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THE IDENTIFICATION AND VALIDATION OF CRITICAL SAFETY BEHAVIORS OF HIGH SCHOOL GIRLS' GYMNASTICS COACHES

By

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ABSTRACT

THE IDENTIFICATION AND VALIDATION OF CRITICAL SAFETY BEHAVIORS OF HIGH SCHOOL GIRLS' GYMNASTICS COACHES

By

Barbara Kaye McKenzie

Safety and accidents in sports, and in high school girls' gymnastics in particular, present perennial and probably increasingly severe problems such as a growing number of injuries and lawsuits and increased cost of insurance coverage. The two main approaches to these problems are (1) periodically revising opinion-based guidelines for coaches seeking certification and (2) conducting research on accident epidemiology. This writer believes that both of these approaches, although commendable, are inadequate. Expert opinions generally are not empirically derived and often are not behaviorally expressed. Epidemiological studies have tended to focus on a few selected accident factors and have not reported what injury-reducing steps should be taken to reduce the occurrence of injuries.

This research departed from past practice in several ways, to overcome the perceived inadequacies. The critical incident technique was used to collect a substantial number of experts' observations, which were content analyzed to yield behaviorally worded, specific

statements to establish new guidelines. These, in turn, were organized into broader categories to enhance their comprehensibility by coaches.

The critical-incident-based guidelines were validated by having a second substantial and independent sample of experts check each behavior statement and broader category with respect to their experience regarding both frequency of occurrence and importance to gymnastics safety. Validity of the statements and their categories was demonstrated by the fact that all were reported as having been observed with some degree of frequency and importance. Reliability checks made throughout the research process showed adequate reliability to warrant proceeding to validation.

In addition to the above-mentioned substantive findings, several refinements of the critical incident method were developed in this study. Also reported were suggestions for further research and uses practitioners might make of the research findings.

Dedicated to Dr. Frederic Wickert and my parents,

Virginia and Duncan McKenzie, Jr.

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CHAPTER I

INTRODUCTION

The number of females participating in sports has increased dramatically in the past 20 years (Albohm, 1978; Clark & Buckley, 1980; Eisenberg & Allen, 1978; Gillette, 1975; Haycock & Gillette, 1976). In turn, there has been a concomitant increase in the number of sports-related injuries (Eisenberg & Allen, 1978) and lawsuits (Aschenbrenner, 1983; Graham, 1982).

Although virtually everyone associated with athletic endeavors is concerned about injury and the prevention of injuries, few research studies have been conducted regarding the specific causes of sports injuries to females (Albohm, 1976; Gillette, 1975; Whiteside, 1980). As a result, present training programs for coaches are guided primarily by the opinions of experts about what should be done to improve safety practices and sparse research findings on accident epidemiology--that is, frequency data on selected factors such as the location and type of injury. In the present study, the writer assumed that the existing coach-training programs are not systematically teaching the critical competencies that, on the one hand, would help prevent injury and on the other would lead to effective post-injury care. It is entirely possible that a major reason for the increased number of injuries is

that such competencies are largely unknown or, at best, founded on opinion rather than the result of empirical study.

Purpose of the Study

The purpose of this study was to identify and validate critical safety behaviors of high school girls' gymnastics coaches that serve to prevent, reduce, or deal effectively with injuries to female high school gymnasts. Such coach behaviors are subsequently called incidents, and accidents or injuries always pertain to high school girl gymnasts.

Need for the Study

The increasing number of participants in gymnastics during the past 20 years has been accompanied by an increased number of injuries (Bowers, Fie, & Schmidt, 1981).

> Despite all precautions, . . . the possibility of serious injury remains due to the high levels to which the sport has progressed and to the considerable pressure to increase the difficulty content in routines. (Bowers et al., 1981, p. 317)

In addition, the growing number of lawsuits in gymnastics (Aschenbrenner, 1983), the sizable financial awards being demanded (Aschenbrenner, 1983; Jacki, 1985), and the resultant increase in gymnastics insurance rates (Aschenbrenner, 1983; Jacki, 1985) have greatly increased the concern of gymnastics professionals.

Even though the occurrence and severity of gymnastics injuries have drawn considerable recognition, few research studies have been conducted on the specific causes of these injuries (Garrick, 1981; Lowry & Leveau, 1982; Snook, 1979; Whiteside, 1980). As a result,

present coach-training programs are guided by limited research from two sources: (1) opinion-based research that gives experts' opinions on what constitutes safe gymnasium practices for gymnastics personnel to follow and (2) epidemiology-based research that focuses on the frequency with which selected accident factors occur so that potential injury patterns can be better identified and preventive efforts be designed, implemented, and evaluated.

Both the opinion- and epidemiology-based research approaches are commendable and have produced useful results in the form of clues to what is happening in terms of injuries. These two approaches have provided some preventive measures such as safety guidelines and frequency data for practitioners to follow as they attempt to reduce injuries. Despite the contributions that opinion and epidemiology research have made, however, both approaches to the problem of sports injuries have inherent weaknesses.

Insight into sports injuries using experts' opinions is based on the experience of concerned gymnastics experts. For example, in 1976 the United States Gymnastics Safety Association (USGSA) formed a commission to develop a list of safety principles, publish a safety manual, and develop a certification program. The safety manual contained 18 questions, such as "Are the gymnast and instructor able to communicate clearly so that each understands his/her responsibilities during the learning of the skill?" (Isabelle, Feigley, & Kruger, 1976, p. 2). Although these questions, which were referred to as guidelines, represent a major contribution, they did not identify specific actions

to be taken to prevent accidents. In addition, the opinion-based guidelines were limited to a small group of interested gymnastics supporters and therefore could be biased according to each contributor's special experiences in the sport. Based on 23 years of experience as a gymnast, coach, and official, this researcher contends that such data do not provide a firm foundation for developing sound, safe gymnastics practices.

Sensing the need for more quantitative data with which to analyze the safety situation, gymnastics researchers within the past ten years have turned to a more rigorous approach borrowed from the field of medicine, the epidemiological approach. This technique measures the frequency of occurrence of factors associated with accidents, such as injuries at a particular body site (e.g., head, ankle), types of injuries (e.g., sprains), conditions under which more accidents occur (e.g., the event on which the gymnast was performing when she was injured), the movement the gymnast was doing when she fell (e.g., a double back on the floor), and participant characteristics (e.g., male versus female).

When the epidemiological approach is used, sports injuries are investigated by means of frequency statistics. However, frequency data alone do not indicate what injury-reducing steps to take or the degree of importance of each factor. For example, in a recent epidemiological research project in the sports area, data were collected concerning injuries to 100 female college gymnasts (Sands, 1984). No control data for an equivalent sample of noninjured athletes were

reported. The investigator declared that the "epidemiological approach can tell us a great deal about how to prevent some of our injuries in some way." He continued, "A profile of the injured athlete . . . shows her to be about five feet three inches, weight about 125.5 pounds, injured in November or January," and among other things, "less than 22 years old" (Sands, 1984, p. 7). But what does this indicate about preventing injuries? Should all gymnasts who fit this description be stopped from participating in gymnastics in November and January, for example? Perhaps during these two months some special effort should be put into preventing accidents. But nothing was said about what form such special effort, if any, would take.

Sands did not mention how important each factor was in contributing to unsafe practices. Is one factor more important than another? Factors are probably not equally important. For example, is weight more or less important than or as important as the gymnast's age? It is imperative that the importance dimension of accident factors be taken into account. Some injuries could happen frequently but not be important, whereas others could happen rarely but be of great importance. Other injuries could be both frequent and important or even infrequent and relatively trivial. If decision makers are to have dependable information to use in improving the sport's safety practices, data that indicate both frequency and importance of accident causes are needed.

The present study differs from previous research in three major ways: (1) the investigator concentrated on just one important accident

factor, the safety practices of the high school coach; (2) she examined both the frequency and importance of safety data, a first in gymnastics research efforts as far as the investigator has been able to ascertain; and (3) the researcher directly addressed the form of special effort that could be taken in preventing gymnastics accidents. These three new directions in research on gymnastics safety were followed through the use of the critical incident technique.

The critical incident technique may serve to add a component to epidemiological research that it now lacks because it furnishes behavioral information to supplement the statistics provided by the epidemiological approach. Referring again to Sands's study on female college gymnasts, suppose that women gymnasts weighing more than 125.5 pounds were reported to have more accidents than those weighing less. This factor could be used as a basis for additional research using the critical incident technique. Gymnastics experts who can readily observe women gymnasts practice and/or compete in college could be surveyed and asked to describe their recollections of accidents involving only those college female gymnasts who weighed 125.5 pounds or more. The in-depth behavioral information concerning this type of gymnast could be identified, analyzed, and then added to the existing data base provided by an epidemiological approach.

Definition of Terms

The following terms are defined in the context in which they are used in this dissertation.

Accident. An event developing from unforeseen circumstances, which usually results in some injury or loss.

Behavior. The observed actions, movements, and performances of an individual.

Critical behaviors. Those behaviors that differentiate between an effective and an ineffective coach.

Emergency. "An unexpected serious happening, demanding immediate action" (Taber, 1965, p. E-22).

First-aid. "The administration of emergency assistance to individuals who have been injured or otherwise disabled, prior to the arrival of a doctor, or transportation to a hospital or doctor's office. In no sense assumed to be the substitution for medical care" (Taber, 1965, p. F-23).

Incident. "Any observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about the person performing the act" (Flanagan, 1954, p. 327).

Injury. A trauma experienced by an athlete/gymnast during practice and/or competition that results from an accident.

Post-injury care. The care administered to an injured person after an accident has taken place. In this study, post-injury care involved coaches deciding to treat an injury personally; sending the injured person to a physician, nurse, or athletic trainer; or a combination of the two actions.

Prevention. A process through which those in leadership positions, such as sports coaches, strive to control their gymnasium

environments and the behaviors of gymnasts at practices and/or meets by continually assessing and correcting unsafe circumstances as needed (e.g., initially obtaining safe equipment and then checking it periodically to ensure it is in proper working order).

Safety. A value that is highly supported by both society and the law, which involves minimizing accidents and injury. In this research, the coach behaviors that prevent accidents from occurring were considered effective safety behaviors.

Validation. "(1) inferences are drawn from observations of one set of behaviors about a quite different set of behaviors and (2) our concern is with the relative accuracy of those inferences" (Ebel, 1979, p. 303).

Design of the Study

Research Questions

Six major research questions were addressed in this study:

1. What are the most frequently occurring critical effective incidents that have reduced the occurrence and severity of injuries?
2. What are the most frequently occurring critical ineffective incidents that have increased the occurrence and severity of injuries?
3. What are the most important critical effective incidents to occur to prevent, reduce, or deal effectively with injuries?
4. What are the most important critical ineffective incidents not to occur to prevent, reduce, or deal effectively with injuries?
5. What are the combined most frequently occurring and most important critical effective incidents to occur to reduce the occurrence and severity of injuries?

6. What are the combined most frequently occurring and most important not to occur critical ineffective incidents to reduce the occurrence and severity of injuries?

Population

The study population comprised athletic directors, coaches, coach-selected gymnasts, and officials in three midwestern states from 1982 through 1984. The first survey, which was used to collect the incidents, was administered to all the athletic directors, coaches, and coach-selected gymnasts in Iowa and Michigan during 1982-83 whose high schools were registered with the state high school athletic association and had competitive teams. The population also included all of the registered officials in Michigan during 1982-83. The second survey, which was used to validate the incidents, was administered to all of the coaches in Illinois during 1983-84 whose high schools were registered with the state high school athletic association and had competitive teams. The population also included all of the registered officials in Illinois during 1983-84.

Measured Coach Behaviors

In addition to identifying critical behaviors of the coach, two other research specifications were involved. The first was that the data be considered in terms of both frequency and importance. The second was that the research results be expressed in such a way that special efforts the coach should make to reduce accidents be accurate, clear, unequivocal, and possible to follow. It is this high level of

specificity that sets the present research apart from previous studies of safety in high school girls' gymnastics.

The critical incident approach used in this research involved three steps: (1) collection of incidents, (2) content analysis of the incidents to identify and formulate the behavioral guidelines, and (3) validation of the behavioral guidelines developed in step two by presenting them to an independent sample of observers of coach behaviors associated with gymnastics accidents.

Step one--Collection of incidents. To collect the pool of critical incidents on which subsequent steps were based, knowledgeable observers were asked to report actual observed incidents. Aside from using personal interviews during pilot testing of the instructions for the resulting mail survey, personal interviews were not used for reasons of time, cost, and anonymity. It would have been too time consuming and expensive for the investigator to arrange personal interviews with all 196 of the high school respondents from Iowa and Michigan. The issue of anonymity became very clear in the pilot testing. Most of the respondents specifically asked to remain anonymous. Likewise, they did not wish to have the names of their high school identified.

In collecting the critical incidents by mail survey, the writer carefully followed the guidelines developed by Flanagan (1954). Early in the development of the critical incident technique, Flanagan noted that observers of events under study tended to express personal

opinions about what ought to be done. Such data were easy to collect but were of limited utility because of vagueness and observer bias.

To obtain useful generalizations from observers of accidents, Flanagan developed a different behaviorally oriented data-collection and data-processing procedure that eliminated asking for opinions. Observers were asked to think back on their experiences and to recall incidents relevant to the problem of concern. For each such incident, observers were asked to report what people were doing as the incident occurred. In the case of high school girls' gymnastics, the incidents would involve accidents.

Previous studies using the critical incident technique consistently have identified either positive or negative behaviors. In contrast, the intention of this researcher was to identify behaviors that differentiated between an effective and ineffective coach. These differentiating behaviors are critical--as implied by the term "critical incident approach." The fact is that effective and ineffective coaches do their jobs in very similar ways except for these few critical behaviors. Observers can describe incidents but may not be in a position to identify truly critical behaviors. These emerge only from a detailed study of a wide variety of positive and negative safety incidents.

In summary, a researcher using the critical incidents method does not seek ordinary opinions but instead collects observations of behaviors and then objectively and impartially makes much sounder

generalizations from the large pool of collected observations of incidents.

Observers do not always feel completely comfortable about reporting only their observations without their opinions because they are not sure how someone else might interpret them. Observers would rather include their opinions. Nevertheless, instructions can be written in such a way as to motivate subjects to recall and describe the details of critical incidents.

The data-collection instructions for this study asked the subjects to recall their past experiences with high school girls' gymnastics and to focus on the effectiveness of coaching behaviors. The behavior data were categorized as either effective or ineffective and served as the basis for the final safety guidelines.

From the content analysis of the circumstances surrounding injuries and accidents, another set of research variables was identified--the two time aspects of injuries: (1) prevention (before the injury) and (2) post-injury care (after the injury). Subjects were asked three questions about each incident: (1) What was the situation or background in which the injury almost occurred or did occur? (2) What did you personally observe actually happening as the near or actual injury was taking place and/or being cared for afterwards? and (3) What were the consequences of the near or actual injury?

Step two--Content analysis of the incidents. The investigator and a colleague, experienced in the development and use of the critical incident technique, independently read and analyzed the incidents.

identified each one as effective or ineffective, and, once agreement on incidents was obtained, developed these into behavioral statements to form the guidelines.

The content-analysis process employed by the investigator was based on the work of Maier (1965). Maier advocated that to initiate a change in the occurrence of any behavior, catastrophic or not, one must first address accident causes as they relate to the role of the professional, such as a gymnastics coach, and then change the events that lead to accidents. Little is accomplished by examining only the consequences of accidents, other than describing the unsatisfactory state of affairs that exists. Once an accident has taken place, no matter how catastrophic, it is too late for prevention. Therefore, rather than focusing on the consequences of accidents, this study was concerned with the causes of gymnastics accidents in an effort to develop lists of coach safety behaviors from which professionals could develop preventive measures. The investigator did not use the information collected on the consequences of accidents in developing the final safety guidelines, but this information did help provide details about the behaviors and accidents that were essential to understanding the causes of accidents.

The content analysis began with the investigator's reading and rereading the collected critical incident reports to screen them and formulate a preliminary framework of incident categories. Because the gymnastics safety literature commonly classifies safety as prevention and remediation, referred to in this study as post-injury care, and the

critical incident literature categorizes incidents as either effective or ineffective, the investigator assigned all the incidents to one of four major categories: (1) effective prevention, (2) ineffective prevention, (3) effective post-injury care, and (4) ineffective post-injury care. Some of the ineffective incidents could not be classified as strictly ineffective prevention or ineffective post-injury care. Hence a fifth combined category was developed, ineffective prevention and post-injury care.

After each incident had been assigned to a category, the incidents were reread and further analyzed in an effort to group more of the incidents that were similar to each other. As a result, five new groups were identified:

1. Coach behavior toward the gymnast
    a. mainly during practice
    b. mainly during competition
    c. during both practice and competition
2. Coach behavior with respect to the equipment during both practice and competition
3. Coach background
4. Coach behavior as a manager of assistant coaches
5. Coach behavior in general

The data within the reports dictated the development of the study variables. Table 1.1 summarizes the arrangement of the variables used in this study. Prevention behaviors are listed first, followed by post-injury care. Normally, a coach would first take preventive measures. Once an accident occurred, post-injury care would be

administered. Since most published safety guidelines take a positive approach, the investigator followed the same procedure.

Table 1.1.--Research variables.

1. Effective Prevention

   A. Coach behavior toward the gymnast
      --mainly during practice
      --during both practice and competition
   B. Coach behavior with respect to the equipment during both practice and competition
   C. Coach background
   D. Coach management of assistant coaches

2. Ineffective Prevention

   A. Coach behavior toward the gymnast
      --mainly during practice
      --mainly during competition
      --during both practice and competition
   B. Coach behavior with respect to the equipment during both practice and competition
   C. Coach background
   D. Coach management of assistant coaches

3. Effective Post-Injury Care

   Coach behavior in general during both practice and competition

4. Ineffective Post-Injury Care

   Coach behavior in general

   --mainly during practice
   --mainly during competition
   --during both practice and competition

5. Ineffective Prevention and Post-Injury Care

   Coach behavior in general

Coach behaviors and background, as well as the situational variables with practice and competition, did not appear uniformly in each of the five categories shown in Table 1.1. It was discovered that observers reported coach behaviors and situational factors under some circumstances but not others. The categories correspond closely to observer reports.

Table 1.2 shows the number of safety behaviors in each category.

Table 1.2.--Number of safety behaviors, by category.

Category	No. of Behaviors
Effective prevention	19
Ineffective prevention	26
Effective post-injury care	6
Ineffective post-injury care	8
Ineffective prevention and post-injury care	2
Total	61

Step two resulted in (1) the identification of 61 behavioral items that subsequently became safety guidelines for coaches and (2) a categorization of these 61 items into a simplified structure that would lend itself to providing measurable variables to be used to group, simplify, and better communicate the behavioral findings of potential users and aid in further checking on the reliability and validity of the outcomes of steps one and two.

The reliability of the content analysis carried out in step two is discussed in Chapter III. The reliabilities were found to be satisfactory, and the behavioral guidelines were therefore usable for step three.

Step three--Validation of the behavioral guidelines. The third and final step provided a validation check on the behavioral guidelines developed in step two. The need for validation of the behavioral guidelines arose from some of the difficulties that trained researchers have experienced when using the critical incident method.

In the critical incident method, strategically situated observers identify and report critical behaviors. Next, a separate group of people, called judges, subjectively categorize these reported behaviors. Two important questions must then be addressed: (1) How representative of the behaviors under study were the original observations? and (2) How accurate was the categorization? To answer these questions, a third independent but parallel sample of persons experienced in the behavior under study indicates the extent to which the behavioral categories derived from the original sample have occurred in their experience. If the behaviors observed by the first group and categorized by the second group of persons are rare or nonexistent, the observed experiences and categorization process would not be valid. If, on the other hand, the observations of the third group closely parallel those of the first two groups treated as a unit, a user of the safety guidelines would have more confidence in those findings.

Experience with psychological measurement and the critical incident method has repeatedly shown the need for validation.

In validating the content occurring in safety research, previous researchers characteristically have encountered a further difficulty. Instead of the usual single criterion for satisfactory validation, two criteria must be considered: frequency of occurrence and importance. All too often, frequency and importance are not highly correlated; that is, a behavior that frequently occurs can be relatively unimportant, or a behavior that is highly important may not happen very often. Accordingly, validation must be carried out for each of these two criteria.

