiovisual variety for boys classes. Journal of Health, Physical Education, and Recreation, 1968, 39, 1968.

Bullough, R. V. Creating instructional materials. Columbus, Ohio: Charles E. Merrill, 1974.

Bunker, L. K., Shearer, J. D., & Hall, E. G. Video-taped feedback and children learning to flutter kick. Perceptual and Motor Skills, 1976, 43, 371-74.

Bunn, J. W. The art of officiating sports. Englewood Cliffs, New Jersey: Prentice-Hall, 1968.

Butler, F. G. The concept of competence: An operational definition. Educational Technology, 1978, 18, 27-29.

Coffey, R. H. Instructional T.V. Journal of Health, Physical Education, and Recreation, 1968, 39, 33.

Collins, B. E. & Guetzkow, H. A social psychology of group processes for decision making. New York: Wiley, 1964.

Corcoran, K. & Dreidame, R. E. Problems in officiating different skill levels. In Basketball Guide, 1968-1969. Washington: Division for Girls and Women's Sports of the American Association for Health, Physical Education, and Recreation, 1958.

Costello, J. A., & Molina, C. Videotape for training intercollegiate officials. Journal of Health, Physical Education, and Recreation, 1975, 46, 37-38.

Dale, E. Audiovisual methods in teaching (3rd ed.). Hinsdale, Illinois: Dryden Press, 1969.

Deford, F. The ruling class. Sports Illustrated, 1976, 45, 126-30.

Dolan, E. Applicant's workshop handbook. Prince George's County, Maryland: IAABO Press, 1979.

Doran, R. L., Green, R. A., & McIntyre, P. J. Construction of test items to be presented via motion picture. Audiovisual Instruction, 1974, 19, 52-56.

Drum, B. A. The construction of a film as an instructional aid for training women basketball officials. Unpublished master's thesis, State University of Iowa, 1963.

DuBey, K. How to videotape through a microscope. Audiovisual Instruction, 1978, 23, 33-34.

Eiser, J. R. & Stroebe, W. Categorization and Social Judgment. New York: Academic Press, 1972.

Erickson, W. H. & Curl, D. H. Fundamentals of teaching with audiovisual technology. New York: The MacMillan Company, 1972.

Friedrich, J. A. Teaching games and skills through sight and sound. Journal of Health, Physical Education, and Recreation, 1952, 23, 12-13.

Gerlach, V. S. & Ely, D. P. Teaching and media. Englewood Cliffs, New Jersey: Prentice-Hall, 1971.

Gouran, D. S. The process of decision making. New York: Harper and Row, 1974.

Hainfield, H. Developing an audiovisual approach to testing. Audiovisual Instruction, 1968, 13, 717-719.

Hammond, K. R. & Stewart, T. R. Social Judgment Theory. In M. Kaplan & S. Schwartz (Eds.), Human judgment and decision processes. New York: Academic Press, 1975.

Hancock, Alan. Planning for educational mass media. New York: Longman, 1977.

Hano, Arnold. Traffic cop in slaughter alley. New York Times Magazine, 1976, 4, 26-28.

Hughes, E. Videotapes. Journal of Health, Physical Education, and Recreation, 1968, 39, 36.

Johnson, L. A new approach to teaching sports officiating. Journal of Health, Physical Education, and Recreation, 1976, 47, 37-38.

Koenig, F. B. Oficial with a cause. In Basketball Guide, 1964-1965. Washington: Division for Girl's and Women's Sports of the American Association for Health, Physical Education, and Recreation, 1964.

Landis, D., Masonis, E., & Loye, D. Television as a testing medium. Educational Television, 1971, 3, 17-20.

Le Bert-Francis, B. Do you see what I see? New York: Vantage Press, 1966.

Mackey, R. T. Sports skills lessons on television. Journal of Health, Physical Education and Recreation, 1968, 39, 31-32.

Magnusson, L. The better the officiating the better the play: Developing student officials. Journal of Health, Physical Education, and Recreation, 1963, 34, 27.

McQuire, B., Peterson, J., & Matthews, D. Officials manual: Basketball. Champaign, Illinois: Stipes Publishing, 1970.