To validate the findings of step two and to better identify the frequency of occurrence and the degree of importance of the recall-based behaviors, a different group of observers of accidents and post-injury care was surveyed. Recognition, rather than recall, was the method used. A new population was presented with the recall-based behavioral items. Each individual was asked to indicate the extent to which he/she had personally observed the effective and ineffective safety behaviors and the importance of each in maintaining a safe gymnastics environment. As in the recall process used in step one, the subjects were required to remember past gymnastics accidents before responding to the survey. Next they were asked to select from the recall-based list those behaviors they had personally observed in the sport and how important in their judgment each behavior was in contributing to the safety practices under investigation.

In effect, this recognition check on recall-based behavior lists is one form of external validation. Those recall-based behaviors identified by one sample of gymnastics experts had to be recognized as occurring on the gymnasium floor by another group of experts before the investigator could confidently formulate safety guidelines to be used in making practical decisions (e.g., selection, training, retraining, and/or evaluation of present and/or potential coaches). Without such measures, the checklists could not be used with as high a degree of confidence. Behaviors that very rarely, if ever, predict a coach's safety practices and/or are unimportant could appear on the lists if they were not checked by another independent group of practitioners.

The outline of the study variables in step two remained the same for step three because the findings for step three closely paralleled those of step two. As a result of carrying out step three, measurements along two dimensions not available from step two were provided: (1) frequency of occurrence and (2) degree of importance.

Limitations of the Study

Girls' gymnastics falls into four organized training levels: (1) private gymnastics clubs and schools, (2) secondary schools, (3) colleges and universities, and (4) the elite level of gymnastics. This writer concentrated on the high school level for a number of compelling reasons. In previous research on the injury rate for females, comparing the high school level to club gymnastics, the latter was found to have a significantly lower injury rate because of better supervision, equipment, and conditioning programs and a greater emphasis on teaching

proper skills progression (Hage, 1982). It is at the high school level that the skills of gymnasts and coaches are probably the most diverse. It is also likely that high school gymnasts perform at the widest range of environmental conditions, from little in the way of facilities and coaching to relatively fine conditions. This diversity creates the variability that has the best likelihood of meeting research objectives.

Female rather than male gymnasts were selected for two reasons: (1) researchers have found that the rate of injuries is greater among female than male gymnasts (Kindig, 1982), and (2) the field of women's gymnastics has been relatively neglected in terms of research (Snook, 1979).

A number of individuals have varying degrees of influence on the safety of female high school gymnasts: coaches, gymnasts, and ancillary personnel, including parents and relatives of the gymnasts, athletic trainers, athletic directors, officials and other administrators including those who set budgets, the gymnastics industry including equipment designers, sports physicians, safety researchers, and gymnastics policy setters such as those who prescribe competition rules and write safety manuals.

Since the coach is a relatively permanent part of the sports scene, the professional who can be reached by injury-reducing messages and can probably do the most to reduce sports injuries, this study was limited to examining the safety practices of the high school coach. At the high school level, the coach is at the center of the communications

network and is the person who mediates between and among the gymnasts and the various ancillary personnel mentioned above. This study was based on the assumption that the most progress in improving the safety of girls' high school gymnastics is likely to be made by changing the safety practices of high school coaches. The safety guidelines generated in this study were based on and limited to the reported observations of the population surveyed.

Contributions of This Research to Educational Systems Development

This study can potentially contribute to the field of educational systems development in several ways:

1. The usefulness of an infrequently applied data-collection device, the critical incident technique, has been demonstrated. The identification of the effective and ineffective critical safety behaviors of high school girls' gymnastics coaches might encourage future practitioners to use this technique to identify the most appropriate competencies for practitioners in other fields.

2. The critical incidents gathered in the study can serve as a source of materials from which practitioners in academic-preparation institutions and/or leaders in gymnastics training programs can design, implement, evaluate, and/or revise coach-training programs.

Summary

The purpose of this investigation was to identify and validate critical safety behaviors of high school girls' gymnastics coaches that

help to prevent, reduce, or deal effectively with injuries to female gymnasts. The value of making coach behavior lists available was identified. To collect these safety incidents and formulate them into guidelines for coaches to follow, the critical incident technique was undertaken in three steps. Step one, the collection of incidents, involved asking knowledgeable observers to recall and report their observations of coach behaviors. In step two, content analysis was used to identify items and to formulate the behavioral guidelines from the incidents. In step three, as a validity check, another survey was developed and administered to a second, independent group of observers of coach behaviors. These observers were asked to recognize from their experience how often those behaviors in the checklist took place and how important they were in maintaining safe practices. Because the incidents identified with the recall technique in step two were validated to a significant degree by the recognition check in step three, the recall- and recognition-based coach behavior lists were combined into one set of working safety guidelines for the profession.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

In this chapter, literature closely related to the study is treated under two headings: (1) safety and (2) the critical incident method. Content research is concerned with the behaviors of safety personnel and their role in preventing accidents among followers. Research on the critical incident technique concerns how content interrelationships can be observed and measured.

Literature on Safety

Introduction

A review of research on safety revealed studies in five relevant, interrelated areas: (1) categories of people in the work place (e.g., supervisors, foremen, coaches), (2) three types of accident research (e.g., opinion, epidemiology, and behavior based), (3) two time frames (e.g., prevention and post-injury care), (4) two types of safety guidelines (e.g., effective and ineffective), and (5) a number of situational environments in which accidents take place (e.g., coach behavior toward the gymnast during practice and/or competition).

Since the safety literature was primarily concerned with the first three topics listed above, these areas were used to provide the

foundation for the discussion of research in this literature review.

The literature dealing with safety was categorized as follows:

I. Prevention

   A. General safety and the role of the safety manager

      1. Opinion-based research
      2. Epidemiology-based research
      3. Behavior-based research

   B. Sports accidents and the role of the coach

      1. Opinion-based research
      2. Epidemiology-based research
      3. Behavior-based research

   C. Gymnastics accidents and the role of the coach

      1. Opinion-based research
      2. Epidemiology-based research
      3. Behavior-based research

II. Post-injury Care

   A. General safety and the role of the safety manager

      1. Opinion-based research
      2. Epidemiology-based research
      3. Behavior-based research

   B. Sports accidents and the role of the coach

      1. Opinion-based research
      2. Epidemiology-based research
      3. Behavior-based research

   C. Gymnastics accidents and the role of the coach

      1. Opinion-based research
      2. Epidemiology-based research
      3. Behavior-based research

Prevention

General Safety and the Role of the Safety Manager

The review of literature on prevention is focused on the topics of general safety and sports accidents. The gymnastics literature is examined in detail.

Several categories of people are involved with safety, irrespective of where the effort takes place (e.g., policy makers, supervisors, coaches). In reviewing the literature on general safety (nonsports-related injuries), the term "safety manager" is used to designate the individual who controls the safety practices in the work place. Regarding sports, however, the term "coach" is used to designate the individual who controls the safety practices of athletes and coaching staff.

Opinion-based research. General safety research began with people formulating opinions. Grimaldi and Simmonds (1975) and Haddon et al. (1964) examined the origin of opinion-based research on safety. They found that since accidents were believed to "just happen," few attempts were made to observe and/or study accidents systematically.

Epidemiology-based research. The epidemiological approach to safety research evolved during World War II (Haddon et al., 1964). Researchers, borrowing from medicine, felt that manifestations of injuries and their characteristics, just as symptoms of disease and epidemics, could be quantified so that causal patterns could be identified and then used to develop injury-reducing measures.

The history of the epidemiological approach and significant epidemiological studies in general safety research were summarized by Haddon et al. (1964). According to their summary, the focus of such research is on the statistical analysis of factors associated with accidents, such as the host, agent, and environment. The frequency with which accident factors occur is measured. The safety manager's effect on preventing and/or causing accidents is but one of the many factors examined. A common emphasis is on factors that can be readily observed and quantified, such as the kind of injury, the injury site on the body, and the amount of time lost from work. By implication, the factor counts suggest accident-prevention actions to the safety manager.

Behavior-based research. In general, the behavior-based approach in examining accidents considers accidents a form of injury-producing behavior that can be studied with observational techniques. Once these behaviors are identified, safety researchers report what appropriate procedures can be designed and implemented to reduce the occurrence of such accidents.

Landy (1985) reviewed the literature dealing with safety in the work place and found safety managers using three approaches that have met with some success in reducing accident behaviors on the job: (1) an engineering approach that identifies unsafe work procedures and/or physical conditions in the work environment and then redesigns the environment to improve the safety conditions; (2) a personnel psychology approach that identifies individual work characteristics, traits,

and/or responses that cause accidents to take place so appropriate personnel changes are made (e.g., training and/or retraining programs are developed and implemented); and (3) an industrial/social approach that assumes accidents are motivational problems whereby workers have minimal motivation to follow the company's safety policies. A discussion of each of these three approaches, some examples of findings, and prevention procedures (guidelines) follow.

1. The engineering approach. The engineering approach is used to reduce the occurrence of accidents by first identifying environmental conditions that have been causing accidents and then eliminating these unsafe conditions by modifying the nature of the work equipment or process a worker uses. Heinrich (1959) and von Haller Gilmer (1971) used this approach in their safety research.

In studying the causes of accidents, Heinrich found that injury-producing accident behaviors fell into two categories: (1) unsafe mechanical or physical conditions within the work environment and (2) unsafe acts of persons, violations of commonly accepted safety practices. After reviewing 12,000 cases taken at random from closed files of insurance claims and 63,000 other cases from plant owners' records, Heinrich reported that 10% of the accidents stemmed from unsafe mechanical or physical conditions and 88% were related to unsafe acts of persons. The following list summarizes some of the unsafe mechanical and/or physical conditions found to cause accidents.

1. Unsafely designed machines, tools, etc. . . .
2. Unsafely clothed, no goggles, gloves or masks, wearing high heels, etc. . . .
3. Unsafe processes, mechanical, chemical, electrical, nuclear, etc. (p. 20)

von Haller Gilmer (1971) reviewed the literature on accidents and concurred with Heinrich's classifications of accident behaviors. The environmental conditions found to contribute to accidents were: (1) poor lighting, (2) warm and/or cold work temperatures, (3) physically demanding work, (4) high noise level, and (5) poor industrial climate (e.g., low probability of promotion).

2. The personnel psychology approach. This approach is concerned with the safety behaviors displayed by workers. Accident-producing behaviors are studied with observational techniques to identify effective and ineffective safety behaviors. Based on these behavioral findings, safety managers make selection and/or training decisions. For example, an individual displaying the safety behaviors identified as effective is selected for a position and/or promoted within the organization. An individual demonstrating ineffective safety behaviors may be passed over for a new position, dismissed from the current position, relocated to a less hazardous job within the organization, or receive training to improve his/her safety behaviors. Heinrich (1959) and von Haller Gilmer (1971) also used the personnel psychology approach in their safety research. Some of their findings are summarized below.

In her previously reported general accident research, von Haller Gilmer found several behavioral factors contributing to

accidents in varying degrees: (1) poor vision, (2) extreme fatigue, (3) low emotions, (4) little experience on the job, and (5) taking high risks--willingness to engage in an activity in which there is specific probability of failure.

Heinrich identified a number of unsafe personal acts resulting in accidents. These included "(1) operating or working at unsafe speed . . . (2) using unsafe equipment, or equipment unsafely . . . [and] (3) failure to use safe attire or personal protective devices" (p. 20). In addition, Heinrich developed a list of rules for successful supervisory performance in preventing accidents, based on his knowledge of accident research. Some of these rules are:

1. Deal with people as human beings, not machines. . . .
2. Get people to like and respect you, create loyalty, win cooperation, instill confidence, build morale, and make men feel that they belong. . . .
3. Give orders clearly and precisely. . . .
4. Recognize your responsibilities to both management and labor. . . .
5. Anticipate difficulties and remove obstacles in advance, plan ahead and organize. (pp. 207-208)

3. The industrial/social approach. The third approach used by safety managers to reduce accidents involves motivating workers to behave safely. Research has shown that the number of work-related accidents can be reduced by motivating workers to follow the organization's safety policies (Landy, 1985).

Komaki, Barwick, and Scott (1978) developed a program incorporating goal setting, positive reinforcement, and feedback to improve worker safety in two departments in a food-manufacturing plant. After desired safety practices had been identified, workers were

observed for 25 weeks, during which they were frequently given feedback on their safety performance as well as encouragement to improve their safety practices. As a result, employees in both departments greatly improved their safety behaviors. Workers in one department improved their safety performance from 70% to 96%; those in the other department showed improvements from 78% to 99%. Komaki et al. concluded that as long as the safety program was in operation it was an effective way to improve workers' safety performance.

4. Accident-prevention procedures (guidelines). To reduce accidents, safety researchers have developed accident-prevention procedures for safety managers to follow. Two representative examples are reported below.

von Haller Gilmer (1971) advocated the following four-step plan for safety managers to follow in attempting to reduce accidents:

1. Analyze the causes of accidents by observing the unsafe acts and work conditions taking place on the job.

2. Distinguish between accidents and their consequences.

3. Eliminate unsafe acts through training or retraining employees and/or relocating workers to a less hazardous job within the organization.

4. Eliminate unsafe conditions.

von Haller Gilmer found that the severity and frequency of accidents have been substantially reduced since the early 1900s, with the implementation of the above-mentioned safety procedures. She stated,

> Whenever the strategic procedures summarized above have been put into practice, the result has been an improvement in the safety record. Where these have not been adopted, as in the case of traffic accidents, the record is poor. (p. 336)

Heinrich (1959) developed another set of procedures for safety managers to follow to improve the accident-prevention practices of organizations. His formula contained the following four steps:

1. Identify the problem.
2. Find and verify the reason for the existence of the problem.
3. Select the appropriate remedy.
4. Apply the remedy. (p. 209)

Heinrich reported that research has shown that there are only a few kinds of supervisory problems, seven reasons for their existence, four basic remedies, and only a few methods of application. According to Heinrich, the kinds of supervisory problems are as follows:

I. Work Problems

1. Errors of commission
2. Insufficient work volume
3. Poor work quality
4. Breakage, wastage, spoilage, etc.
5. Improper methods, tools, etc.

II. Procedures, Rules, etc.

1. Conscious violation of rules
2. Failure to report facts
3. Abuse of privileges
4. Failure to maintain premises, tools, etc.
5. Horseplay, gossip, loafing, etc.

III. Attitudinal Problems

1. Direct refusal or insubordination
2. Assumption of unwarranted authority
3. Loose talk
4. Ridicule or criticism or company, etc.
5. Creating disturbance, noise, etc.

IV. Miscellaneous Personnel Problems

1. Dissatisfaction, wages, treatment: unhappiness generally
2. Chronic tardiness or absence
3. Outside, home, social situations
4. Demands for premature promotion, etc.
5. Trivial tale bearing (p. 209)

Heinrich found several reasons for the existence of supervisory-related safety problems:

1. Lack of skill
2. Insufficiently informed, misunderstands
3. Not convinced--indecision
4. Finds standard procedure difficult, awkward, etc.
5. Space, light, tools, etc. inadequate, unsafe, etc.
6. Physically unsuited
7. Personal characteristics unsuited (p. 210)

To resolve the various kinds of problems, Heinrich advocated employing one or more of the following types of remedies:

1. "Engineering revision" (e.g., changing the physical environment through construction, repair).

2. "Persuasion and appeal" (e.g., sending memoranda to workers).

3. "Personal adjustment" (e.g., adjusting the work assignment to better suit the worker).

4. "Discipline" (e.g., administering penalties) (p. 210).

Heinrich reported that, when the foregoing procedures are followed, the safety manager is better able to identify the safety-related work problem and to select an appropriate remedy for the problem by basing the remedy on actual observations of behaviors rather than on hunches and/or opinions about what the problem might be.

The review of behavior-based safety literature showed that behavioral approaches have been used to prevent accidents. Actions to reduce accidents have included formulating behavioral checklists to provide guidelines to safety managers, describing how they should behave toward subordinates. That procedure was used in the present study, as well.

Sports Accidents and the Role of the Coach

Opinion-based research. Many articles by individual sports experts have reflected their opinions about how to reduce sports accidents (Allman, 1976; Frazier, 1979; Langerman & Fidel, 1977; Obremsky, 1976). However, a search of the literature on the role of the coach in preventing sports accidents produced only three studies that went beyond individual opinions and used the collective opinions of groups of experts in identifying the safety abilities an athletic coach should possess. Those abilities were often referred to as medical and/or medical legal.

Esslinger (1968) headed a task force for the American Association for Health, Physical Education, and Recreation (AAHPER) Division of Men's Athletics. Well aware of the fact that many coaches have deficiencies in their professional preparation, this association created a small task force to resolve the concern. They concluded that, to improve the general qualifications of athletic coaches, each state should develop certification standards. To assist the states with this endeavor, the task force, using their members' opinions,

developed a 16-semester-hour program listing minimal standards for the general professional preparation of all secondary school athletic coaches.

In 1973, the AAHPER task force met again to review and modify the coaching standards established at the 1968 meeting. The committee, through discussion and the consensus of experts, developed a list of skills a coach should possess in each of five designated areas: "(1) medical aspects of athletic coaching, (2) principles and problems of coaching, (3) theory and techniques of coaching, (4) kinesiological foundations of coaching, and (5) physiological foundations of coaching" (AAHPER, 1973, pp. 1-2).

Nathanson (1979a, 1979b) formulated a list of 68 competencies an athletic coach should possess, based on the opinions of a panel of experts as well as opinions reported in the sports literature. He then submitted these competency statements to high school and college athletic directors and regional representatives or selected coaching executive officers in New York. Respondents were asked to express on a five-point rating scale their degree of agreement with each statement. Fifty-one of the 68 competencies were accepted and incorporated into a set of recommendations for programs for the City University of New York and the State University of New York. Such opinion-based research on the role of the coach in preventing accidents is an important step in identifying safety concerns.

Epidemiology-based research. Epidemiology-based sports safety research originated in the 1970s. Frequency counts on factors

associated with sports accidents provide a basis for identifying areas in which concerned professionals can do something to decrease the likelihood of injuries.

The relatively high rate of accidents taking place in the sports area (Bailey, 1981; Esslinger, 1968; Garrick & Requa, 1978) has initiated the development of several accident-data-collection systems for the epidemiological surveillance of injuries (Damron, 1981). Damron listed three data-collection systems that are applied to sports:

1. The National Safety Council System, which records the details of elementary and secondary school student accidents and injuries.

2. The National Electronic Injury Surveillance System, a national data-collection system that attempts to determine the causes and scope of product injuries to consumers.

3. The National Athletic Injury Reporting System, a national sports injury data-collection system, which generates continuing counts on the incidence of and circumstances associated with athletic injuries for male and female sports participants.

The epidemiology-based research procedure is used to quantify the frequency of occurrence of accident-related factors but at best is only minimally effective in identifying what injury-reducing steps to take.

Behavior-based research. Educational Research Information Center (ERIC) computer searches at the University of Iowa and Michigan State University, Medline computer searches at the University of Iowa,

manual literature searches by the investigator, and correspondence with individuals currently involved in related research failed to provide evidence of behavior-based research in the sports area.

Gymnastics Accidents and the Role of the Coach

Safety guidelines for gymnastics coaches seem to have evolved from the experiences of individuals involved in the sport as an observer, an athlete, a coach, or an official. In time, gymnastics magazines and textbooks and classes were developed that concentrated on safety in the sport (e.g., safety clinics and gymnastics coaching classes). As the number of injuries has increased within the past decade (Eisenberg & Allen, 1978; Snook, 1979), concerned professionals have begun to search for additional ways to improve safety in the sport.

One of the earliest programs aimed at organizing available gymnastics safety information and raising the level of safety practices was developed by the United States Gymnastics Safety Association (USGSA). In 1977, the USGSA formed a small gymnastics commission that wrote the Gymnastics Safety Manual and developed a certification program.

The Gymnastics Safety Manual contains a wealth of professional opinions concerning the more important safety concerns in the sport. It also includes a checklist of 18 safety questions practitioners should use in evaluating safety practices. These safety questions are:

Is the Environment Prepared for the Performance of the Skill?

1. Has the instructor prepared the gymnasium with proper matting and safe, secure equipment?
2. Is the protective equipment properly positioned?
3. Is the protective equipment appropriate to the level of difficulty and/or risk of the skill to be attempted?
4. Is the protective equipment sufficient for the weight of the gymnast and the force of a fall should it occur?
5. Is the apparatus properly adjusted for the gymnast?
6. Have measures been taken to prevent accidental collisions with others by identifying approach and landing areas in which performers have the right of way?

Is the Gymnast Prepared to Be Performing the Skill?

1. Does the gymnast have the physical abilities, strength, flexibility, and body awareness needed for the new skill?
2. Are the gymnast and instructor able to communicate clearly so that each understands his/her responsibilities during the learning of the skill?
3. Is the gymnast motivated to perform the skill?
4. Have the potential problems in the new skill learning experience been adequately identified to the satisfaction of both instructor and gymnast, and have measures been taken to eliminate or to minimize any risk?
5. Does the gymnast display or admit to any anxieties, doubts, or fears that could interfere with the safe performance of the skill?
6. Does the gymnast understand the mechanics of the skills and the sequence of necessary steps leading to the mastery of the skills?
7. Has the gymnast attained sufficient mastery of the required subskills?

Is the Instructor Prepared to Teach the Skill?

1. Does the instructor have sufficient knowledge of the mechanics of the skill to be learned and the necessary subskills?
2. Is the instructor able to make specific adjustments in the learning sequence to accommodate the gymnast's need whether real or imagined?
3. Is the instructor familiar with the level of mental preparedness of the gymnast and has the instructor determined if that preparedness is appropriate to the difficulty level of the skill?
4. Is the instructor capable of spotting the skill properly either by himself/herself or with qualified assistance?

5. In the event of special learner problems, is the instructor able to further divide the skill into smaller meaningful steps? (Isabelle et al., 1977, pp. 1-2)

The safety guidelines include many, if not most, of the important safety considerations regarding the environment, athlete, and instructor. However, as the authors of the manual indicated, these guidelines are not exhaustive.

Epidemiology-based research. An examination of epidemiology-based research on gymnastics accidents revealed a large variety of investigator interests. To provide a comprehensive yet concise classification, the literature is reviewed in terms of the following clusters: (1) specific body parts, (2) catastrophic injuries, and (3) specific organized training levels--private clubs, high schools, universities, and elites.

1. Research on specific body parts. Priest and Weise (1981) examined both personal and environmental factors associated with elbow injuries to female gymnasts. The personal factors were (1) the experience of the spotter and (2) the training the gymnast had been given on how to fall. The environmental factors were (1) the event on which the gymnast was injured, (2) thickness of the mats, (3) the skill the gymnast was performing when she became injured, (4) the occasion (e.g., competition or practice), and (5) the presence of a spotter when the injury took place. The authors noted that the factors most often associated with elbow injuries were lack of spotters and thin floor mats.

Jackson, Wiltse, and Cirincione (1976) studied personal accident factors associated with the incidence of spondylosis, vertebrae defects in the lower back, in female gymnasts. The personal factors were (1) height, (2) weight, (3) age, (4) years of experience in the sport, (5) hours of practice a week, and (6) past history of back pain. The investigators found that the incidence of spondylosis was four times higher in the study group than in the general female Caucasian population.

2. Research on catastrophic injuries. Since 1978, the USGSA has continuously studied catastrophic injuries to male and female gymnasts in the United States. This organization funds the National Gymnastics Catastrophic Injury Registry at the University of Illinois, which collects personal and environmental data on permanent neurological injuries. Personal data included (1) sex, (2) age, (3) performance level, and (4) status of the gymnast (e.g., an athlete who competed in the sport or a physical education student doing gymnastics in school). The environmental data collected concerned (1) the event on which the injury occurred, (2) the gymnastics equipment company that produced the equipment on which the gymnast was injured, (3) the type of injury (e.g., brain damage), (4) program sponsor (e.g., high school, private club), (5) the occasion (e.g., practice and/or competition), (6) the situation (e.g., improper landing on the mats), and (7) the type of spotting harness used, if any. The Registry found that, through 1982, of the 20 catastrophic injuries reported, 70% involved males, 50% of the women's injuries occurred on the parallel or uneven bars, 29% of

the men's injuries took place in a physical education class, and 45% of those who were injured were 19 to 23 years old.

3. Research on specific organized training levels. Research conducted at a specific organized training level was the most prevalent of the three types of epidemiological research. These training levels are (1) private clubs, (2) high schools, (3) universities, and (4) elites.

Two studies addressed the injury problem at the private-club level. Both studies examined selected environmental factors as they related to injuries taking place in the sport, whereas only one reported the personal factors associated with gymnastics accidents.

Lowry and Leveau (1982) examined certain environmental factors related to injuries taking place at clubs. These factors were (1) club size, (2) class level of competition, (3) student/instructor ratio, (4) types and number of injuries, (5) event on which the injury occurred, (6) availability of safety equipment, and (7) conditioning program. The investigators found that:

1. The more highly competitive levels of gymnastics resulted in higher injury rates than did the less competitive and noncompetitive levels.

2. More injuries to female gymnasts took place on floor exercise.

3. Contusions were the most frequent type of injury for both female and male gymnasts.

4. The higher student/instructor ratios (8:1 or 7:1) as compared to lower ratios (such as 4:1) did not result in higher injury rates.

Ganim and Weiker (1983) reported the number and types of injuries at the club level of men's and women's gymnastics. They collected information on the personal and environmental factors associated with injuries. The personal factors pertained to both instructor and gymnast. Instructor information included (1) number of instructors at the club, (2) student/instructor ratio at each level, and (3) personal data (e.g., age, experience in the sport as a competitor and coach, previous USGSA safety certification). Gymnast background information included (1) sex; (2) hand, eye, and foot dominance; (3) height; (4) weight; (5) years of formal gymnastics training; (6) present competitive class level; and (7) number of hours of training a day. The environmental factors examined were (1) program information (e.g., requirements for each gymnastics level in the club), (2) facility information (e.g., type of apparatus), and (3) injury information (e.g., the event on which the injury occurred).

The investigators found that the factors related to the gymnastics program and the instructor showed no correlation with injury rates. The following environmental factors did relate to club gymnastics accidents:

1. The highest number of injuries occurred on the balance beam.

2. Class I gymnasts tended to get injured from mixed moves, whereas preps, gymnasts taking classes but not presently on a competitive team, most often were injured in a fall from the apparatus.

3. The most common type of injury to a Class I gymnast was a sprain or fracture, whereas for a prep it was usually a sprain or contusion.

4. An increase in injuries was related to the more difficult moves.

5. Gymnasts performing established skills--those skills gymnasts have generally mastered--had the highest injury rate.

6. The highest number of injuries for Class I gymnasts tended to occur in the second hour of workout, while preps tended to get injured late in their workout.

To summarize the higher risk factors, Ganim and Weiker constructed profiles of the athlete most likely to become injured, based on the study findings. They reported that the gymnast most likely to become injured would be "a smaller than average, Class I, female gymnast performing an established skill at the C or CR level on the beam during the second hour of her workout and working without a spotter" (p. 5).

Garrick and Requa (1973, 1974) carried out two studies in which they examined the gymnastics injury problem at the high school level. The first study involved just the high school level of gymnastics, whereas the second study included high school, college, and private-club gymnastics. In each study, the authors investigated the

following environmental factors associated with men's and women's gymnastics accidents: (1) the event on which the accident took place, (2) number and types of injuries, (3) anatomical site of the injury, (4) amount of time lost from training, and (5) occasion. The researchers found that:

1. Most injuries took place on floor exercises (38%), followed by the balance beam (21%).

2. Sprains were the most frequent injury (43%).

3. The ankle was the most frequent injury site.

4. Most injuries occurred during practice (95%); just 5% took place at meets.

Seven research studies examined environmental factors associated with accidents among women collegiate gymnasts (Albohm, 1976; Clarke, 1980; Eisenberg & Allen, 1978; Gillette, 1975; Haycock & Gillette, 1976; Sands, 1984; Snook, 1979). The environmental factors most often investigated, in order of priority, were:

1. Frequency and type of injury to women collegiate gymnasts (Albohm, 1976; Clarke, 1980; Eisenberg & Allen, 1978; Gillette, 1975; Haycock & Gillette, 1976; Sands, 1984; Snook, 1979).

2. Anatomical site of the injury (Clarke, 1980; Eisenberg & Allen, 1978; Haycock & Gillette, 1976).

3. The environment in which the injury took place (Albohm, 1976; Clarke, 1980).

4. The event on which the injury occurred (Clarke, 1980; Sands, 1984).

5. The skill the gymnast was performing when the accident occurred (Sands, 1984).

6. The month the accident took place (Sands, 1984).

The researchers found:

1. The two most common types of injuries were the sprain followed by the strain.

2. Most injuries were to the lower extremity.

3. Most accidents occurred in floor exercises.

4. Most accidents took place at practice.

5. Most accidents took place when the gymnast performed a double back somersault.

6. Most accidents occurred during January.

One study was conducted at the elite level. Jeffrey (1975) found that gymnasts at the more highly competitive, elite level had a higher injury rate than did those at the less competitive levels.

Behavior-based research. Medline computer searches at the University of Iowa, ERIC computer searches at the University of Iowa and Michigan State University, manual searches by the investigator, and correspondence and discussions with individuals currently located in related gymnastics research failed to locate citations of behavior-based research in the gymnastics area.

Post-Injury Care

Introduction

The post-injury care literature dealing with general safety and sports accidents is summarized in this section. The gymnastics literature is examined in detail.

General Safety and the Role of the Safety Manager

Opinion-based research. Safety research on post-injury care was predominantly opinion based. For example, Blake (1964) reported that post-injury care and the responsibilities of the safety manager in any organization involved insuring that there were adequate first-aid provisions and that prompt and proper treatment was given to employees who suffered an injury on the job. This process involved the safety manager's assessing the organization's first-aid facilities, the competencies of personnel administering first aid, type of organizational record keeping of accidents, and the need for first-aid training within the plant so that when accidents did occur an injured employee was given the proper treatment.

Epidemiology-based research. A Medline computer search at the University of Iowa, ERIC computer searches at the University of Iowa and Michigan State University, and a manual search of the literature failed to identify post-injury-care citations that were epidemiology based.

Behavior-based research. Medline computer searches at the University of Iowa, ERIC computer searches at the University of Iowa

and Michigan State University, and manual searches by the investigator failed to provide citations of behavior-based research on post-injury care.

Sports Accidents and the Role of the Coach

Opinion-based research. Most research in the post-injury-care literature dealing with the role of the coach was opinion based. Many opinion-based books (Muckle, 1975) and articles (Hage & Moore, 1981; Obremsky, 1977; Redfearn, 1980b) are available. In general, these provide opinions on what a coach should do to treat an injured athlete.

The literature evidenced little or no consensus on just where the coach's responsibility begins and ends. Opinions range from the belief that because coaches are usually the first to approach the injured athlete, they should assess the situation and administer the needed basic medical care (Shroyer, 1977), to the other extreme, which holds that the coach's main responsibility is merely to summon a trainer or medical professional such as a team physician for assistance (Redfearn, 1975).

Epidemiology-based research. Only one study was located that was epidemiology based and examined the post-injury skills of coaches. Redfearn (1980a) administered a questionnaire to high school coaches in ten sports in Michigan concerning their medical skills, such as training in emergency medicine, Red Cross, and cardiopulmonary resuscitation (CPR); experience with life-threatening injuries; and self-appraisals of ability to manage a life-threatening injury. The findings showed

that 2.7% of the subjects were trained in emergency medicine, 55% in Red Cross First Aid, and 30% in CPR. In addition, the respondents' self-appraisals indicated that only 44% of the subjects felt they could handle a medical emergency, and 28% reported that they had experienced a life-threatening injury with one of their athletes.

Behavior-based research. An ERIC computer search conducted at the University of Iowa and Michigan State University and correspondence with researchers in this area produced no citations of behavior-based research on post-injury care in dealing with sports accidents.

Gymnastics Accidents and the Role of the Coach

Opinion-based research. The Gymnastics Safety Manual (1977) summarized the opinions of experts concerning the role of the gymnastics coach in dealing with post-injury care. The following three suggestions were made for the coach to follow:

1. Always have Medical Information Forms for each gymnast in order to know of any physical or psychological handicaps he or she may have--including chronic ailments such as diabetes, epilepsy, heart disease, allergies, or asthma--as well as the name of his or her physician and relatives to be notified in emergencies.

2. Be ready to summon help from the most appropriate source: a physician, a certified athletic trainer, an ambulance service, a person trained in the American National Red Cross Advanced First Aid and Emergency Care program, or a person trained in the Red Cross or American Heart Association resuscitation program. (Leaders of high-risk or high-exposure activities should themselves receive emergency medical care training, according to a recommendation of the National Academy of Science/National Research Council.) A telephone should be available to every gymnastic instructor or coach, and posted near it should be numbers for

Ambulance (or Emergency Operations Center)
Team or School Physician
Athletic Trainer
Fire Department (or Emergency Operations Center)
Police Department (or Emergency Operations Center)

3. Carry an adequate amount of emergency care equipment and supplies. This should be stored in a safe and accessible place such as a gymnasium office; should be plainly marked; and should be inspected periodically to assure its cleanliness and usability. (Lindstrom & Kalenak, 1977, p. 101)

Epidemiology-based research. Correspondence and discussions with researchers on gymnastics accidents, a manual search of the literature, and ERIC computer searches at the University of Iowa and Michigan State University produced no epidemiology-based research on post-injury care as related to the role of the coach.

Behavior-based research. A Medline computer search at the University of Iowa, ERIC computer searches at the University of Iowa and Michigan State University, a manual search of the gymnastics literature, and correspondence with individuals involved in related research failed to identify post-injury-care citations that were behavior based.

Summary

In this section of the literature review, safety research was organized into three areas: (1) the types of safety managers and their role in improving safety practices, (2) type of research conducted, and (3) type of accident event. The research on general safety dealing with safety managers was far more extensive than that on athletics or gymnastics. Nevertheless, the review showed that findings of research from nonathletic areas could also apply to gymnastics.

Of the three types of safety research that have been conducted, opinion-based research was the most prevalent across all categories of safety managers. This was followed by epidemiology-based research and then behavior-based research. All three types of research have made useful contributions to accident reduction. Concerning the type of accident event, the prevention literature across all categories of people involved in accident prevention was far more widespread than that concerning post-injury care.

The Critical Incident Technique

The principal research method used in this study was the critical incident technique. What high school girls' gymnastics coaches did in safety situations was identified through collected critical incidents that were observed taking place on the job. These incidents were then categorized and formulated into safety guidelines for coaches to follow. The critical incident technique was used because it:

> is thought to have certain values not obtainable by other techniques of measurement:
>
> 1. Adequate collection of critical incidents places categories of human behavior on an empirical base, thus providing for greater validity for any subsequent measuring instrument.
> 2. Collections of critical incidents provide realistic bases for any of a variety of evaluation techniques, although the incidents do not of themselves comprise a measuring instrument.
> 3. The critical incidents themselves can frequently serve as a source of the raw material out of which evaluation items are constructed. (Good, 1966, pp. 261-62)

The originator of the critical incident technique, Flanagan (1954), considered the technique a two-step process: (1) the unvalidated development of the practical implications of a set of critical incidents and (2) a validated follow-up.

In reviewing the literature on the critical incident technique, it was found that a number of researchers using the technique did not use the recommended follow-up but merely relied on unvalidated implications of a set of critical incidents. For this reason, the review was divided into two sections: (1) studies without validation and (2) studies with validation.

Critical Incident Studies Without Validation

The critical incident technique was first used to analyze the effective and ineffective combat-leadership behaviors of pilots in the United States Air Force in World War II (Flanagan, 1954). The technique was found to be helpful in identifying effective and ineffective behaviors of combat pilots. During the past 40 years, the critical incident technique has been used successfully in a number of other fields, including business law (Wilkinson, 1979), consulting (Hanson, 1977), special education (Ingham & Blackhurst, 1976), education (Jensen, 1951/1952; Leles, 1968), paraprofessionalism (Santapolo & Kell, 1976), engineering (Kaufman, 1973), orthopaedic surgery (Gregory, 1969), and personnel management (Kay, 1959; Kirchner & Dunnette, 1957), as well as with specific occupational groups, such as sales clerks

(Folley, 1953), dentists (Wagner, 1950), bookkeepers (Nevins, 1949), and foremen (Finkle, 1949).

Once effective and ineffective critical behaviors were identified, checklists were produced for individual and/or organizational use. Interested individuals could use the checklists to (1) evaluate their own behaviors and determine the need for training and/or retraining and (2) become more aware of what was and what was not expected of them on the job. Organizations could use the checklists to (1) select candidates for a specific job, (2) appraise the job performance of employees and take needed actions (e.g., rewarding outstanding employees with job promotions and/or a merit raise, terminating ineffective employees), and (3) develop and implement training and/or retraining programs.

For example, in 1964, the American Board of Orthopaedic Surgery used the critical incident technique to identify critical behaviors of orthopaedic surgeons (Gregory, 1969). More than 1,700 incidents involving 1,100 practicing surgeons were collected. These behaviors were then used to develop examinations and certifying procedures.

Hansen, Himes, Dowd, and Sartone (1977) used the critical incident technique to identify and describe the critical behaviors of consultants who worked with teachers. The researchers surveyed 45 elementary school teachers. One hundred forty incidents were identified, of which 113 were effective. Based on a content analysis of these incidents, the majority of the effective incidents fell in the categories of instructing, consultant characteristics, and consultation

relationships. Most of the 27 ineffective incidents were categorized under consultant characteristics and structure. Hansen et al. identified the "consultant's ability to offer explanations and concrete suggestions and to help the teacher learn how to work with the student or students" (p. 293) as the most critical effective consultant behavior.

Critical Incident Studies With Validation

Researchers using the critical incident technique have identified a range of behaviors inherent in a job and/or problematic situation but have not always measured, as fully as desirable, the relative frequency and/or importance of the behaviors. Therefore, to better identify the frequency of occurrence and degree of importance of the recall-based behaviors identified through the critical incident technique, researchers have often surveyed a parallel sample of subjects to validate their findings. After a successful validity check, the validated behaviors could presumably be used with a greater degree of confidence. Such validation studies have been conducted by Roff (1950) with combat-leadership behaviors of Air Force pilots, Reilly (1976) with the behaviors of graduate students, and Machungwa (1981) with the work behaviors that enhanced motivation and productivity in Zambia.

After collecting descriptions of good and poor combat leaders from returning aircrew officers, Roff (1950) developed and administered a validation survey to flying officers. Subjects were asked to rate the degree of importance of various effective and ineffective

characteristics, based on their flying experiences. Examples of descriptions of good and poor combat leaders included:

> Knowledge of Combat Flying: Knows his combat tactics perfectly; very good at evasive action; . . . vs. Lacked combat experience; inadequate knowledge of combat tactics and enemy opposition; experience not up to his rank.
>
> Proficiency in His Rated Specialty and Knowledge of His Equipment: A poor pilot; couldn't fly a good lead; dangerous to fly with or follow; . . . vs. Exceptional flying ability; best pilot in his squadron; understood all phases of bombing technique. (pp. 230-31)

Roff compared the ratings of successful officers and poor officers. The most discriminating characteristic was Strictness of Ground Discipline, followed by Quality and Speed on Combat Decisions, Concern with Personal Advantage, Flying Judgment, and Responsibility for His Men in Combat. Such characteristics as Voice, Stature, Education, and Age were discovered not to distinguish between the more successful and less successful leaders.

Machungwa (1981) conducted a validation study on work motivation in Zambia. Critical incidents were first collected from 341 Zambian employees and content analyzed to construct a validation questionnaire. The validation survey was given to another group of employees to determine which behaviors could enhance work motivation and productivity. Machungwa found five factors that could increase or impair motivation: "(1) Growth and Advancement Opportunity, (2) Work Nature and Context, (3) Material and Physical Provisions, (4) Relations With Others, [and] (5) Fairness in Organizational Practices" (p. 61). Some of the motivating work behaviors that were validated in the Growth and Advancement Opportunity category were: "Promotion or chance for

promotion," "Chance to learn more about job and/or further training," "Responsibility," and "feedback (corrective)" (p. 61). Some of the demotivators that impaired work in the Growth and Advancement Opportunity category were: "Promotion (lack of)" and "Lack of chance to learn more about job and/or further training" (p. 61).