Miller, D. W. The structure of human decisions. Englewood Cliffs, New Jersey: Prentice-Hall, 1967.

Miller, Gary L. Official's Manual: Basketball. New York: Leisure Press, 1979.

Moyer, L. J. The construction of films designed for practice in officiating women's basketball. Doctoral dissertation, State University of Iowa, 1968.

Naylor, J. H. Intramural officiating. Journal of Health, Physical Education, and Recreation, 1963, 34, 77-78.

Neve, N. ACC Officials' Handbook. Prince George's County, Maryland: IAABO Press, 1979.

Newell, A., & Simon, H. A. Human problem solving. Englewood Cliffs, New Jersey: Prentice-Hall, 1972.

Oles, H. J. Super 8 comes of age. Audiovisual Instruction, 1977, 22, 16-17.

O'Neil, M. Conditioned response in officiating. In Basketball Guide, 1960-1961. Washington: Division for Girls and Women's Sports of the American Association for Health, Physical Education, and Recreation, 1960.

Sanford, J. R. Learning to officiate is fun. Journal of Health, Physical Education, and Recreation, 1953, 24 29; 36.

Scandura, J. M. Problem solving. New York: Academic Press, 1977.

Shackle, G. L. S. Decision, order, and time in human affairs (2nd ed.) Cambridge, England: Cambridge University Press, 1969.

Steinbrecher, W. L. Sports officiating: An educational responsibility. The North Carolina Journal, 1973, 10, 22-23.

Stang, D. J. Group size effects on conformity. Journal of Social Psychology, 1976, 98, 175-78.

Stewart, R. E. Recruitment, training and assignment of intramural officials. The Physical Educator, 1968, 25, 32-33.

Surface. Referee: Roughest role in sports. The Reader's Digest, 1976, 109, 168-71.

Thiagarajan. Learner verification and revision: What, when, and how? Audiovisual Instruction, 1976, 21, 18-20.

Thompson, S., & Clegg, A. Modern officiating. New York: McGraw-Hill, 1974.

Turnbull, W. I. Construction of a basketball official's test presented by video-tape. Unpublished master's thesis, University of North Carolina at Greensboro, 1974.

Wittich, W. A., & Schuller, C. F. Instructional technology. New York: Harper & Row, 1979.

APPENDIX A

Response Sheet Provided for Subject

Responses to Filmed Series

Sample 1:	light jersey	dark jersey	no foul
Sample 2:	light jersey	dark jersey	no foul
Sample 3:	light jersey	dark jersey	no foul

LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF

LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF
LJ	DJ	NF

APPENDIX B

Form Provided for Subject Demographic Data Response

Age: _____

Indicate years of officiating experience: _____

Indicate education level completed:

High School _____

Bachelor's Degree _____

Master's Degree _____

Doctor's Degree _____

Do you officiate other sports? ____yes ____no

Have you coached basketball? ____yes ____no

Have you played basketball on a team? ____yes ____no

APPENDIX C

Responses to Individual Situations by Response Choice and Subject Groupings

		L			D			NF		
SITUATION		ACC	IAABO	TOTAL	ACC	IAABO	TOTAL	ACC	IAABO	TOTAL
1	N	29	29	58	3	6	9	13	10	23
	%	64	64	64	7	13	10	29	22	26
2	N	3	3	6	8	23	31	34	19	53
	%	7	7	7	18	52	35	76	42	59
3	N	29	31	60	1	7	8	15	7	22
	%	64	69	67	2	16	9	33	16	25
4	N	3	11	14	41	34	75	1	0	1
	%	7	24	16	91	76	84	2	0	2
5	N	12	9	21	24	4	28	9	32	41
	%	27	20	24	53	9	32	20	71	46
6	N	10	32	42	6	5	11	29	8	37
	%	22	71	47	13	11	13	64	18	42
7	N	36	33	69	1	10	11	8	1	10
	%	80	73	77	2	22	13	18	4	12