Summary

The critical incident technique is a two-step process that has been used successfully in a number of fields since it was first introduced during World War II. The effective and ineffective behaviors of workers in various occupations have been identified. These behaviors have often been formed into checklists and used to (1) self-train and/or retrain, (2) make workers more aware of what behaviors are expected on the job, (3) select work personnel, (4) evaluate employees' job performance, (5) train and/or retrain personnel, (6) promote outstanding employees, (7) dismiss poor employees, and (8) develop and implement needed training and/or retraining programs.

Chapter Summary

General safety research dealing with safety managers in nonathletic areas was far more extensive than research on safety in athletics and gymnastics. Of the three types of safety research that have been conducted, opinion-based research was the most common across all categories of safety managers, followed by epidemiology-based and then behavior-based research. In addition, the prevention literature

across all categories of people involved in reducing accidents was far more widespread than the literature on post-injury care.

The critical incident technique, a two-step process, has been used successfully in a number of fields to identify effective and ineffective behaviors of workers. These behaviors have often been formulated into checklists and used by individuals and/or organizations to (1) self-train and/or retrain, (2) select work personnel, (3) evaluate job performance, and (4) develop and implement needed training and/or retraining programs.

CHAPTER III

METHODS

Introduction

This chapter contains a description of the methods used to achieve the purpose of the study: to identify and validate critical safety behaviors of high school coaches that serve to prevent, reduce, or deal effectively with injuries to female gymnasts.

Statement of the Problem

A great deal of concern is being evidenced about the prevention of sports injuries. However, few research studies have been conducted on the specific causes of sports injuries to women (Albohm, 1976; Gillette, 1975; Whiteside, 1980). Some researchers have provided information on what was believed to constitute safe sports practices but often have not reported the specific injury-reducing steps or behaviors that the coach should take. This writer assumed that present coach-training programs are not systematically teaching the critical preventive competencies a coach should possess because such competencies are largely unknown or, at best, founded on opinions and accident statistics rather than being based on empirical evidence.

Subjects

The population comprised 637 athletic directors, coaches, coach-selected gymnasts, and officials. These individuals were chosen because they all were in a position to observe the effective and ineffective safety behaviors of girls' high school gymnastics coaches. The predictor instrument was used to survey all of the high school athletic directors, coaches, and coach-selected gymnasts in Iowa and Michigan whose high schools were registered with the state high school athletic association and had competitive gymnastics teams. In addition, all of the state-registered high school officials in Michigan were surveyed. The criterion instrument was used to survey all of the high school coaches in Illinois whose high schools were registered with the state high school athletic association and had a competitive gymnastics team, as well as all of the state-registered officials.

Methodology

The critical incident technique developed by Flanagan (1954) was used to collect behavior-based safety information. The technique involved three steps: (1) development and administration of a predictor survey to collect observed incidents of coaches who were effective and ineffecitve in preventing accidents and administering post-injury care, (2) content analysis of the incidents to identify and categorize the behaviors, and (3) development and administration of a criterion survey to validate the behavioral guidelines developed in step two.

Steps one and two were designed to develop the preliminary sets of gymnastics safety guidelines, and step three the validated guidelines. Operationally, the predictor (steps one and two together) and criterion (step three) instruments were carried through three phases: (1) development of the instrument, (2) collection of data, and (3) data analysis. Within each of these three phases, several operations common to both instruments were involved. These within-phase operations were as follows.

Several steps were involved in the first phase. First was the formulation of instrument objectives, which were (1) to design a measuring instrument to collect the needed safety data, (2) to instruct subjects on how to complete and return the survey and supplementary forms, (3) to motivate subjects to participate conscientiously in the survey, and (4) to ascertain the extent to which the groups of subjects were comparable.

The instruments from steps one and three were routinely pilot tested to monitor their effectiveness in collecting and/or validating the safety information. Needed revisions were made before administering the instrument in its final form.

It was necessary for subjects to be representative of the target population--high school girls' gymnastics coaches. Thus, the survey population comprised all of the athletic directors and coaches in Iowa and Michigan whose high schools were registered with the state high school athletic association and had girls' gymnastics teams, all of the high school officials in Michigan and Illinois who were

registered with the state, and coach-selected gymnasts in Iowa and Michigan who were members of the gymnastics team.

In selecting subjects for the surveys, seven north-central states were considered: Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin. Indiana was eliminated because in 1982-83 that state's competitive high school gymnastics program for girls was divided into two evaluation levels, compulsory and optional. This division would make it difficult, if not impossible, to compare Indiana with the other states because the other states used optional competition only. Minnesota and Wisconsin were eliminated because they had a far higher proportion of high schools with gymnastics teams than did the other states (Minnesota = 22.5%, Wisconsin = 33.2%). Ohio was eliminated because its high school gymnastics were regulated by the International Federation of Gymnastics Code of Points, as opposed to the National High School Federation's rule book, which was used for high school competition in all of the other considered states. The three remaining states--Iowa, Illinois, and Michigan--were used in the research. Smaller and less developed in high school girls' gymnastics, Iowa was used only for pilot testing. Table 3.1 summarizes the gymnastics statistics for the seven north-central states.

Of the two principal methods of administering surveys, personal interview or mail survey, the latter was used for both the predictor and criterion instruments. The mail survey permitted anonymity of responses, was less expensive and time consuming to administer, and had

the potential for reaching a larger geographic area within a shorter period of time than the personal interview.

Table 3.1.--Gymnastics statistics for the seven north-central states.

State	Number of High Schools in the State High School Athletic Assoc.	Number of High Schools in the State With Girls' Gymnastics Teams	Percent of High Schools With Girls' Gymnastics Teams
Illinois	834	103	12.4%
Indiana	405	147	36.5%
Iowa	495	31	6.3%
Michigan	742	95	12.8%
Minnesota	601	135	22.5%
Ohio	730	140	19.2%
Wisconsin	424	141	33.2%

Subjects were first mailed a package of materials that included the survey and related forms. Each package was coded so that respondents and nonrespondents could be differentiated. Two weeks later, a reminder postcard was mailed to nonrespondents. Two weeks after the reminder postcard had been sent, another copy of the original survey materials and an appeal letter were mailed to remaining nonrespondents. As a final follow-up, reminder phone calls were made to predictor-survey subjects. The investigator thought that it would be extremely difficult to make telephone contacts with subjects during the summer vacation. On the other hand, a mailing was certain to be received within a reasonable time. Therefore, this technique was used with the criterion-survey group.

In the third phase, data analysis, each of the two surveys required two different sets of data-processing procedures. The predictor survey necessitated a content analysis of the critical incidents, whereas the criterion survey involved statistical analysis.

Step One--Development and Administration of the Pilot Predictor Survey

Development of the instrument. The predictor instrument reflected the joint experiences of the investigator, a long-time gymnastics competitor, coach, and official, and her research advisor, who had for a number of years used the critical incident technique in business, industry, and the military. Also used were guidelines that Flanagan (1954) had carefully developed.

Flanagan's critical incident method consisted in collecting behaviors of employees that described especially effective and ineffective performance. The behaviors, obtained through observations rather than opinions, described the events that led to incidents, the specific actions of employees during the incidents, and the consequences of those behaviors.

To obtain these critical incidents, subjects experienced in gymnastics were asked to (1) recall their experiences with girls' high school gymnastics during the 1982-83 academic year, (2) focus on the behavior of one or more coaches who displayed especially effective and/or ineffective behavior in preventing and/or caring for a gymnastics injury, and (3) write as precisely as possible responses to three open-ended questions: (a) What was the situation or background in

which the injury almost occurred or did occur, the circumstances, the antecedents? (b) What did you personally observe happening as the near or actual injury was taking place and/or being cared for? and (3) What were the consequences, if any, of the near or actual injury?

To motivate subjects to participate in the study, a cover letter was included with the survey, emphasizing that the study findings would be personally useful, mentioning the support from the surveyed state's high school athletic association, and describing the general professional value of the study.

To determine the extent to which the pilot population was comparable to the predictor and criterion respondents and to comply with federal and university regulations protecting subjects of graduate research, three supplementary forms were developed to accompany the survey: (1) a personal data sheet used to collect demographic data, as well as written feedback on any difficulties the respondents experienced while completing the survey; (2) a participant agreement form; and (3) a parental consent form to be used with gymnastics under 18 years old.

Collection of data. Iowa was used as the pilot predictor state because (1) the investigator lived in Iowa during the time of the pilot survey and served as assistant women's gymnastics coach at the University of Iowa, and (2) Iowa had a relatively small but sufficient number of girls' high school teams to pilot test the survey and, in case the survey did not collect the needed data, a large number of subjects would not have been lost to the main study.

Before the pilot data collection began, the pilot predictor was administered informally and independently to five individuals at the University of Iowa: the head and assistant women's gymnastics coaches, the assistant men's gymnastics coach, a high school girls' gymnastics official, and a member of the University of Iowa's gymnastics team. Each subject was instructed to read and complete the surveys as if he/she were involved in high school gymnastics and to report on difficulties experienced. Because no problems were experienced, the tested materials were systematically administered to subjects who were knowledgeable about high school gymnastics. They included athletic directors, coaches, and coach-selected gymnasts in all 31 high schools in Iowa that belonged to the state high school athletic association and had a girls' gymnastics team during the 1982-83 academic year--a total of 93 subjects.

On February 21, 1983, three packages of materials--each containing a cover letter, six critical incident forms (three effective and three ineffective), a participant consent form, a personal data sheet, and a self-addressed, unstamped return envelope--were sent to the athletic directors at the designated high schools. The athletic director was instructed to complete and return one package and to give the other two packages to the girls' gymnastics coach. The coach, in turn, was asked to complete and return one of the packages and to give the remaining package to a senior gymnast.

Thirty-five of the 93 surveys were returned, of which 26 were usable. This represented a usable return rate of 28%. Complete data on return rates and usability of the reports are given in Table 3.2.

Table 3.2.--Pilot predictor survey return rates.

	Athletic Director	Coach	Gymnast	Total
Number of surveys mailed	31	31	31	93
Number of surveys returned (including return of personal data sheets only)	13	16	6	35
Return rate (including return of personal data sheets only)	41.9%	51.6%	19.4%	37.6%
Number of respondents submitting usable critical incident reports	7	13	6	26
Percent of respondents, by category, submitting usable critical incident reports	53.8%	81.2%	100.0%	74.3%
Percent of total possible respondents who returned usable surveys	26.9%	50.0%	23.1%	28.0%

By far the largest number of critical incidents was reported by coaches; hence this strongly influenced the development of the safety guidelines. Many of the athletic directors who participated in the study reported that they were so busy supervising the wide range of

high school athletics programs that they often did not have an opportunity to observe gymnastics practices and/or meets. Because of their limited observations, just over half of the participating athletic directors returned usable critical incident reports. Only six high school gymnasts returned the survey. Because the survey was administered after the competitive season was over, the coaches had difficulty reaching their gymnasts and distributing the survey to them.

Participants were asked to answer several demographic questions so that comparisons could be made among the various groups of predictor respondents and eventually between the predictor and criterion respondents. These questions concerned the respondents' (1) position, (2) gender, (3) age, (4) experience in their present position, (5) educational degrees, and (6) major and minor in school. Response frequencies and percentages were computed for each question. Table 3.3 shows the demographic findings for the pilot predictor respondents who returned the survey.

Analysis of the pilot predictor survey. Based on feedback from respondents to the pilot predictor survey, the following revisions were made:

1. The number of critical incident forms distributed to subjects was reduced from six to four. Pilot respondents indicated that six forms were unnecessary because they could not recall the details of that many accidents. Each respondent usually returned two to four report forms.

Table 3.3.--Demographic information for pilot predictor survey respondents: athletic directors, coaches, and coach-selected gymnasts in Iowa.

Category	Number	Percent
Gender		
Female	15	57.7
Male	11	42.3
Total	26	100.0
Age		
> 35 years	8	30.8
30-34 years	3	11.5
25-29 years	6	23.1
20-24 years	3	11.5
< 20 years	6	23.1
Total	26	100.0
Experience in Present Position		
5 or more years	11	42.3
4 years	3	11.5
3 years	2	7.7
2 years	1	3.8
1 year	2	7.7
No reply	7	26.9
Total	26	100.0
Education		
Graduate degree	9	34.6
Bachelor's degree plus	4	15.4
Bachelor's degree	4	15.4
Some college	0	0.0
High school graduate	1	3.9
In high school	5	19.2
No reply	3	11.5
Total	26	100.0
Major		
Physical education	15	57.7
Education	3	11.5
Other	4	15.4
No reply	4	15.4
Total	26	100.0

2. Several respondents reported that an indefinite time frame would allow them to report important events that had occurred before 1982-83. Thus, the time span was increased to include all of the respondents' past experiences in observing girls' high school gymnastics.

3. A few athletic directors recommended that the investigator include postage on the return envelopes so that more subjects would return the surveys. Therefore, a postpaid return envelope was included in future mailings.

4. Because a number of coaches reported that they had not received the survey from their athletic director or that they had received the survey a few weeks after its original mailing, the investigator decided to make separate mailings to athletic directors and coaches with the final predictor instrument.

5. The categories reflecting the high school's enrollment were changed from Class A, B, C, and D, a classification scheme not used in Iowa, to enrollment numbers.

Step One--Development and Administration of the Predictor Survey

Development of the instrument. The revised pilot predictor instrument and the personal data sheet (Appendix A) were used for the predictor survey administered in Michigan. In addition, the cover letter from the pilot survey was used again; however, because the state was changed, the name of the state high school athletic association supporting the research study was changed (Appendix A).

Collection of data. Michigan was used for the predictor survey for the following reasons: (1) the investigator moved back to Michigan after the pilot data were collected; (2) many coaches, judges, and gymnasts in the state personally knew the investigator and were likely to be cooperative; and (3) Michigan's high school girls' gymnastics representative to the national association supported the study.

The predictor instrument was administered to all of the high school athletic directors, coaches, and coach-selected gymnasts in Michigan whose high schools were members of the Michigan High School Athletic Association and had a girls' gymnastics team during the 1982-83 academic year. When the collected data became redundant--that is, no additional coach behaviors were reported--the survey was extended to all 70 of the 1982-83 registered high school girls' gymnastics officials in Michigan.

The first mailing took place May 4, 1983, for the athletic directors, coaches, and gymnasts and then on July 5, 1983, for the officials. The same procedures used with the pilot predictor survey were followed for both predictor surveys, except that it proved impractical during summer vacation to make reminder telephone calls. Each individual was mailed a cover letter (Appendix A), four critical incident forms (two effective and two ineffective), a participant agreement form (Appendix A), a coded personal data sheet to help the investigator keep track of nonrespondents (Appendix A), and a postage-paid return envelope.

Of the 355 surveys administered in both predictor surveys, 109 were returned, a 30.7% return rate. As shown in Table 3.4, the highest percentages of usable surveys were returned by officials, coaches, athletic directors, and gymnasts, in that order. Officials and coaches had the highest return rates and the highest percentage of usable reports. As was found with the pilot test, athletic directors had a moderate return rate, 32.6%; only about half of their returns included usable critical incident reports. Gymnasts had a low return rate, but those who did respond submitted usable reports of their observations of coach safety behaviors. Gymnasts and coaches had low return rates because their competitive season was over when the surveys reached their high schools.

As shown in Table 3.4, the majority of critical incident reports came from officials and coaches. Officials usually reported on incidents that had occurred during meets because this was generally their only contact with coach safety behaviors. High school coaches reported information from both meets and practice sessions. Therefore, from the point of view of situational inclusiveness, that is, reporting incidents that had occurred in practice as well as competition, the two groups were not exactly comparable. The loss in comparability, however, was judged to be more than compensated for by the increased number and variety of critical incidents available for content analysis.

The predictor subjects were also asked to provide demographic data on themselves. The same demographic questions used for the pilot

Table 3.4.--Combined predictor survey return numbers and rates (Michigan subjects).

	Survey 1				Survey 2	Total for Both Surveys
	Athletic Directors	Coaches	Gymnasts	Total	Officials	
Number of surveys mailed	95	95	95	285	70	355
Number of surveys returned (including return of personal data sheets only)	31	33	3	67	42	109
Return rate (including return of personal data sheets only)	32.6%	34.7%	3.2%	23.5%	60.0%	30.7%
Number of respondents submitting usable critical incident reports	16	30	3	49	40	89
Percent of respondents, by category, submitting usable critical incident reports	51.6%	90.9%	100%	73.1%	95.2%	81.7%
Percent of total possible respondents who returned usable surveys	16.8%	31.6%	3.2%	17.2%	57.1%	25.1%

predictor subjects were used for the predictor subjects. Response frequencies and percentages were computed for each question. Table 3.5 contains the demographic data for the predictor group.

Content analysis of the data. The reports collected in step one provided the first large body of data to be subjected to analysis. Details of the content analysis are reported in the following pages.

Step Two--Content Analysis of the Collected Critical Incident Reports

The content analysis was carried out in several stages: (1) pooling and screening the reports, (2) assigning coach behavior statements to a preliminary framework of categories, (3) identifying and writing coach safety behavior statements from the reports, (4) placing each behavior statement into the appropriate preliminary category, (5) refining the coach behavior categories, and (6) refining the coach behavior statements.

1. Pooling and screening the critical incident reports. The incidents from all sources were treated as a single collection because the conditions under which the various sets of incidents were collected were essentially the same, and using the incidents from all sources provided a larger, more varied pool of incidents. Scanning incidents from the various sources suggested no systematic differences among the incidents from different sources.

The combined predictor data shown in Table 3.6 describe the subjects included in the content analysis.

Table 3.5.--Demographic information for predictor survey respondents: athletic directors, coaches, and coach-selected gymnasts in Michigan plus officials in Michigan.

Category	Number	Percent
Gender		
Female	61	80.3
Male	15	19.7
Total	76[a]	100.0
Age		
> 35 years	35	46.1
30-34 years	14	18.4
25-29 years	18	23.7
20-24 years	6	7.9
< 20 years	3	3.9
Total	76	100.0
Experience in Present Position		
5 or more years	50	65.8
4 years	7	9.2
3 years	4	5.3
2 years	5	6.6
1 year	6	7.9
No reply	4	5.3
Total	76	100.1
Education		
Graduate degree	30	39.5
Bachelor's degree plus	14	18.4
Bachelor's degree	14	18.4
Some college	13	17.1
High school graduate	3	4.0
In high school	2	2.6
Total	76	100.0
Major		
Physical education	31	40.8
Education	9	11.8
Elementary education	3	4.0
Other	8	10.5
No reply	25	32.9
Total	76	100.0

[a]Thirteen of the 89 Michigan predictor respondents submitting usable reports did not complete and return the demographic data sheets.

Table 3.6.--Demographic information for predictor survey respondents: athletic directors, coaches, and coach-selected gymnasts in Iowa and Michigan plus officials in Michigan.

Category	Number	Percent
Gender		
Female	76	74.5
Male	25	25.5
Total	102	100.0
Age		
> 35 years	43	42.2
30-34 years	17	16.7
25-29 years	24	23.5
20-24 years	9	8.8
< 20 years	9	8.8
Total	102	100.0
Experience in Present Position		
5 or more years	61	59.8
4 years	10	9.8
3 years	6	5.9
2 years	6	5.9
1 year	8	7.8
No reply	11	10.8
Total	102	100.0
Education		
Graduate degree	39	38.2
Bachelor's degree plus	18	17.7
Bachelor's degree	18	17.7
Some college	13	12.7
High school graduate	4	3.9
In high school	7	6.9
No reply	3	3.0
Total	102	100.2
Major		
Physical education	46	45.1
Education	12	11.8
Other	15	14.7
No reply	29	28.4
Total	102	100.0

Screening was the next operation. The final reports that were accepted were descriptions of the observed safety behaviors of high school girls' gymnastics coaches. These reports were content analyzed and met all of the following criteria: (1) described a safety incident that dealt with girls' high school gymnastics, (2) reported on the critical behavior(s) of girls' high school coaches, and (3) described the specific safety behaviors of coaches. Approximately 5% of the reported incidents were eliminated because they did not meet these criteria.

2. Formulating a preliminary framework of categories for the coach behavior statements. Based on the review of the literature on gymnastics and the critical incident technique, a framework was developed for performing the content analysis. The elements in this framework represent the principal variables used in this study. Table 3.7 summarizes the preliminary framework of categories for the coach behavior statements.

The breakdown of coach behaviors according to whether they were effective or ineffective was derived from the critical incident literature. The prevention and post-injury-care categories and subcategories came from the gymnastics safety literature and recent gymnastics epidemiology research reports.

3. Identifying and writing the coach behavior statements. Respondents reported incidents in varying detail and format. For example, some respondents closely followed the instructions and thoroughly described one incident on each report form, taking care to

Table 3.7.--Preliminary framework of categories for the coach behavior statements.

	No. of Items
Effective Coach Behaviors	25
1. Prevention	19
a. Coach background	1
b. Coach behavior toward the gymnast	12
(1) mainly during practice (5)	
(2) during both practice and competition (7)	
c. Coach behavior toward the equipment during both practice and competition	4
d. Coach behavior as a manager	2
2. Post-injury care	6
a. Coach behavior toward the gymnast	
(1) during both practice and competition	6
Ineffective Coach Behaviors	36
1. Prevention	
a. Coach background	1
b. Coach behavior toward the gymnast	19
(1) mainly during practice (5)	
(2) mainly during competition (7)	
(3) during both practice and competition (7)	
c. Coach behavior toward the equipment during both practice and competition	4
d. Coach behavior as a manager	2
2. Post-injury care	8
a. Coach behavior toward the gymnast	8
(1) mainly during practice (1)	
(2) mainly during competition (1)	
(3) during both practice and competition (6)	
3. Prevention and post-injury care--general behaviors that apply to both	2
a. Coach behavior toward superiors and the community (2)	

report the background of the incident, the incident itself, and the consequences in the designated areas of the report. Other respondents reported incidents in a variety of ways, such as (1) writing out a number of incidents on a single report form, (2) describing an incident in 15 words or less and not reporting the background and/or the consequences, and (3) writing an effective incident on an ineffective report form, and vice versa. The mix of information and the format in which the reports were written made it difficult for the investigator to count the number of incidents reported. In general, most critical incident studies have counted the number of reported incidents. In this study, however, the investigator could not specifically count the number of incidents reported. Rather, coach behavior statements were extracted from the variety of information that was reported.

The incidents reports were read repeatedly. The content analyzers examined only the observed behaviors of coaches that led to the effective and ineffective safety practices. The behavior statements were then written from the collected reports. The content analyzers tried to capture both the content and the spirit of the language of the reports. A single mention of an incident was sufficient to merit its inclusion in the safety list.

In wording the safety guidelines, the content analyzers sought to achieve a balance between being too specific and wording each incident exactly as it was written in the reports and being too general, i.e., not giving enough specifics regarding what coaches did and did not do in their safety practices.

4. Placing each behavior into the appropriate preliminary category. The individual coach behavior statements were placed into the study's preliminary categories described in operation two, in accordance with the following procedures:

1. Statements were sorted into two groups: effective and ineffective.

2. Statements within the effective and ineffective groupings were then re-sorted into categories of prevention and post-injury care.

3. Statements within the prevention category were placed in one of three areas: coach background, coach behavior toward the gymnast, and coach behavior toward the equipment. At the same time, the behaviors were also placed into the appropriate environmental subcategory: during practice, during competition, and during both practice and competition. Strict attention was paid to the environment in which the incident was reported to have taken place. If no specific environment was indicated, the statement was placed into the during-both-practice-and-competition category.

4. Statements within the post-injury-care area were placed into one of three subcategories dealing with the environment in which the incident had taken place: during practice, during competition, and during both practice and competition.

5. Refining the coach behavior categories. Flanagan indicated that the errors that occur in content analysis tend not to happen so much in the collection and analysis of the incidents themselves but in interpreting them properly. For example, (1) the categories might need

revision, (2) individual behavior statements might not have reflected closely enough the content of one or more of the incidents, or (3) the wording of the statements may not have captured the spirit of the reports. To avoid such errors, two types of reliability checks were performed: (1) reliability checks on the content-analysis process to determine if there was evidence for each category and each individual statement and (2) reliability checks on the raters to determine if there was interrater agreement.

In performing reliability checks on the content analysis of the coach behavior lists, three procedures were used: (1) a content-verification check on the categories, in which three raters who were highly experienced in gymnastics independently read the reports and evaluated whether there was evidence for each category; (2) a content-verification check on the individual behaviors, in which three raters independently read the reports and then determined whether there was evidence somewhere in all the incidents supporting the inclusion of each statement in the guidelines; and (3) a quantitative check on the individual behaviors, in which two raters read the reports and counted the number of times the content of each statement was mentioned in the reports. The content-verification check of the categories is described in the following paragraphs, whereas the two checks on the individual statements are reported under operation six.

A manual was first developed and pilot tested for the content-verification check on the categories and statements. The manual was developed to standardize the instructions, procedures, and answer

sheets across raters participating in the check. One content rater, highly experienced as a male high school and collegiate competitor, coach, and official and functioning in a pretesting or pilot role, (1) read through the manual and completed the evaluation forms, (2) reported difficulties he experienced, and (3) provided oral and written evaluations of the manual. As a result, a number of minor revisions were made in the final manual.

In the actual content check on the categories, two raters, both experienced in gymnastics, independently studied the instructional manual and responded to an open-ended question: Is there some better way to categorize the data that is more effective? If so, what are your ideas?

Based on the input from the pilot rater and the two other raters, the study's categories were supported. After further examining rater reports on the categories, the investigator made the following revisions: (1) the categories on both the effective and ineffective prevention lists were reordered so that the "coach background" category was moved from first place on the lists to second-to-last place, and the category "coach management of assistant coaches" was moved from second to last place; and (2) the ineffective category "coach self-defeating tendencies" was removed from the list. The behavior that was listed under this category was placed under the category "coach management of assistant coaches."

6. Refining the coach behavior statements. Because a number of errors could have occurred in the content-analysis process as the

two content analyzers attempted to interpret the reports and write the individual statements, a content-verification check and a quantitative check were performed. These checks were conducted to ensure that the statements were reliable enough to warrant continuing to step three, validation of the guidelines.

The content check on the statements involved four kinds of checks: (1) two content checks on the individual statements and (2) two reliability checks on the raters. In the first check, three raters read the reports and the statements to determine whether there was evidence to justify each behavior's inclusion in the guidelines. In the second check, two raters independently read both the reports and the statements and counted the number of times each behavior was mentioned in the reports to ensure each statement had been reported at least once. The two reliability checks conducted on the raters used both the intraclass correlation coefficient and Finn's r to calculate the degree of rater agreement in the first content check reported above.

The first content check is reported immediately below, followed by a discussion of the rater reliability checks. The second content check, the quantitative check of the guidelines, is discussed later in the chapter.

The same manual used for the content checks of the categories was used for the content checks on the individual behaviors. The same three raters who participated in the content checks of the categories were used. Each rater independently responded to a series of

evaluative questions on the content of the 61 statements: (1) Is there evidence for each coach behavior statement somewhere in the incidents? (2) Did each statement capture the spirit of the incidents reported? If not, what are your suggestions for change? and (3) Is the amount of information contained in each statement sufficient for your understanding it? If not, which ones need to be rephrased to better reflect the incidents? How would you rephrase the statement? This check was done to eliminate statements not found to appear in the reports, to minimize potential biases from the content-analysis process, and to make sure the data were reasonably sound before proceeding to step three.

Based on the raters' input, the needed revisions were made. Two statements in both the effective and the ineffective lists were deleted because of content overlap.

To estimate interrater reliability, both an intraclass correlation and Finn's r were computed. The intraclass correlation is based on analysis of variance and is often used to "obtain either a unique estimate or a confidence interval for the reliability of either the component ratings or their average" (Ebel, 1951, p. 401). The intraclass correlation is the most frequently employed measure for comparing the reliability of raters across situations. However, it does not control a not-unusual chance problem, namely that "raters may agree through chance alone, and the raw frequency of agreement includes both chance and true agreement" (Whitehurst, 1984, p. 22). Finn's r computes "the relationship of the ratings not due to chance" (Whitehurst, 1984, p. 26), using an index "that compares the obtained error variance

with that which would have occurred had the ratings been assigned randomly" (Whitehurst, 1984, p. 25).

Both sets of reliability coefficients shown in Table 3.8 were high enough to proceed to step three. Both reliability checks yielded essentially the same results. This indicates that the chance problem that Finn's r attempts to control for did not play much of a role in the content-analysis process used in this study.

Table 3.8.--Results of reliability checks.

Type of Coach Behavior Statement	Intraclass Correlation Coefficient	Finn's Reliability
Effective	.79	.78
Ineffective	.88	.83

After the above-mentioned revisions in the guidelines had been made, another reliability check was done to determine the number of times each statement appeared within the reports. Two raters, one highly experienced gymnastics coach and official and the investigator, read and reread a typed copy of the reports--55 single-spaced pages--and recorded the number of times each of the 61 statements was made within the reports.

Each rater found all the statements at least once except for two effective statements. The investigator found the two effective statements in the reports just once, whereas the other rater did not

find the statements at all. (See Table 3.9.) Because of the large number of incidents each rater had to read, an incident that appeared only once could easily have been overlooked. As a result, all 61 statements were retained on the predictor-generated safety lists.

Table 3.9.--Results of quantitative check.

	Rater 1	Rater 2
Effective Coach Behaviors (N = 25)		
Yes, the coach behavior was found in the critical incident reports	25 behaviors	23 behaviors
No, the coach behavior was not found in the critical incident reports	0 behaviors	2 behaviors
Ineffective Coach Behaviors (N = 36)		
Yes, the coach behavior was found in the critical incident reports	36 behaviors	36 behaviors
No, the coach behavior was not found in the critical incident reports	0 behaviors	0 behaviors

Evidence from all of the reliability checks suggested that the checklists were reliable enough to proceed to step three and to submit the recall-generated safety lists to a second and larger group of respondents for a validation check that was based on recognition.

Step Three--Development and Administration of the Pilot Criterion Survey

Development of the instrument. Using recall and recognition raises potential methodological problems. Recall is a difficult task since subjects often forget details of events with the passage of time (Yelon & Weinstein, 1977). In addition, recall does not offer as complete an opportunity to measure the relative frequency and importance of identified behaviors. Recognition is easier for the subject than recall but has its own inherent difficulties (Yelon & Weinstein, 1977). While using a rating scale for recognition, respondents may check items in a constant direction as to their general impression of the subject, referred to as the halo effect (Kerlinger, 1964). Recognition, unlike recall, does provide an opportunity to measure the frequency of occurrence of behaviors and/or their degree of importance. Unfortunately, such data do not lend themselves to combining the degree of frequency and/or importance. Despite the problems, when recognition is used as a check on recalled data, the validated findings can be used with a higher degree of confidence than if either technique had been used separately (Roff, 1950).

The researcher used the recalled behaviors identified in steps one and two and subjected them to a recognition check in step three to validate the checklists. Because the recognition check was faced with obtaining measurements in two not necessarily highly correlated dimensions--frequency and importance--the validated survey form essentially called for both frequency and importance judgments on each behavior statement. The recall-generated behavior statements developed in steps

one and two were subjected to a recognition check using two five-point Likert scales, one for frequency and the other for importance. The validation survey form asked a second independent group of observers to indicate (1) how often they had observed each coach behavior take place in high school girls' gymnastics (i.e., 1 = Very Frequently, 2 = Frequently, 3 = Sometimes, 4 = Rarely, 5 = Never or Practically Never) and (2) how important in their experience each behavior was in contributing to safe gymnasium practices (i.e., 1 = Very Important, 2 = Important, 3 = Moderately Important, 4 = Indifferent, 5 = Unimportant). For respondents who had not had an opportunity to observe the identified behaviors (e.g., gymnastics officials who did not get an opportunity to observe coaches during practice sessions were not able to respond to practice-based coach behavior statements), a sixth choice was included: "Does Not Apply." The cover letter and the criterion instrument with trial instructions were used for the pilot criterion survey.

Collection of data. In selecting subjects to pilot test the criterion materials, individuals were chosen whom the investigator knew were experienced with high school gymnastics, were likely to participate in the study, lived in the immediate area, and could return the surveys promptly. Ten individuals meeting these criteria were used in the pilot study: four coaches, three officials, and three gymnasts. One coach had participated in the predictor survey.

On January 16, 1984, the ten pilot respondents received the necessary forms to read, complete, and write down any difficulties

experienced. One week later, the investigator collected the survey materials and listened to each respondent's feedback.

Analysis of the data. All ten surveys were returned. Of the three respondent groups, coaches and officials gave more verbal and written feedback on the instrument than did gymnasts.

The surveys were reviewed to determine what problems the respondents had experienced. It was discovered that respondents did not understand how to rate the degree of importance for the ineffective coach safety behaviors. Instead of responding to how important it was that each listed ineffective behavior should not occur, as was the intention of the scale, many respondents interpreted the question to mean how important it was for each behavior to occur. Based on the feedback, needed revisions were made in the instructions.

Step Three--Development and Administration of the Criterion Survey

Development of the instrument. The instrument for the criterion survey was essentially the same as that for the pilot test. The revised criterion instrument and cover letter are contained in Appendix A.

Collection of data. Illinois was used as the criterion state because it was comparable to Michigan in terms of the number of girls' high school teams that were registered with the state high school athletic association (Illinois = 834, Michigan = 742) and had a similar percentage of high schools with girls' gymnastics teams (Illinois = 12.3%, Michigan = 12.8%).

Because the study called for the selection of subjects who were highly motivated to return the surveys, and coaches and officials had the highest return rates and submitted the highest percentage of usable critical incident reports with the predictor instrument, all of the 1983-84 registered high school officials and all of the Illinois high schools that had state-registered high school teams were surveyed with the criterion instrument. This included 189 potential subjects: 101 officials and 88 coaches. No athletic directors or coach-selected gymnasts were included in the criterion survey group.

A distortion that could have taken place between the two surveys was the different years in which the surveys were administered. There was no reason to believe that the 1983-84 observations of high school coaches were any different from those during 1982-83. As far as the investigator was able to ascertain, no significant changes took place in the occurrence of accidents during the two years.

An attempt was made to keep the two surveys identical so that any differences in the findings would be a result of the different techniques. Therefore, both surveys used the same instructions and motivations in the cover letters and the same personal data sheets. The groups of subjects were kept as comparable as possible, given the fact that different states were used.

On February 4, 1984, each subject was mailed a package of materials that contained the cover letter, criterion survey, personal data sheet, participant agreement form, and postage-paid, self-addressed return envelope. Of the 189 surveys mailed, 77 were

returned, for a 40.7% response rate. Detailed information on the survey response rates is given in Table 3.10.

Table 3.10.--Criterion survey return rates.

	Coach	Official	Total
Number of surveys mailed	88	101	189
Number of surveys returned	39	38	77
Return rate	44.3%	37.6%	40.7%
Number of respondents submitting usable reports	39	38	77
Percentage of respondents submitting usable reports	100%	100%	100%

Because follow-up operations continued into the summer vacation months, the criterion population did not receive reminder phone calls. The 40.7% return rate was comparable to the return rate of 35.1% for the predictor survey. The return rate with recognition was somewhat higher than that with recall. This is not surprising because pilot testing showed that the recognition survey was easier and less time consuming than the recall survey.

Unlike the predictor surveys, all of the returned criterion surveys were usable. The criterion respondents completed all of the validation questions on both the frequency and importance dimensions.

Originally, 88 coaches and 101 officials were surveyed. However, the personal data sheets showed that eight of the officials

were also coaches, so they were counted as coaches rather than officials.

The criterion population, like the predictor population, was asked to provide demographic data so comparisons could be made between the criterion and predictor groups. The same demographic questions were used as those answered by the predictor respondents. Response frequencies and percentages were computed for each question. Table 3.11 shows the demographic information for criterion respondents, whereas Table 3.12 compares the predictor and criterion respondents in terms of demographic characteristics.

After reviewing the demographic data collected from the predictor and criterion respondents, and taking into account the fact that the predictor group included several high school gymnasts whereas the criterion group did not, it was discovered that the two groups did not differ appreciably. Both groups appeared reasonably similar on each of the demographic characteristics measured.

Analysis of the data. The behaviors identified in the content analysis and formulated into statements were used as items in the criterion survey and then presented to a second, independent population of respondents who indicated on a five-point Likert scale (1) how often they had observed the behaviors taking place and (2) how important each behavior was in contributing to safe gymnastics practices. Each item could be rated from 1 to 5. In scoring each behavior under each of the two dimensions, frequency and importance, the number of points for each statement was the numerical value of each particular response. For

Table 3.11.--Demographic information for criterion survey respondents: coaches and officials in Illinois.

Category	Number	Percent
Gender		
Female	61	79.2
Male	11	14.3
No reply	5	6.5
Total	77	100.0
Age		
> 35 years	36	46.8
30-35 years	17	22.1
25-29 years	16	20.8
20-24 years	8	10.4
Total	77	100.1
Experience in present position		
5 or more years	57	74.0
4 years	4	5.2
3 years	6	7.8
2 years	8	10.4
1 year	1	1.3
No reply	1	1.3
Total	77	100.0
Education		
Graduate degree	32	41.6
Bachelor's degree plus	26	33.8
Bachelor's degree	12	15.6
Some college	6	7.8
High school graduate	1	1.3
Major		
Physical education	47	61.0
Education	7	9.1
Other	10	13.0
No reply	13	16.9
Total	77	100.1

Table 3.12.--Demographic information for predictor survey respondents (athletic directors, coaches, and gymnasts in Iowa and Michigan plus officials in Michigan) and for criterion survey respondents (coaches and officials in Illinois).

Demographic Category	Predictor		Criterion		Total	
	N	%	N	%	N	%
Gender						
Female	76	74.5	61	79.2	137	76.5
Male	26	25.5	11	14.3	37	20.7
No reply	0		5	6.5	5	2.8
Total	102	100.0	77	100.0	179	100.0
Age						
> 35 years	43	42.2	36	46.8	79	44.1
30-34 years	17	16.7	17	22.1	34	19.0
25-29 years	24	23.5	16	20.8	40	22.4
20-24 years	9	8.8	8	10.4	17	9.5
< 20 years	9	8.8	0		9	5.0
Total	102	100.0	77	100.1	179	100.0
Exp. in present position						
5 or more years	61	59.8	57	74.0	118	65.9
4 years	10	9.8	4	5.2	14	7.8
3 years	6	5.9	6	7.8	12	6.7
2 years	6	5.9	8	10.4	14	7.8
1 year	8	7.9	1	1.3	9	5.0
No reply	11	10.8	1	1.3	12	6.7
Total	102	100.0	77	100.0	179	99.9
Education						
Graduate degree	39	38.2	32	41.6	71	39.7
Bachelor's degree plus	18	17.7	26	33.8	44	24.6
Bachelor's degree	18	17.7	12	15.6	30	16.8
Some college	13	12.8	6	7.8	19	10.6
High school graduate	4	3.9	1	1.3	5	2.8
In high school	7	6.9	0		7	3.9
No reply	3	3.0	0		3	1.7
Total	102	100.2	77	100.1	179	100.1
Major						
Physical education	46	45.1	47	61.0	93	52.0
Education	12	11.8	7	9.1	19	10.6
Other	15	14.7	10	13.0	25	14.0
No reply	29	28.4	13	16.9	42	23.5
Total	102	100.0	77	100.0	179	100.1

example, if a respondent gave a statement a 2 in frequency and a 1 in importance, the frequency score was 2 and the importance score was 1. The closer the mean score was to 1, the more frequently the behavior occurred and/or the more important the behavior was in contributing to safe practices.

Summary

Data collection basic to developing guidelines for high school girls' gymnastics coaches followed a lengthy and somewhat complex process. The first step involved obtaining recall information in the form of critical incidents. The second step was content analyzing these incidents into a preliminary set of coach guidelines. The third step involved collecting recognition data based on the previously obtained recall data to serve as a validation check on the recall data. For purposes of convenience, the recall-based data guidelines are referred to as the predictor instrument, whereas the recognition-based data guidelines are referred to as the criterion instrument.