8	N	1	9	10	1	29	30	43	7	50
	%	2	20	12	2	64	34	96	16	56
9	N	41	36	77	2	7	9	2	2	4
	%	91	80	86	4	16	10	4	4	4
10	N	40	39	79	1	2	3	4	4	8
	%	89	87	88	2	4	4	9	9	9
11	N	12	32	44	3	4	7	30	9	39
	%	27	71	49	7	9	8	67	20	44
12	N	11	26	37	25	12	37	9	7	16
	%	24	58	42	56	27	42	20	16	18
13	N	33	26	59	7	9	16	5	10	15
	%	73	58	66	16	20	18	11	22	17
14	N	10	10	20	2	9	11	33	26	59
	%	22	22	20	4	20	13	73	58	66
15	N	2	9	11	7	5	12	36	31	67
	%	4	20	13	16	11	14	80	69	75
16	N	36	35	71	5	7	12	4	3	7
	%	80	78	79	11	16	14	9	7	8
17	N	37	38	75	1	3	4	7	4	11
	%	82	84	84	2	7	5	16	9	13

18	N	7	12	19	2	5	7	36	28	64
	%	16	27	22	4	11	8	80	62	72
19	N	8	6	14	11	29	40	26	10	36
	%	18	13	16	24	64	45	58	22	40
20	N	29	31	60	7	5	12	9	9	18
	%	64	69	67	16	11	14	20	20	20
21	N	5	11	16	38	27	65	2	7	9
	%	11	24	18	84	60	73	4	16	10
22	N	9	27	36	27	8	35	9	10	19
	%	20	60	40	60	18	39	20	22	22
23	N	6	8	14	11	8	19	28	29	57
	%	13	18	16	24	18	22	62	64	64
24	N	13	12	25	1	6	7	31	27	58
	%	29	27	28	2	13	8	69	60	65
25	N	1	9	10	9	9	18	35	27	62
	%	2	20	12	20	20	20	78	60	69
26	N	9	6	15	4	3	7	32	36	68
	%	20	13	17	4	7	8	71	80	76
27	N	34	36	70	9	4	13	2	5	7
	%	76	80	78	20	4	29	4	11	8

APPENDIX D

Raw Data on Demographic Characteristics of the IAABO Subject Group

Subject	Age (years)	Experience (years)	Education*	Officiate Other Sports	Coached Basketball	Played Basketball
1	38	11	B	no	no	yes
2	43	8	M	no	no	yes
3	32	2	B	no	no	yes
4	55	27	B	no	no	yes
5	24	1	H	no	no	yes
6	20	1	H	no	no	yes
7	27	5	H	no	no	yes
8	22	4	B	no	no	no
9	34	14	B	yes	no	yes
10	24	3	M	yes	no	yes
11	46	23	B	yes	no	yes

12	25	5	B	yes	no	no
13	23	3	H	yes	no	yes
14	37	5	H	yes	no	yes
15	40	5	H	yes	no	yes
16	36	7	B	no	yes	yes
17	29	3	H	no	yes	yes
18	36	11	M	no	yes	no
19	38	4	B	no	yes	yes
20	38	5	H	no	yes	yes
21	37	13	M	no	yes	yes
22	48	15	H	no	yes	yes
23	29	3	H	no	yes	yes
24	46	7	H	no	yes	yes
25	43	8	B	no	yes	yes
26	26	7	B	no	yes	yes
27	37	3	H	no	yes	yes
28	35	7	M	no	yes	yes

29	20	2	H	no	yes	yes
30	44	21	M	yes	yes	yes
31	38	7	M	yes	yes	yes
32	42	7	B	yes	yes	yes
33	44	1	H	yes	yes	yes
34	46	10	M	yes	yes	yes
35	41	13	H	yes	yes	yes
36	24	5	M	yes	yes	yes
37	40	3	H	yes	no	no
38	51	15	H	yes	no	no
39	23	3	H	no	no	no
40	38	2	M	no	no	no
41	43	1	B	yes	yes	no
42	38	3	B	no	yes	no
43	27	12	H	no	yes	yes