Data processing for both predictor and criterion comprised three phases: instrument development, collection of data, and data analysis. The first two phases were kept as comparable as possible for both predictor and criterion. A high degree of comparability was achieved. Both instruments were systematically and routinely pilot tested. The necessary revisions were made before administering the instruments in final form.

Phase three, data analysis, was markedly different for the predictor and criterion phases because of the data differences. Predictor data were highly verbal, whereas criterion data were highly quantitative. Details of the predictor data analysis, primarily the content analysis and demographic comparisons of the predictor and criterion respondents, were reported in this chapter. Results of the criterion analysis are reported in Chapter IV, along with the results of the study.

Predictor data analyses were checked for reliability. The researcher concluded that the predictor data were sufficiently reliable to proceed with validation.

CHAPTER IV

RESULTS

Introduction

Chapter IV contains the data collected in this study and provides behavior-based safety guidelines for coaches of high school girls' gymnastics. Two different sets of guidelines are set forth: (1) recall-based, predictor guidelines and (2) recognition-based, criterion guidelines. The predictor and criterion guidelines are compared to provide a validity check for the predictor guidelines.

Predictor results necessarily precede criterion results. The two corresponding sets of results are presented in this recall/recognition sequence. There is more to the presentation of criterion results than of predictor results because, beyond internal analysis of the data, validity comparisons are involved in presenting the criterion results.

Predictor Results

It is a well-established practice to check reliability before proceeding with other manipulations involving a particular measure. Results of reliability checks on the predictor were presented in Chapter III, where reliability was reported as sufficient to proceed further with the study.

The results of the predictor studies in this research culminated in a set of safety guidelines for coaches. These predictor-based guidelines are evident from the content of the survey questionnaires shown in Appendix A. They are also presented in the form of guidelines in Appendix B.

These guidelines comprise two levels. The first level consists of behavioral statements directly emanating from the content analysis of the incidents. The second level consists of categories or logical content groupings of the behavioral statements. The 61 behavioral statements that comprise the predictor guidelines could be presented in random order. However, they were grouped by categories to help coaches better use the guidelines by providing some structure to the presentation. In presenting the coach behavior categories, an attempt was made to establish an appropriate complexity/simplicity level. Guidelines that are too complex, that is, contain too many behaviors for the coach to remember, may not be very useful. On the other hand, a set of guidelines that is too short and simple may be too vague and general to be useful. The 61 behavioral statements, arranged under categorical headings, are shown in Appendix B-1.

Criterion Results

Criterion results were analyzed to produce additional guidelines for coaches to follow and also to validate the recall-based guidelines. Results of validation are discussed first.

In this study, validity refers to the validity of the recall-based guidelines as ascertained through independent, recognition-based follow-up observations carried out in the form of a criterion survey. The predictor guidelines were validated by comparing them with the criterion guidelines. The criterion guidelines were developed from a statistical analysis of the data. The statistical character of the criterion data provided a number of analysis possibilities not available with the predictor data. With the criterion data, it was possible to estimate reliability in a more statistical way.

Criterion Reliability

A series of Cronbach alphas first was used to measure the reliability of the overall instrument and then to measure the reliability of the instrument's two major dimensions: frequency and importance. A third set of Cronbach alphas was employed to measure the reliability of each of the instrument's eight major categories and, for purposes of comparability across categories, was corrected for the number of items within each of these categories. The eight categories and the number of items in each category are as follows: (1) effective prevention/frequency (n = 19), (2) effective prevention/importance (n = 19), (3) effective post-injury care/frequency (n = 6), (4) effective post-injury care/importance (n = 6), (5) ineffective prevention/frequency (n = 26), (6) ineffective prevention/importance (n = 26), (7) ineffective post-injury care/frequency (n = 8), and (8) ineffective post-injury care/importance (n = 8).

The Cronbach alpha for the entire instrument was high, r = .98. The Cronbach alphas for both the frequency and importance dimensions, even when calculated separately for the items in the effective and ineffective categories, were also high and ranged from r = .91 to .97, as shown in Table 4.1. The Cronbach alphas for each of the eight major categories were relatively high, considering the smaller number of items in each category as compared with the more inclusive categories shown in Table 4.1. The Cronbach alphas for the eight categories ranged from r = .71 to .95, as shown in Table 4.2. Based on these data, it was concluded that the criterion reliability measures for the entire instrument and its eight categories were sufficiently high to proceed with further analyses.

Table 4.1.--Cronbach alphas for the frequency and importance dimensions of the criterion instrument.

Category	Reliability	No. of Behaviors
1. All the effective frequency data (prevention and post-injury care)	.94	26
2. All the ineffective frequency data (prevention and post-injury care)	.96	36
3. All the effective importance data (prevention and post-injury care)	.91	26
4. All the ineffective importance data (prevention and post-injury care)	.97	36

Table 4.2.--Cronbach alphas for the eight major categories of the criterion instrument.

	Category	Reliability	No. of Behaviors
1.	Effective prevention/frequency	.93	19
2.	Effective prevention/importance	.90	19
3.	Effective post-injury care/ frequency	.82	6
4.	Effective post-injury care/ importance	.71	6
5.	Ineffective prevention/frequency	.94	26
6.	Ineffective prevention/importance	.95	26
7.	Ineffective post-injury care/ frequency	.88	8
8.	Ineffective post-injury care/ importance	.92	8

Criterion Internal Analysis Beyond Reliability

Basic to understanding the criterion survey results were the data concerning (1) behavior statements and (2) behavior categories. Behavior statement means and standard deviations for each of the 61 items are shown in Appendix B-2. The behavior statement tables included in Chapter IV are rearrangements of the appendix data. These rearrangements are later reported for the purpose of making logical points in the development of the recognition-based guidelines.

The behavior statement data in Appendix B-2 are presented in terms of both frequency and importance. In the criterion survey,

subjects reported their recollection of frequency and importance of each behavior separately.

Tables 4.3 through 4.5 summarize the study's categorical data. The number of items accumulated across the categories first identified in Chapter I are shown in Table 4.3. Responses concerning both frequency and importance were obtained for all 61 items and were broken down into 25 effective and 36 ineffective behaviors. The behavior statements were subdivided into prevention and post-injury care and then further sorted into the seven categories that identify coach behaviors and characteristics.

The data in Table 4.4 represent a rearrangement of the numbers in Table 4.3 to show 45 prevention, 14 post-injury-care, and 2 combined prevention and post-injury-care items. By way of review, Table 4.5 identifies the origins of item categories.

Basic data for categories to parallel Table 4.5 are presented in Appendices B-3 and B-4. Grouped frequency distributions of behavior statement means are shown by frequency and importance and by the study's subdivisions: effective/ineffective prevention and effective/ineffective post-injury care. Columns F and G for both frequency and importance are subtotals and are discussed later. Appendix B-4 contains grouped frequency distributions of category means for the same data.

Table 4.3.--Number of criterion items accumulated across categories.

Effective/ Ineffective	Coach Behaviors or Characteristics for Frequency and/or Importance (N = 61 behaviors)							
	Prevention/ Post-injury Care	Coach Back-ground	Coach Behavior Toward Gymnast During Practice	Coach Behavior Toward Gymnast During Compe-tition	Coach Behavior Toward Gymnast During Practice & Comp.	Coach Behavior Toward Equip-ment: Practice & Comp.	Coach as a Manager	Coach Behavior Toward Superiors and the Community
Effective (25)	Prevention (19)	1	5	0	7	4	2	0
	Post-injury care (6)	0	0	0	6	0	0	0
	Prevention (26)	1	5	7	7	4	2	0
Ineffective (36)	Post-injury care (6)	0	1	1	6	0	0	0
	Prevention & post-injury care (2)	0	0	0	0	0	0	2
Column total	61	2	11	8	26	8	4	2

Table 4.4.--Category totals not on Table 4.3.

	Frequency	Importance
Prevention	45	45
Post-injury care	14	14
Prevention and post-injury care	2	2
Total	61	61

Table 4.5.--Origins of item categories in Table 4.3.

The Study's Major Categories	Traditional Critical Incident Practice		Content Analysis of the Study's Critical Incidents and the Technical Literature
	Recall	Recognition	
Effectiveness/ ineffectiveness	X		
Frequency/importance		X	
Prevention/ post-injury care			X
Coach characteristics and behaviors			X

In addition, data from the criterion survey were of two types: (1) overall analyses to determine if there were other ways to categorize the data than the classification used in Tables 4.3 and 4.4 and (2) analyses by specific established categories to determine special

category characteristics and to provide a structure to what would otherwise be just miscellaneous behavior statements.

The overall analysis procedure was factor analysis. To check the categories, a factor analysis was done on the table of intercorrelations resulting from step-three data. The eigenvalues for the factors that emerged (Appendix B-5) indicated that only the effective and ineffective factors in the frequency dimension were supported. No other factors emerged to a statistically significant degree. The generally low obtained eigenvalues suggest that either the rational categories developed in the content analysis did not hold up under factor analysis once intercorrelations among the item measures became available, or the item measures did not meet the measurement assumption of factor analysis. The measures were not interval but ordinal level. Factor analysis was still worth trying because with similar data it sometimes happens that the data meet the strict assumptions of a demanding statistical procedure and help in explanation. Unfortunately, such was not the case with the data in this study. The factor analysis helped very little. Other kinds of overall analysis such as cluster analysis were considered. However, technicians did not recommend further overall analyses of these sorts after considering the nature of the data.

Partial Correlations

A second kind of overall analysis was tried--partial correlations. Partial correlations were computed as a precautionary measure to better understand the analyses to be used in working with the

special category characteristics. The criterion survey was divided into the eight categories for intercorrelational checks on the eight parts of the instrument:

1. Effective prevention behaviors: frequency with importance.

2. Effective post-injury-care behaviors: frequency with importance.

3. Ineffective prevention behaviors: frequency with importance.

4. Ineffective post-injury-care behaviors: frequency with importance.

5. Frequency of effective behaviors: prevention with post-injury care.

6. Frequency of ineffective behaviors: prevention with post-injury care.

7. Importance of effective behaviors: prevention with post-injury care.

8. Importance of ineffective behaviors: prevention with post-injury care.

Partial correlations measured the degree of relationship between each set of two variables and each other set (e.g., frequency with importance, prevention with post-injury care) while adjusting for the effects of the remaining variables. Consequently, spurious intercorrelations might be identified if the partial correlations were substantial.

Table 4.6 shows the partial correlations among the eight sets of variables.

Table 4.6.--Partial correlations for the criterion instrument's eight scales.

Scale	Correlation	p
Frequency With Importance Comparisons		
#1--Effective prevention	.35	.003
#2--Effective post-injury care	.57	.001
#3--Ineffective prevention	.27	.022
#4--Ineffective post-injury care	.54	.001
Prevention With Post-Injury-Care Comparisons		
#5--Frequency of effective behaviors	.40	.001
#6--Frequency of ineffective behaviors	.58	.001
#7--Importance of effective behaviors[a]	--	--
#8--Importance of ineffective behaviors	.72	.001

[a]Because a number of officials did not have an opportunity to observe high school girls' gymnastics practices, they did not respond to the degree of importance of these effective individual coach behaviors. As a result, too many data were missing to permit the computation of statistically dependable coefficients for the importance of effective coaching behaviors.

Except for #7 in Table 4.6, which could not be computed as explained in the footnote to the table, the partial correlations were positive and almost all high enough to be significantly different from zero. It is clear that the variables did tend to vary together. Nevertheless, the coefficients were also sufficiently low to indicate

that much of the variance was still unaccounted for. Partially for this reason, analysis of data was undertaken to determine special characteristics of certain of the categories without severe misgivings about spurious interrelationships.

Frequency and Importance

If there had been some way to show that frequency and importance were highly intercorrelated, it might have been possible to reduce the number of specific coach behavior statements appearing in the safety guidelines and to simplify the rather complex guidelines. However, this was not the case. In general, frequency and importance were found not to be highly intercorrelated.

In comparing frequency and importance for the statements and categories, several checks were made: (1) Pearson correlations for each of the individual statements in ungrouped and grouped frequency distributions, (2) Pearson correlations for each of the categories in ungrouped and grouped frequency distributions, (3) individual statement means in ungrouped and grouped frequency distributions, (4) category means in ungrouped and grouped frequency distributions, (5) one-way analysis of variance of frequency and importance, and (6) t-tests to show the significance of the differences between frequency and importance means.

Pearson correlations showed the extent of the relationship between frequency and importance for each statement and are reported in Appendix B-7. The details are summarized in Table 4.7.

Table 4.7.--Frequency distributions of Pearson r's between frequency and importance for each behavior statement, by effective versus ineffective, for prevention, post-injury care, and both prevention and post-injury care.

Pearson r's	Prevention		Post-Injury Care		Prevention and Post-Injury Care		Total Effective Behavior Statements	Total Ineffective Behavior Statements	Grand Total of E and I
	E	I	E	I	E	I			
.9 to 1.00									
.8 to .89									
.7 to .79									
.6 to .69									
.5 to .59	1						1		1
.4 to .49	4		2				6		6
.3 to .39	5		2				7		7
.2 to .29	7		1				8		8
.1 to .19	2	2	1				3	2	5
0 to .09		9		2				11	11
0 to -.09		12		5				17	17
-.1 to -.19		2		1				3	3
-.2 to -.29						2		2	2
-.3 to -.39		1						1	1
-.4 to -.49									
-.5 to -.59									
-.6 to -.69									
-.7 to -.79									
-.8 to -.89									
-.9 to -1.00									
Total	19	26	6	8	0	2	25	36	61

Key: E = Effective behavior statements, I = ineffective behavior statements

Table 4.7 shows grouped frequency distributions of the Pearson r's by major categories. Frequency and importance were clearly more highly correlated on effective than on ineffective behaviors, even to the point of making it possible to consider some combination of frequency and importance on the effective statements. On the other hand, the correlations hovered around zero for the ineffective statements so that combining corresponding items on ineffective behaviors hardly appeared justified.

Table 4.8 shows Table 4.7 data condensed for category data. In general, the same results emerged from Table 4.8 as from Table 4.7.

The means for the coach behavior statements (Appendix B-2) were compared on both frequency and importance by placing them into parallel grouped frequency distributions. (See Table 4.9.) Table 4.9 shows that the frequency and importance distributions differed markedly from each other.

Side-by-side grouped frequency distributions of category means (Appendix B-8) for both frequency and importance are shown in Table 4.10. As was the case with the individual coach behavior means, Table 4.10 shows that the frequency means were markedly higher than the importance means.

The results of a one-way analysis of variance for frequency and importance data are summarized in Table 4.11. The one-way analysis of variance showed that the frequency/importance difference was highly significant statistically.

Table 4.8.--Frequency distributions of Pearson r's between frequency and importance for each behavior category, by effective versus ineffective, for prevention, post-injury care, and both prevention and post-injury care.

Pearson r's	Prevention		Post-Injury Care		Prevention and Post-Injury Care		Total Effective Behavior Statements	Total Ineffective Behavior Statements	Grand Total of E and I
	E	I	E	I	E	I			
.9 to 1.00									
.8 to .89									
.7 to .79									
.6 to .69									
.5 to .59			1				1		1
.4 to .49	1						1		1
.3 to .39									
.2 to .29									
.1 to .19									
0 to .09		1		1		1		3	3
Total	1	1	1	1		1	2	3	5

Table 4.9.--Parallel grouped frequency distributions of behavior statement means (from Appendix B-3) for frequency and importance.

Mean	Frequency	Importance
1.00 to 1.24		16
1.25 to 1.49		34
1.50 to 1.74	3	11
1.75 to 1.99	7	
2.00 to 2.24	7	
2.25 to 2.49	6	
2.50 to 2.74	2	
2.75 to 2.99		
3.00 to 3.24	1	
3.25 to 3.49	3	
3.50 to 3.74	11	
3.75 to 3.99	6	
4.00 to 4.24	4	
4.25 to 4.49	9	
4.50 to 4.74	2	
4.75 to 4.99		
Total	61	61
Grand mean	3.2	1.4

Table 4.10.--Parallel grouped frequency distributions of coach behavior category means (from Appendix B-8) for frequency and importance.

Mean	Frequency	Importance
1.00 to 1.24		2
1.25 to 1.49		10
1.50 to 1.74		4
1.75 to 1.99	1	
2.00 to 2.24	3	
2.25 to 2.49	2	
2.50 to 2.74		
2.75 to 2.99		
3.00 to 3.24		
3.25 to 3.49	1	
3.50 to 3.74	1	
3.75 to 3.99	2	
4.00 to 4.24	2	
4.25 to 4.49	3	
4.50 to 4.74	1	
4.75 to 4.99		
Total	16	16

Table 4.11.--Results of analysis of variance for the frequency and importance data.

	SS	df	MS	F
Treatments (between)	44.65	1	44.65	26.9
Error (within groups)	477.55	287	1.66	
Totals	522.20	288		

In addition to the analysis of variance, a t-test showed that the difference in means between frequency and importance was statistically significant to an extreme degree (t = 14.75, whereas t at the 1% level with 288 degrees of freedom was just 1.645). For purposes of the guidelines, frequency and importance should continue to be considered separately.

Effective/Ineffective

In addition to frequency and importance, another category, effective/ineffective, required a similar analysis. The effective/ineffective analysis was carried out within frequency and importance and included (1) Pearson correlations for each of the individual coach behavior statement means, (2) Pearson correlations for each of the coach behavior category means, (3) differences between the means of the individual statements collectively, (4) differences between the means of the coach behavior categories collectively, (5) several one-way analyses of variance, and (6) t-tests of the significance of differences between means.

Table 4.7, which showed the Pearson r's for the individual statements for frequency and importance, also showed the Pearson r's for effective/ineffective. Columns labeled "Total Effective Behavior Statements" and "Total Ineffective Behavior Statements" in the table showed that effective behaviors were correlated higher with each other than were the ineffective behaviors. The difference between the means of these two columns was .36, which was significant at better than the 1% level.

The category Pearson r's between frequency and importance as reported in Table 4.8 also included the effective/ineffective category Pearson r's. Again, like the individual behavior results, the effective categories were more highly correlated with each other than were the ineffective categories. The difference between the means of these two columns was .45, which was significant at the 1% level.

The means for the effective and ineffective coach behavior statements (Appendix B-2) on both frequency and importance are presented in parallel grouped frequency distributions in Table 4.12.

An inspection of the two subtotal columns in Table 4.12 discloses that frequency means for the effective behaviors were significantly higher than those for ineffective behaviors. The difference was statistically significant to a high degree ($t = 6.94$, while t at the 1% level was 1.96). For the importance measure, the difference between effective and ineffective means was not significant ($t = .98$, while t at the 1% level was 1.96).

Table 4.12.--Parallel "grouped" frequency distributions of behavior statement means by frequency and importance for effective and ineffective prevention and effective and ineffective post-injury care.

Mean	Frequency					Subtotals		Total	Importance					Subtotals		Total
	Eff. Pre.	Inef. Pre.	Eff. PIC	Inef. PIC	Inef. Pre. & PIC	All Eff.	All Inef.		Eff. Pre.	Inef. Pre.	Eff. PIC	Inef. PIC	Inef. Pre. & PIC	All Eff.	All Inef.	
1.00-1.24								0	10	1	4	1		14	2	16
1.25-1.49								0	7	19	2	6		9	25	34
1.50-1.74	3					3		3	2	6		1	2	2	9	1
1.75-1.99	4		3			7		7								0
2.00-2.24	5		2			7		7								0
2.25-2.49	6					6		6								0
2.50-2.74	1		1			2		2								0
2.75-2.99								0								0
3.00-3.24					1		1	1								0
3.25-3.49		1		1	1		3	3								0
3.50-3.74		11					11	11								0
3.75-3.99		4		2			6	6								0
4.00-4.24		4					4	4								0
4.25-4.49		5		4			9	9								0
4.50-4.74		1		1			2	2								0
4.75-4.99								0								0
Total	19	26	6	8	2	25	36	61	19	26	6	8	2	25	36	61

Parallel frequency distributions of the means for the effective and ineffective categories on both frequency and importance, drawn from Appendix B-8, appear in Table 4.13. The table reveals that the effective and ineffective category means were significantly different for frequency but similar for importance. Appendix B-13 summarizes the significance of particular differences.

It should be mentioned that, before conducting the t-tests for significance of differences among the various means, a one-way analysis of variance was performed. (See Appendix B-10.) The analysis of variance indicated that it would be worthwhile doing the t-tests.

One interpretation of the effectiveness/ineffectiveness outcomes is that, in the frequency context, respondents to the criterion survey were willing and able to look back at their experiences with gymnastics accidents and report, with a good deal of discrimination, which coach behaviors they observed frequently and which ones less so. On the other hand, in the importance context, subjects were unwilling or unable to discriminate. Apparently all coach behaviors that had any role in preventing and leading to accidents were considered important to occur and/or not to occur.

Prevention/Post-Injury Care

Another analysis of the criterion survey dealt with the prevention/post-injury-care behaviors and categories of the study. In comparing the findings for the prevention and post-injury-care statements and categories, the same analyses were carried out as those

Table 4.13.--Effective and ineffective "grouped" frequency distributions of the coach behavior category means (from Appendix B-8).

Mean	Frequency					Subtotals		Total	Importance					Subtotals		Total
	Eff. Pre.	Inef. Pre.	Eff. PIC	Inef. PIC	Inef. Pre. & PIC	All Eff.	All Inef.		Eff. Pre.	Inef. Pre.	Eff. PIC	Inef. PIC	Inef. Pre. & PIC	All Eff.	All Inef.	
1.00-1.24								0	2					2		2
1.25-1.49								0	2	4	1	3		3	7	10
1.50-1.74								0	1	2			1	1	3	4
1.75-1.99	1					1		1								0
2.00-2.24	2		1			3		3								0
2.25-2.49	2					2		2								0
2.50-2.74								0								0
2.75-2.99								0								0
3.00-3.24								0								0
3.25-3.49					1		1	1								0
3.50-3.74		1					1	1								0
3.75-3.99		2					2	2								0
4.00-4.24		2					2	2								0
4.25-4.49				3			3	3								0
4.50-4.74		1					1	1								0
4.74-4.99								0								0
Total	5	6	1	3	1	6	10	16	5	6	1	3	1	6	10	16

previously reported for frequency and importance and effective and ineffective behaviors and categories.

Table 4.7 reporting the Pearson r's for the individual statements and Table 4.8 reporting the categorical Pearson r's revealed that the correlations for both the prevention and post-injury-care behaviors and categories were similar. The means for the prevention and post-injury-care statements and categories shown in the grouped frequency distributions in Tables 4.12 and 4.13 were also found to be similar in both frequency and importance.

The analyses of variance for prevention and post-injury care are summarized in Appendix B-12. The only findings regarding possibly significantly different prevention and post-injury-care responses occurred in the context of importance and ineffective behaviors. Subjects considered it more important that ineffective post-injury-care behaviors not occur than that ineffective coach prevention behaviors not occur. This finding approached significance at the 1% level in the analysis of variance.

Results of the t-tests are reported in Appendix B-13. The t-tests showed the differences in the means were not statistically significant at the 1% level. Thus it is difficult to make too much of the highly tentative finding stated in the preceding paragraph.

A review of the data concerning prevention and post-injury care suggested that this differentiation should probably be preserved. This distinction was also reflected in the gymnastics safety literature.

Coach Behaviors and Characteristics

One last kind of categorization intended to be helpful to coaches as they consider their safety behaviors concerned coach behaviors and characteristics. The seven categories under this heading emerged from the content analysis of incidents. In addition, these categories seemed meaningful to coaches. Schematic relationships among these categories as variables were shown in Table 4.3. The obtained means and N's for the groupings of these coach behaviors and characteristics within frequency/importance, effective/ineffective, and prevention/post-injury care are reported in Appendix B-11.

The previously reported analysis procedures that were performed on the seven categories were not carried out on coach behaviors and characteristics because the individual behaviors were not similar enough to permit drawing comparisons. Two analysis possibilities that were considered dealt with practice versus competition behaviors and coach behaviors toward the gymnast as compared with behaviors toward the equipment. However, behaviors that were observed during practice were for the most part different from those observed during competition, as was the case with behaviors toward the gymnast and the equipment. The few situational behaviors that were similar were too few in number to be able to perform stable analyses of variance or t-tests.

Further analyses of the data for coach behaviors and characteristics presented several difficulties. For one thing, a substantial proportion of the respondents who were officials rather than coaches may have been unable to observe in practice as much as in competition

situations, whereas coaches would have observed in both. Since the observations were different for these two groups, any analysis of the data for this set of variables was suspect. Few items for coach background and management made for response instability. Importance means were all quite similar, with nearly all behaviors considered important. The variability was so restricted as to make analysis unrewarding.

Notwithstanding the above-described difficulties of precise analyses of the data concerning coach behaviors and characteristics, cruder analyses were considered both possible and desirable. The practical issues of where to focus attention among the various coach behaviors and characteristics were thought to be so important to the profession that Tables 4.14 and 4.15 were developed to elucidate relevant findings.

Table 4.14 shows the most frequently occurring, the most important, and a combination of the most frequently occurring and the most important coach behaviors in each of the study's categories. For the most part, these turned out to be different rather than the same behaviors. However, the categories of coach behaviors in Table 4.15 were the same across frequency and importance. The most frequently occurring categories were also the most important to occur or not to occur in promoting safe gymnasium practices.

Validation

In the context of this study, validity refers to the degree of agreement between the outcomes of the critical-incident analysis and the criterion survey. To what extent did the criterion respondents

Table 4.14.--Individual coach behaviors: The most frequently occurring, most important to occur and/or not to occur, and a mix of the most frequently occurring and most important (numbers in parentheses reflect statement item number on the criterion instrument).

Most Frequently Occurring	Most Important to Occur or Not to Occur	Mix of the Most Frequently Occurring and the Most Important
Out of 19 Effective Prevention Behaviors:		
-Takes full advantage of safety aids and apparatus when teaching new movements. (5)	-Accurately senses the gymnast's physical condition in both practice and competition and does not let the gymnast do a movement for which he/she has reason to believe the gymnast does not have the strength, flexibility, or endurance. (9)	-Develops the gymnast's flexibility through having her do structured stretching exercises. (1) -Takes full advantage of safety aids and apparatus when teaching new movements. (5)
Out of 26 Ineffective Prevention Behaviors:		
-Assumes that the gymnasts warm up before and during practice and/or a meet on their own and does not make the effort to check that the gymnasts are warm, stretched out, and ready to move. (14)	-Neglects to adjust the equipment before warm-ups, practice, and/or competition to see to it that it is adjusted for each gymnast, especially at away meets where the equipment may be unfamiliar. (23)	-Rarely uses skill progressions or simply assumes that the gymnasts have mastered fundamentals or lead-up skills. (2) -Has had little experience or no formal or informal training and/or experience in coaching girls' gymnastics. (24)
Out of 6 Effective Post-Injury-Care Behaviors:		
-Stays in control while examining and treating an injury no matter how severe. (23)	-Stays in control while examining and treating an injury no matter how severe. (23)	-Stays in control while examining and treating an injury no matter how severe. (23)
Out of 8 Ineffective Post-Injury-Care Behaviors:		
-Has problems using taping to support weak body structures. (31)	-So that the meet can continue, tells the gymnast who has fallen hard to move immediately or even pulls the gymnast up to her feet before examining her. (28)	-Misses identifying a serious injury. (30)
Out of 2 Ineffective Prevention and Post-Injury-Care Behaviors:		
-Leaves it to someone else to arouse the community including the school administration to make progress toward solving such perennial problems as: too small an athletic budget to obtain or replace desperately needed equipment; insufficient amount of permitted practice time in the school schedule; too many meets in the season; too much pressure to win. (36)	-Leaves it to someone else to arouse the community including the school administration to make progress toward solving such perennial problems as: too small an athletic budget to obtain or replace desperately needed equipment; insufficient amount of permitted practice time in the school schedule; too many meets in the season; too much pressure to win. (36)	-Leaves it to someone else to arouse the community including the school administration to make progress toward solving such perennial problems as: too small an athletic budget to obtain or replace desperately needed equipment; insufficient amount of permitted practice time in the school schedule; too many meets in the season; too much pressure to win. (36)

Table 4.15.--Categories of coach behaviors: The most frequently occurring, most important to occur and/or not to occur, and a mix of the most frequently occurring and the most important.

Most Frequently Occurring	Most Important to Occur or Not to Occur	Mix of the Most Frequently Occurring and the Most Important
Out of 5 Effective Prevention Categories:		
-Coach behavior with respect to the equipment during both practice and competition.	-Coach behavior with respect to the equipment during both practice and competition.	-Coach behavior with respect to the equipment during both practice and competition.
Out of 6 Ineffective Prevention Categories:		
-Coach background.	-Coach background.	-Coach background.
Out of 1 Post-Injury-Care Category:		
-Coach behavior during both practice and competition.	-Coach behavior during both practice and competition.	-Coach behavior during both practice and competition.
Out of 3 Post-Injury-Care Categories:		
-Coach behavior during both practice and competition.	-Coach behavior during both practice and competition.	-Coach behavior during both practice and competition.
Out of Ineffective Prevention and Post-Injury-Care Category:		
-General coach behaviors that apply to both.	-General coach behaviors that apply to both.	-General coach behaviors that apply to both.

observe the safety behaviors that were reported by the predictor respondents? The criterion observers were not allowed to add to the list of behaviors in the predictor but were asked to report the degree of frequency and the degree of importance of these events, according to their experience. Validation is reported at the same two levels as the criterion survey results: behavior statements and categories.

Validation at the behavior-statement level (Appendix B-2) showed that all of the behaviors emerging from the predictor were reported as occurring with some degree of frequency. Earlier tables in this chapter showed a good deal of variability in frequency. Appendix B-2 also shows that criterion respondents considered all the behaviors important. There was much less doubt about importance than there was about frequency. The researcher concluded that there was a substantial degree of validity at the behavior-statement level. Because the critical incident analysis does not lend itself to the reporting of particularly quantitative data, the preceding data analyses represent about all that could be done in reporting validity at the statement level.

At the category level, validity concerns the degree to which the categories that were developed from the incidents level held up in analyses of the criterion survey. Four major categories were developed in this study: frequency/importance, effective/ineffective, prevention/post-injury care, and coach behaviors and characteristics. Of these four categories, frequency/importance emerged as a result of the criterion survey. The degree of frequency and importance did not

appear in the reports except for a few unsystematic, fleeting references. Therefore, frequency/importance is irrelevant here in a discussion of category validation.

Regarding effective/ineffective, criterion subjects saw these two categories as very different, as shown in Table 4.12 and Appendix B-10. Therefore, this category, with its origin in the history of critical incident technology and its support from the content analysis in this study, became a behavior categorization that was validated. Statistical analysis of the criterion survey demonstrated its existence in the sense that subjects regarded effective and ineffective as two quite different phenomena and therefore as two separate kinds of categories.

The criterion subjects appeared to accept prevention/post-injury care and coach behaviors and characteristics as categories. There is no reason to consider these two kinds of categorization in any way invalid.

At the coach-behavior-statement level, all of the behaviors were validated. However, the degree of importance of these behaviors was higher than their frequency. At the category level, all held up on the criterion subjects' acceptance grounds, with effective/ineffective on statistical grounds as well. In data that check recall with recognition, there is always a danger that the recall process suggested the material that was recognized. The investigator saw no means to control for suggestion effects in this research situation.

Safety Guidelines for Coaches

The more practical results of this study, the guidelines coaches may use to improve their safety behaviors, are presented next. The data did not permit the investigator to publish a single, ultimate set of guidelines. Rather, five sets of guidelines were developed. The users' values, purposes, and preferences will determine which set of guidelines to use. Probably no one set is better than any other. The first of these five sets of guidelines is based on the critical incidents analysis. The last four are based on criterion-survey analyses.

The first or predictor-based set of guidelines is presented in Appendix B-1. That set has the advantage of being shorter than the other four and not complicated by considerations of frequency and importance. However, not having frequency and importance built into a set of guidelines assumes that all the statements are of approximately equal frequency and importance or they would not have been included in the list. The criterion survey findings made frequency and importance information available, and one need not be content with guidelines that do not consider these aspects as fully as possible. On the other hand, since the items in the first set of guidelines were validated, a coach could feel reasonably comfortable about using them, even without frequency and importance information.

The remaining four sets of guidelines are based on criterion survey results, which include frequency and importance information. Items in the first three criterion-based sets are arranged within a

structure that takes into account the three basic variables used in this study: frequency/importance, effective/ineffective, and prevention/post-injury care. The fourth criterion-based set of guidelines reflects a similar use of the three basic variables but, in addition, has an item-by-item comparison of frequency and importance.

Details regarding the first three criterion-based sets are made clear by indicating that these sets are based on (1) frequency alone, (2) importance alone, and (3) a balanced mix of frequency and importance. For purposes of presentation, these first three criterion-based sets have identical internal organization, which is as follows. The appendix in which each guideline subset may be found is also indicated.

Appendix

An example of the balanced mix of frequency and importance for the effective prevention categories of coach behaviors is as follows:

Coach Behavior Categories that are Very Important and occur Very Frequently

1. Coach behavior with respect to the equipment during practice and competition.

Coach Behavior Categories that are Very Important and occur Frequently

1. Coach behavior toward the gymnast--mainly during practice.
2. Coach background.

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[a]III.B.3, "Effective Post-Injury Care," and 5, "Ineffective Prevention and Post-Injury Care--General Coach Behaviors," each contained but one topical heading; for this reason there was no way to incorporate these two into a frequency-importance matrix as described above in the text for the other variables.

Coach Behavior Categories that are Important and occur Frequently

1. Coach behavior toward the gymnast during both practice and competition.

Coach Behavior Categories that are Moderately Important and occur with Moderate Frequency

1. Coach management of coaching assistants.

The outline shows 15 clusters of behavior statements and 13 categories for a total of 28. Each cluster has a corresponding appendix that presents guidelines for coaches. Within each of the 28 clusters, the items are presented in order of frequency, importance, or both frequency and importance combined.

The only one of the three sets of clusters that needs further explanation is the combined balanced mix of frequency and importance. The balanced mix was arrived at by identifying the items in the top, middle, and lower thirds of frequency and importance and placing the items in the appropriate cell of the two-dimensional schematic matrix shown in Table 4.16.

Table 4.16.--Frequency-importance schematic matrix.

Importance	Frequency		
	Moderately Frequent (bottom 1/3 rankings)	Frequent (middle 1/3 rankings)	Very Frequent (top 1/3 rankings)
Very Important (top 1/3 rankings)			
Important (middle 1/3 rankings)			
Moderately Important (bottom 1/3 rankings)			

Table 4.17 shows the item numbers in the matrices that follow the schematic matrix, whereas Table 4.18 shows the corresponding information for categories.

In using the balanced-mix matrices and the guidelines that follow, coaches should be advised that the frequency items are well distributed; hence differences in frequency may be more meaningful than the less-well-distributed importance items. Criterion subjects were willing and/or able to say which behaviors occurred more and less frequently in their experience but were less willing and/or able to report which behaviors were more and less important. To these subjects, about all of the items were important.

Table 4.17.--Matrices: Balanced mix of frequency and importance (behavior statements).

Effective Prevention	Moderately Frequent (#'s 14-19)	Frequent (#'s 8-13)	Very Frequent (#'s 1-7)
Very Important (#'s 1-7)	12,17,18	6,8,9,11	1,5
Important (#'s 8-13)	19	10	4,16
Moderately Important (#'s 14-19)	3,13	2,7	14,15
Ineffective Prevention	**Moderately Frequent (#'s 19-26)**	**Frequent (#'s 10-18)**	**Very Frequent (#'s 1-9)**
Very Important (#'s 1-9)	6,18,23,25	13,19,22	2,24
Important (#'s 10-18)	4,11,12	5,17	1,3,14,16
Moderately Important (#'s 19-26)	7,10	8,9,21	15,20,26

Table 4.17.--Continued.

Effective Post-Injury Care	Moderately Frequent (#'s 5-6)	Frequent (#'s 3-4)	Very Frequent (#'s 1-2)
Very Important (#'s 1-2)		22	23
Important (#'s 3-4)	21		24
Moderately Important (#'s 5-6)	20	25	

Ineffective Post-Injury-Care	Moderately Frequent (#'s 7-8)	Frequent (#'s 4-6)	Very Frequent (#'s 1-3)
Very Important (#'s 1-3)	27,28		30
Important (#'s 4-6)		29,32,33	
Moderately Important (#'s 7-8)			31,34

Table 4.18.--Matrices: Balanced mix of frequency and importance (categories).

A. Effective Prevention	Moderately Frequent (#5)	Frequent (#'s 3-4)	Very Frequent (#'s 1-2)
Very important (#'s 1-2)		Coach behavior toward the gymnast--mainly during practice. Coach background.	Coach behavior with respect to the equipment during practice and competition.
Important (#'s 3-4)		Coach behavior toward the gymnast--during both practice and competition.	
Moderately important (#5)	Coach management of coaching assistants.		
B. Ineffective Prevention	**Moderately Frequent (#'s 5-6)**	**Frequent (#'s 3-4)**	**Very Frequent (#'s 1-2)**
Very important (#'s 1-2)	Coach behavior toward the gymnast--mainly during competition.	Coach behavior with respect to the equipment during both practice and competition.	Coach background.
Important (#'s 3-4)		Coach behavior toward the gymanst--during both practice and competition.	
Moderately important (#'s 5-6)	Coach management of coaching assistants.		Coach behavior toward the gymnast--mainly during practice.
D. Ineffective Post-Injury-Care[a]	**Moderately Frequent (#3)**	**Frequent (#2)**	**Very Frequent (#1)**
Very important (#1)			Coach behavior toward the gymnast--during both practice and competition.
Important (#2)		Coach behavior toward the gymnast--mainly during competition.	
Moderately important (#3)	Coach behavior toward the gymnast--mainly during practice.		

[a]As previously stated, C, "Effective Post-Injury Care," and E, "Ineffective Prevention and Post-Injury Care--General Coach Behaviors," each contained but one topical heading. For this reason there was no way to incorporate these two into a frequency-importance matrix. Therefore, these categories are not shown in the above matrices.

The fourth set of criterion-survey-based guidelines is presented in Appendices B-34 through B-49. The purpose of this set is to display behavior statements by frequency and their corresponding importance value. To complement the frequency data, Appendices B-34 through B-49 also present guidelines with behavior statements in the order of their rated importance, accompanied by notations of corresponding frequency values. Both sets of guidelines, those in the order of frequency with corresponding importance and those in the order of importance with corresponding frequency, are presented in clusters by major variables: effective/ineffective and prevention/post-injury care. Individual behaviors and categories are listed separately. The internal organization of these appendices is as follows:

Frequency and Importance Combined	Appendix
I. Individual Coach Behaviors	
A. Effective Prevention	
1. Frequency versus importance	B-34
2. Importance versus frequency	B-35
B. Ineffective Prevention	
1. Frequency versus importance	B-36
2. Importance versus frequency	B-37
C. Effective Post-Injury Care	
1. Frequency versus importance	B-38
2. Importance versus frequency	B-39
D. Ineffective Post-Injury Care	
1. Frequency versus importance	B-40
2. Importance versus frequency	B-41
E. Ineffective Prevention and Post-Injury Care	
1. Frequency versus importance and importance versus frequency (same ranks for both)	B-42

Summary

The initial discussion in this chapter involved a consideration of predictor and criterion reliabilities and a description of how validation of the predictor was attempted, both at the individual behavior statement level and at the category level. Results showed a satisfactory degree of validity at both levels.

The remainder of this chapter was devoted to a presentation and discussion of the safety guidelines that were developed in steps one, two, and three. Included were (1) one set of recall-based guidelines and (2) four sets of recognition-based guidelines that took into account frequency, importance, and a mix of frequency and importance for individual coach behaviors and categories of coach behaviors, as well as the variables: effective/ineffective, prevention/post-injury care, and coach behaviors and characteristics.