44	28	6	H	no	no	yes
45	31	3	H	no	no	yes

*H = High School Diploma

B = Four-Year Degree

M = Master's Degree

D = Doctorate

APPENDIX E

Raw Data on Demographic Characteristics of the ACC Subject Group

Subject	Age (years)	Experience (years)	Education*	Officiate Other Sports	Coached Basketball	Played Basketball
1	35	17	D	yes	yes	yes
2	48	20	M	yes	yes	yes
3	38	18	M	yes	yes	yes
4	32	10	M	no	no	yes
5	29	8	B	no	yes	yes
6	47	20	B	no	no	yes
7	32	6	M	no	no	yes
8	35	12	B	no	yes	yes
9	44	14	M	no	yes	yes
10	41	14	H	yes	no	yes
11	33	10	D	no	yes	yes

12	39	15	B	yes	yes	yes
13	37	15	H	yes	no	yes
14	29	11	M	yes	no	no
15	45	15	B	no	yes	yes
16	20	5	H	yes	no	no
17	45	18	M	no	yes	yes
18	41	17	M	yes	yes	yes
19	41	14	B	no	no	yes
20	34	12	B	yes	no	yes
21	31	7	H	yes	no	no
22	36	12	M	no	yes	yes
23	33	12	B	yes	no	yes
24	37	17	B	no	yes	yes
25	25	5	B	no	no	yes
26	29	11	H	yes	no	yes
27	26	6	H	yes	no	yes

28	39	12	D	no	yes	yes
29	52	18	H	yes	no	yes
30	50	25	H	yes	yes	yes
31	38	10	M	yes	no	yes
32	33	12	B	no	no	yes
33	47	24	H	yes	yes	yes
34	41	14	B	yes	yes	yes
35	30	11	B	yes	yes	yes
36	33	13	B	yes	no	yes
37	39	19	M	no	yes	yes
38	42	20	M	yes	yes	yes
39	51	22	B	no	yes	yes
40	43	24	M	yes	no	yes
41	49	23	H	no	no	yes
42	39	15	M	yes	yes	yes
43	56	35	H	yes	yes	yes

44	53	23	M	no	yes	yes
45	30	7	H	yes	no	yes

*H = High School Diploma

B = Four-Year Degree

M = Master's Degree

D = Doctorate

APPENDIX F

Number of Deviations By Subject For

ACC Group. Mean Deviation, Total Group = 5.99.

Subject	Number of Deviations	Subject	Number of Deviations
1	3	*13	9
2	3	14	2
*3	7	15	2
4	1	16	1
5	7	17	3
6	2	18	1
7	3	19	3
8	2	20	2
9	1	21	4
10	4	22	5
*11	9	*23	10
*12	6	24	3

APPENDIX G

Number of Deviations By Subject For

IAABO Group. Mean Deviation, Total Group = 5.99

Subject	Number of Deviations	Subject	Number of Deviations
1	5	*13	8
*2	13	*14	8
3	5	*15	8
*4	7	16	5
*5	7	*17	7
6	4	18	5
7	5	*19	6
8	5	*20	12
9	3	*21	6
*10	7	*22	8
*11	8	*23	7
*12	6	*24	12

*25	11	*41	6
*26	6	*42	9
27	5	*43	7
*28	8	*44	6
*29	13	*45	8
*30	10		
31	5		
*32	6		
*33	7		
*34	11		
35	5		
*36	8		
*37	12		
*38	11		
*39	6		
40	2		

*Indicates Subjects Classified As Non-Agreers.

APPENDIX H

Individual Subject Deviations

By Experience Categories (ACC Subject Group)

Subject	1 - 5	6 - 10	11 - 15	16 - 20	21 and Over
1				3	
2				3	
3				7	
4		1			
5		7			
6				2	
7		3			
8			2		
9			1		
10			4		
11		9			
12			6		
13			9		
14			2		
15			2		
16	1				
17				3	
18				1	
19			3		
20			2		

21		4			
22			5		
23			10		
24				3	
25	7				
26			5		
27		3			
28			6		
29				3	
30					6
31		2			
32			7		
33					7
34			1		
35			7		
36			6		
37				6	
38				3	
39					1
40					7
41					9
42			7		
43					11
44					6
45		4			

APPENDIX I

Individual Subject Deviations

By Experience Categories (IAABO Subject Group)

Subject	1 - 5	6 - 10	11 - 15	16 - 20	21 and Over
1			7		
2		13			
3	5				
4					7
5	7				
6	4				
7	5				
8	5				
9			3		
10	7				
11					8
12	6				
13	8				
14	8				
15	8				
16		5			
17	7				
18			5		
19	6				
20	12				

21			6		
22			8		
23	7				
24		12			
25		11			
26		6			
27	5				
28		8			
29	13				
30					10
31		5			
32		6			
33	7				
34		11			
35			5		
36	8				
37	12				
38			11		
39	6				
40	2				
41	6				
42	9				
43			7		
44		6			
45	8				

APPENDIX J

Individual Subject Deviations

By Age Categories (ACC Subject Group)

Subject	20 - 29	30 - 39	40 - 49	50 and Over
1		3		
2			3	
3		7		
4		1		
5	7			
6			2	
7		3		
8		2		
9			1	
10			4	
11		9		
12		6		
13		9		
14	2			
15			2	
16	1			
17			3	
18			1	
19			3	
20		2		

21		4		
22		5		
23		10		
24		3		
25	7			
26	5			
27	3			
28		6		
29				3
30				6
31		2		
32		7		
33			7	
34			1	
35		7		
36		6		
37		6		
38			3	
39				1
40			7	
41			9	
42		7		
43				11
44				6
45		4		

APPENDIX K

Individual Subject Deviations

By Age Categories (IAABO Subject Group)

Subject	20 - 29	30 - 39	40 - 49	50 and Over
1		7		
2			13	
3		5		
4				7
5	7			
6	4			
7	5			
8	5			
9		3		
10	7			
11			8	
12	6			
13	8			
14		8		
15			8	
16		5		
17	7			
18		5		
19		6		
20		12		

21		6		
22			8	
23	7			
24			12	
25			11	
26	6			
27		5		
28		8		
29	13			
30			10	
31		5		
32			6	
33			7	
34			11	
35			5	
36	8			
37			12	
38				11
39	6			
40		2		
41			6	
42		9		
43		7		
44	6			
45		8		

APPENDIX L

Individual Subject Deviations

By Education Categories (ACC Subject Group)

Subject	High School Diploma	Four-Year Degree	Master's Degree	Doctorate
1				3
2			3	
3			7	
4			1	
5		7		
6		2		
7			3	
8		2		
9			1.	
10	4			
11				9
12		6		
13	9			
14			2	
15		2		
16	1			
17			3	
18			1	
19		3		
20		2		

21	4			
22			5	
23		10		
24		3		
25		7		
26	5			
27	3			
28				6
29	3			
30	6			
31			2	
32		7		
33	7			
34		1		
35		7		
36		6		
37			6	
38			3	
39		1		
40			7	
41	9			
42			7	
43	11			
44			6	
45	4			

APPENDIX M

Individual Subject Deviations

By Education Categories (IAABO Subject Group)

Subject	High School Diploma	Four-Year Degree	Master's Degree	Doctorate
1		7		
2			13	
3		5		
4		7		
5	7			
6	4			
7	5			
8		5		
9		3		
10			7	
11		8		
12		6		
13	8			
14	8			
15	8			
16		5		
17	7			
18			5	
19		6		
20	12			

21			6
22	8		
23	7		
24	12		
25		11	
26	6		
27	5		
28		8	
29	13		
30			5
31			6
32		7	
33	7		
34			11
35	5		
36			8
37	12		
38	11		
39	6		
40			2
41		6	
42		9	
43	7		
44	6		
45	8		

APPENDIX N

Individual Subject Deviations

By Officiating Categories (ACC Subject Group)

Subject	Only Basketball	Other Sports Also
1		3
2		3
3		7
4	1	
5	7	
6	2	
7	3	
8	2	
9	1	
10		4
11	9	
12		6
13		9
14		2
15	2	
16		1
17	3	
18		1
19	3	
20		2

21		4
22	5	
23		10
24	3	
25	7	
26		5
27		3
28	6	
29		3
30		6
31		2
32	7	
33		7
34		1
35		7
36		6
37	6	
38		3
39	1	
40		7
41	9	
42		7
43		11
44	6	
45		4

APPENDIX O

Individual Subject Deviations

By Officiating Categories (IAABO Subject Group)

Subject	Only Basketball	Other Sports Also
1	7	
2	13	
3	5	
4	7	
5	7	
6	4	
7	5	
8	5	
9		3
10		7
11		8
12		6
13		8
14		8
15		8
16	5	
17	7	
18	5	
19	6	
20	12	

21	6	
22	8	
23	7	
24	12	
25	11	
26	6	
27	5	
28	8	
29	13	
30		5
31		6
32		7
33		7
34		11
35		5
36		8
37		12
38		11
39	6	
40	2	
41		6
42	9	
43	7	
44	6	
45	8	

APPENDIX P

Individual Subject Deviations By Coaching Experience Categories (ACC Subject Group

Subject	Coaching Experience	No Coaching Experience
1	3	
2	3	
3	7	
4		1
5	7	
6		2
7		3
8	2	
9	1	
10		4
11		9
12	6	
13		9
14		2
15	8	
16		1
17	3	
18	1	
19		3
20		2

21		4
22	5	
23		10
24	3	
25		7
26		5
27		3
28	6	
29		3
30	6	
31		2
32		7
33	7	
34	1	
35	7	
36		6
37	6	
38	3	
39	1	
40		7
41		9
42	7	
43	11	
44	6	
45		4

APPENDIX Q

Individual Subject Deviations

By Coaching Experience Categories (IAABO Subject Group)

Subject	Coaching Experience	No Coaching Experience
1		7
2		13
3		5
4		7
5		7
6		4
7		5
8		5
9		3
10		7
11		8
12		6
13		8
14		8
15		8
16	5	
17	7	
18	5	
19	6	
20	12	

21	6	
22	8	
23	7	
24	12	
25	11	
26	6	
27	5	
28	8	
29	13	
30	5	
31	6	
32	7	
33	7	
34	11	
35	5	
36	8	
37		12
38		11
39		6
40		2
41	6	
42	9	
43	7	
44		6
45		8

APPENDIX R

Individual Subject Deviations By Basketball Playing Experience Categories (ACC Subject Group)

Subject	Playing Experience	No Playing Experience
1	3	
2	3	
3	7	
4	1	
5	7	
6	2	
7	3	
8	2	
9	1	
10	4	
11	9	
12	6	
13	9	
14		2
15	2	
16		1
17	3	
18	1	
19	3	
20	2	

21		4
22	5	
23	10	
24	3	
25	7	
26	5	
27	3	
28	6	
29	3	
30	6	
31	2	
32	7	
33	7	
34	1	
35	7	
36	6	
37	6	
38	3	
39	1	
40	7	
41	9	
42	7	
43	11	
44	6	
45	4	

APPENDIX S

Individual Subject Deviations By Basketball Playing Experience Categories (IAABO Subject Group)

Subject	Playing Experience	No Playing Experience
1	7	
2	13	
3	5	
4	7	
5	7	
6	4	
7	5	
8		5
9	3	
10	7	
11	8	
12		6
13	8	
14	8	
15	8	
16	5	
17	7	
18		5
19	6	
20	12	

21	6	
22	8	
23	7	
24	12	
25	11	
26	6	
27	5	
28	8	
29	13	
30	5	
31	6	
32	7	
33	7	
34	11	
35	5	
36	8	
37		12
38		11
39		6
40		2
41		6
42		9
43	7	
44	6	
45	8	

*25	7	*41	9
26	5	*42	7
27	3	*43	11
*28	6	*44	6
29	3	45	4
*30	6		
31	2		
*32	7		
*33	7		
34	1		
*35	7		
*36	6		
*37	6		
38	3		
39	1		
*40	7		

*Indicates Subjects Classified As Non-Agreers.