It is hoped the variety of guidelines presented will meet the various needs of gymnastics professionals as they attempt to improve the sport's safety practices.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The first of the two major sections in this final chapter contains both substantive conclusions and conclusions regarding the methods used in this study. The second major section is devoted to recommendations for further research and recommendations for using the safety guidelines generated in the study.

Conclusions

Substantive Conclusions

The findings of this study could mark an important milestone in the development of safe practices in high school girls' gymnastics. To date, research in this area has been characterized by two lines of activity: (1) traditional collection of opinions on what constitutes effective safety practices, leading to the writing of periodically revised safety guidelines and manuals and the content of safety classes and (2) epidemiological investigations in which statistical data are collected on selected accident factors. The opinion approach is used primarily to examine the importance of particular aspects of safety, whereas the epidemiological approach is employed to investigate the frequency with which accident factors occur. There has been little integration of findings regarding importance and frequency.

In contrast to these two rather separate methods of investigating safety problems, the present researcher, by using actual observations of problem safety situations made by substantial numbers of competent and interested accident observers, was able to collect information on both importance and frequency. Findings of the study provide integrated frequency and importance results for the first time.

Substantive research on the topic of gymnastics safety is broader based than the present study. Accumulative research covers a wide variety of factors that could play a role in causing accidents, such as the location of the injury on the athlete's body, type of injury, the skill that was being performed when the accident occurred, and the roles of various safety personnel including coaches, gymnasts, trainers, and sports physicians. The present study, however, was limited to just one aspect of this complexity, namely, the coach's behavior. This writer believed that, to make significant progress in improving safety practices, it is important to focus on the key person in the network of individuals involved in gymnastics safety: the coach. It is the coach who is in a position to make changes: to influence what each gymnast does out on the floor in both practice and competition, to relate to parents, to ask for improved equipment from administrators, and to participate actively in professional gymnastics affairs to improve safety practices. Although concentrating on the coach might be limiting, it can also facilitate greater practical progress in gymnastics.

In accord with the special features of this research, the writer attempted to identify and validate gymnastics safety guidelines that integrate across frequency and importance and to examine the coach's behavior. Further, in line with the increasingly widespread and rewarding practice of working guidelines and other practical aspects of work behavior in specific behavioral terms (e.g., use of behavioral objectives in training), the safety guidelines that resulted are behaviorally stated. A glance at currently available guidelines for gymnastics safety shows that some guidelines contain behaviorally worded statements, but the majority are stated nonbehaviorally.

Just as important as the prevailing conditions in substantive research on gymnastics safety was the method used to identify coach safety behaviors. A technique was available that could produce the kinds of guidelines described above--guidelines that focus on one key role player (in this case the coach) and are expressed in specific, behavioral terminology. This method was the critical incident technique. Since World War II, the critical incident technique has been used effectively in various fields to identify the effective and ineffective behaviors of employees in specific problem situations (e.g., near accidents in airplanes, industrial accidents). However, as far as could be determined, this method had not yet been applied to safety in gymnastics or other sports.

The task of carrying out the critical incident method first necessitates collecting observations made by competent observers of critical incidents in the area under investigation. In this case, the

observations concerned the safety behaviors of high school girls' gymnastics coaches. The term "critical" describes incidents that make a real difference in causing a problem and/or preventing a problem from occurring. Since descriptions of such incidents usually cannot be collected at the moment those incidents occur, they are normally obtained by asking observers to recall the circumstances. The term "recall," used in the first of the two steps in the critical incident method, is derived from observer recall. As an essential component of the first step, these recalled incidents are content analyzed into a list of specific behaviors.

The second of the two steps is called recognition. As one method of validating the recall-derived behaviors, the recalled behaviors are given in survey form to a second, independent, and equally competent group of observers. The members of this second group are asked to check the frequency and importance of each behavioral statement. The extent to which the behavioral statements are judged to be frequent and important serves as a measure of the degree of validity of the recall-derived behaviors. This follow-up process is termed recognition because the second group of observers is asked to recognize the frequency and importance of each behavior but not the details of original experiences.

To put this two-step process in another context, the product of the recall procedure yields predictor information, whereas the product of the recognition procedure provides criterion information.

Determining the extent to which the criterion information confirms the predictor information is a form of validation.

In accordance with classical critical incident procedures, the recall and recognition steps outlined above were followed in this study. Each recall and recognition step was checked with appropriate reliability measures before proceeding to the next step. In each instance, reliabilities generally were found to be more than adequate considering the exploratory nature of the study.

Validity is more complex to describe because it must be considered at two levels: (1) the individual behavioral statements or guidelines for coaches, of which 61 emerged from the analysis of the study data; and (2) the categories into which the individual behavior statements are organized. Sixteen categories were formulated. Specific behavioral statements were considered important because these statements tell coaches what to do to improve their safety practices. Categories of the statements were considered important because it is difficult for guideline users to remember and apply large numbers of miscellaneous statements. Organization of the behaviors into categories helps in recalling and applying the guidelines.

Validation Findings

In the first level of validation, that of the behavior statements, all 61 of the statements generated by the content analysis were evaluated by a second, independent group of observers as occurring with some degree of frequency and being of some importance. Frequency, however, was found to vary much more than importance.

Concerning the second level, or category validation, the findings are reported separately for each of the four categories used in this study. The first of these categories is effective/ineffective. This category was built into the study because of lessons learned in earlier applications of critical incident methodology. Researchers using this methodology found long ago that observers reported incidents of both effective and ineffective behaviors. From the beginning of all data collection in this study, the effective/ineffective dichotomy was used. The content analysis of the critical incidents identified 25 effective behaviors and 36 ineffective behaviors. Evidently effective coach behaviors were less readily identified than coach mistakes. When the second group of observers became involved in using the effective/ineffective category, they reported that effective behaviors were much more frequently observed than ineffective ones. In addition, the effective and ineffective coach behaviors were of about equal importance. In other words, for the observers, coaches were practicing more effective behaviors than ineffective behaviors even though fewer effective than ineffective behaviors were cited.

The second category of behavior statements dealt with accident prevention in contrast to post-injury care. This distinction is a chronological one and is reflected in the safety literature in gymnastics. Entire articles have been focused on prevention and others on post-injury care. This distinction was built into the instructions to subjects who were asked to report critical incidents. The analysis of incidents showed that those incidents involved mostly prevention,

mostly post-injury care, or both. One can conclude that the chronological distinction made sense to both the predictor and criterion observers. The statistical analysis of the criterion group reports indicated a slight suggestion that observers considered it more important that ineffective post-injury-care behaviors rather than ineffective prevention coach behaviors not occur.

The third category of behavior statements was concerned with coach behaviors and characteristics. This category was formulated primarily from the collected incidents and referred to such factors as what the coach did differently in practice as compared to competition situations, and coach behaviors toward the gymnast as compared with the equipment. Despite the professional interest in these somewhat situational factors, the study data did not provide satisfactory insights.

The fourth category of behaviors pertained to frequency and importance. This distinction was not made in the instructions to the group of observers who were asked to recall critical incidents. The researcher wanted to avoid prejudicing the observers regarding frequency and importance. However, these two dimensions, to which critical incident methodology has long accorded much importance, were included in the instructions to the second observer group. This group was in the best position to scrutinize the entire list of behaviors generated from the critical incidents and to report on frequency and importance.

Findings indicated that frequency and importance among effective coach behaviors were significantly more likely to correlate

with each other than were frequency and importance among ineffective coach behaviors. On the whole, frequency and importance were sufficiently different from each other that, despite the practical advantages of combining them and providing simpler safety guidelines, grounds for doing so were inadequate.

Regarding the four types of categories, the researcher concluded that all four should be maintained and worked with in presenting behavioral guidelines to coaches and other potential users. Their validity tended to be supported.

Safety Guidelines for Coaches

Five sets of guidelines were developed from the recall and recognition analyses. All five are presented in their entirety in the following appendices: Set 1--Appendix B-1; Set 22--Appendices B-15 through B-20; Set 3--Appendices B-21 through B-26; Set 4--Appendices B-27 through B-33; and Set 5--Appendices B-34 through B-49. Each set of guidelines comprises a list of behaviors classified into the four behavioral categories.

It was not possible to develop one, all-encompassing set of guidelines. Each of the five sets of guidelines was seen to have uniquely valuable characteristics, as described in the following paragraphs.

Set 1, Appendix B-1, comprises 61 behaviors. It is based solely on the content analysis of the critical incidents. Because this

set does not distinguish between frequency and importance, it is only half as long as the recognition-based guidelines.

Set 2, Appendices B-15 through B-20, concerns frequency alone. Those primarily interested in epidemiological research are most likely to use this set of guidelines.

Set 3, Appendices B-21 through B-26, concentrates on importance alone. This set is the one that gymnastics practitioners such as coaches and athletic directors will probably use the most.

Set 4, Appendices B-27 through B-33, represents an attempt to integrate both frequency and importance. This set lists grouped behaviors and categories that were both most frequent and most important, down to those that were least frequent and least important.

Set 5, Appendices B-34 through B-49, includes frequency and importance for each coach behavior to facilitate comparison across frequency and importance.

Throughout all sets of guidelines, an attempt was made to incorporate the study's major categories: frequency/importance, effective/ineffective, prevention/post-injury care, and coach behaviors and characteristics. These categories were designed to make the guidelines more understandable and usable.

Conclusions Regarding Methods

The refinement of methods involved in the recall, content analysis, and recognition of critical incidents was not a primary goal in this study. Nevertheless, the apparent novelty of some of the situations encountered in the study incidentally led to the refinement

of methods not reported in the literature concerning the critical incident technique. To benefit others using the critical incident method, those refinements are discussed in the ensuing paragraphs.

The refinements fell into three categories: (1) overall--that is, applying to recall or content analysis and the recognition phases of data processing; (2) applying only to content analysis of the critical incidents; and (3) applying only to validation.

Overall methods. Getting enough qualified observers to recall critical incidents and then to recognize them is always a problem. One tactic found to be useful in this study was to include judges at competitive meets as observers. Judges could well serve as additional competent observers to obtain critical incidents in other sports that use judges. One drawback of using judges is that they are not in as good a position as coaches and some other types of observers such as gymnasts to observe appropriate critical incidents that take place during practice sessions.

It was difficult to recruit gymnasts as observers except through their coaches. Gymnasts were often reluctant to report on their coaches if they though the coaches might read their critical incident reports, especially those describing ineffective behaviors.

Related to the above consideration was the difficulty in getting observers to report incidents, especially those dealing with ineffective behaviors. Much care went into motivating observers to participate in this study. State leaders in professional gymnastics supported the research and stressed its importance. Anonymity of

responses was promised and scrupulously observed. On the whole, a cooperative climate emerged.

Another problem was reaching the predictor respondents by mail, especially high school coaches and gymnasts. Because the survey was mailed at the end of the competitive season, the investigator experienced the following difficulties: (1) most of the coaches were discovered to be part-time employees and no longer were employed by the high school when the surveys and/or the follow-up materials arrived, and (2) the gymnasts were often participating on other sports teams and were not in contact with their gymnastics coaches. As a result, the predictor instrument did not reach all of the potential respondents.

Content analysis of the critical incidents. In much of the previous research in which content analysis of critical incidents was reported, just one behavior statement generally emerged from each critical incident. One can then obtain frequency counts for each behavior statement. In this study, critical incidents were often too complex to yield just one behavior. Two or more behaviors often were derived from a single complex incident. For example, a given incident might have described ineffective accident prevention but also reported effective post-injury care. In addition, some incidents might have reported completely on practice situations, others completely on competition, and still others on both practice and competition. The specificity of reports also varied widely. Under these circumstances it was not possible to obtain frequency counts of behaviors in the recalled incidents, and it was not easy to determine interrater

reliability. One solution was to check the quality of the content analysis by having each analyzer independently report whether she had found evidence for each behavior statement somewhere in the mass of critical incidents.

Validation. To assure comparability across the predictor and criterion groups of observers, the same cover letter providing motivation to participate and instructions was used. Further, identical demographic data were collected from each group and then compared. Comparison data were reported in Chapter III.

How to validate also presented difficulties. The predictor list or content-analysis results were in highly verbal form, whereas the criterion list or survey-data results were highly quantitative. One solution to this problem was to ascertain the extent to which each recall-generated behavior was supported by the recognition observers as they reported the frequency and importance of each recall-generated behavior. As stated earlier in this chapter, each behavior statement was reported as occurring with some frequency and as having some importance.

Recommendations for Further Research

The following recommendations for further research include both substantive and methodological suggestions. Substantive suggestions fall into two broad classes: (1) extensions of the data base and (2) other types of validation beyond the type used in this study.

Substantive Suggestions

Extensions of the data base. A number of data-base extensions exist for both the predictor and criterion instruments:

1. Another predictor study using this investigation's predictor instrument with high school coaches, athletic directors, officials, and gymnasts could be conducted in other states and/or in foreign countries to collect additional coach safety behaviors and add them to the present guidelines.

2. Another validation study using this research's criterion instrument could be conducted in other states and/or in foreign countries to determine to what extent the results of the present study are generalizable. State, regional, and/or international similarities and differences could be explored.

3. Both the predictor and criterion instruments developed in this study could be used in the same states in one year, five years, or ten years to determine trends and changes in the safety practices of high school girls' gymnastics coaches.

4. The predictor instrument could be extended to different observers of high school girls' gymnastics from those used in this study (e.g., assistant coaches, athletic trainers, sports physicians) to collect additional observations of safety behaviors.

5. The predictor instrument could be used at other levels of gymnastics (e.g., private club, college, elite), both male and female, to identify the effective and ineffective safety behaviors of coaches. These data could then be compared with the findings of this study to

determine similarities and differences between coach safety behaviors at the two levels of gymnastics.

6. The critical incident technique should be used in other sports (e.g., football, basketball, wrestling, softball), both male and female, to identify the effective and ineffective coach safety behaviors taking place in those sports. Because the critical incident technique employed in this study was effective in collecting and identifying the safety behaviors of gymnastics coaches and this technique has been successfully applied in a number of other fields in which accidents have taken place, it is time that the technique be applied to the sports area. Once the behaviors that prevent or cause sports accidents are identified through empirical research using the critical incident technique, better safety guidelines can be developed, implemented, and evaluated in an effort to reduce the occurrence and severity of sports injuries.

7. The critical incident technique should be used in conjunction with the findings of epidemiological research. Those accident factors that sports epidemiology researchers have found occurring frequently could be used as a basis for further research using the critical incident technique. For example, in 1984 Sands found collegiate female gymnasts weighing 125.5 pounds had more accidents than those weighing less. The critical incident technique could be used to survey the observations of gymnasts who fit this description. Respondents could be asked to recall and report the behavioral details of such

accidents. The data could then be analyzed and added to the existing data base produced through by epidemiological approach.

Other types of validation. Long-term direct validation and indirect predictive validation with the study findings could prove useful.

1. Another study could be conducted with an experimental and a control group of high school girls' gymnastics coaches. The experimental group would be trained in the safety behaviors developed in this study, whereas the control group would continue with their present safety practices using the information normally available to them. After a year or two of data collection, the two groups of coaches could be compared as to the number of accidents occurring to gymnasts under their tutelage.

2. The principles developed in this study could have a wide range of uses in personnel administration: coach selection, periodic evaluation, training, and motivation. Validation data could be used in ascertaining whether the principles helped reduce accidents.

Methodological Suggestions

1. Because the criterion observers reported that almost all of the behaviors were important and did not denote the degree of importance of the behaviors, future validation studies should use a forced-choice format for responses rather than the free-choice format employed in this research. Observers would be required to assign high, moderate, and low importance ratings to a fixed proportion of their

responses. In this way it would be possible to obtain a better idea of which behaviors are very important and which ones less so.

2. Because of the difficulties encountered that were directly related to the timing of the data collection, it is suggested that future researchers in girls' high school gymnastics mail surveys at the beginning of the sports season. This would ensure that coaches receive their surveys at the high school when they are most likely to be there coaching their teams, and the gymnasts could more readily be reached by their coaches and asked to participate in the study.

Recommendations for Use of the Safety Guidelines

The five sets of safety guidelines developed in this study can be used in a variety of ways by gymnastics practitioners.

1. High school girls' gymnastics coaches can use the safety lists to assess their own safety practices, to become more aware of their safety responsibilities, and, if necessary, to obtain further training in their areas of weakness.

2. High school girls' gymnastics coaches can also use the safety lists to evaluate, train, and/or retrain their assistant coaches and other support personnel affiliated with the team.

3. Athletic directors at the high school and college levels, as well as owners of private gymnastics schools, can use the safety guidelines as the basis of interview questions to better assess the safety behaviors of potential coaches.

4. Evaluators of gymnastics coaches can use the safety guidelines as checklists in assessing the safety practices of their coaches. Coach behaviors exhibited in practice and/or competition could be observed and checked off the safety lists. As a result, appropriate administrative actions could be taken: giving recognition and/or a merit raise to coaches displaying effective safety behaviors, suggesting and/or offering further training to coaches who display weaknesses, and terminating coaches who display an overabundance of ineffective safety behaviors and refuse to improve their safety practices.

5. Trainers of gymnastics coaches can use the guidelines as a base on which to develop and direct a coach-training curriculum. For example, the effective frequency and importance safety lists can be used by trainers to design, implement, and evaluate the needed educational experiences to which future coaches need to be exposed. A behavior-based training curriculum would help ensure that trainees know what behaviors are expected of them, how to prevent accidents from occurring in the first place, and where they need additional training.

It is suggested that each gymnastics practitioner carefully review all five sets of safety guidelines before selecting a safety list or lists to follow.

APPENDICES

APPENDIX A

SURVEY INSTRUMENTS AND RELATED CORRESPONDENCE

APPENDIX A-1

CONSENT AGREEMENT

The study has been fully explained and I freely consent to participate in it under the following terms: the respondent can discontinue at any time without recrimination; the results will be treated with the strictest confidence; and the respondents will remain anonymous.

(Signature) _____

(Date) _____

*Note

In describing the coaching incident behaviors please do not write the name(s) of the coach, gymnast, specific high school, or city the incident took place in.

To: Gymnasts

PARENT CONSENT FORM

Gymnast Minors

If you are 17 or younger your parents or guardian must give their consent before you can participate in the study. Please have them review the survey and sign their names below if they agree to your involvement in this gymnastics research. Return this form with your reports.

_____

We give our consent to let our daughter participate in this gymnastics research. She has our permission to complete the critical incident forms and personal data sheet that were given to her by the head girls gymnastics coach.

(Name) _____

(Date) _____

To: High School Athletic Directors, Girls Gymnastics Coaches, and selected girl gymnasts in Michigan

No one ever wants to see a high school girl get injured who's just been putting everything she's got into gymnastics. Unfortunately, the best available information is that injuries in the sport are rising with the increase in both the numbers of participants and the difficulty level of the routines (Bowers, Fie, Schmidt, 1981).

There is every reason to believe you are in a good position to provide information that could eventually lead to a reduction in these unwanted injuries. The research project, of which this letter is a part, is aimed at developing this injury reduction information. This project involves not just another round of collecting random opinions about this important matter. Instead, it involves going directly to athletic directors, coaches, and the girls themselves and asking them to make systematic reports of their actual observations of injuries: the situation in which the injury occured, the injury itself, and the aftermath. The observations are to include both prevention and care of these athletic injuries. Once enough of these observations have been collected, they will be objectively (and anonymously) analyzed to discover what the actual facts are about these injuries. Once the facts become available, our profession and gymnastics participants will be in a stronger position to work out what injury-reducing steps to take. (Incidentally the method described above has been successfully applied to other safety problem areas, e.g., reduction of airplane accidents--it could be time that we, in gymnastics, take advantage of the method to make some progress toward handling our own increasingly embarassing common problem.)

Mr. Vern Norris, Executive Director for the Michigan High School Athletic Association, and Mrs. Susanne Martin, Assistant Director, support this research.

At first the project is limited to data collection in the state of Michigan only. If resources and the Michigan results justify it, the project could be extended to other states. Every effort will be made to help our sport take full advantage of any outcomes of this research.

Each questionnaire has a code number in the upper right hand corner. This will be used to identify those respondents that have not answered the survey so the investigator can send follow up materials. The data that you provide will be kept confidential.

Now, here's where you come in!

Instructions

1. Enclosed are copies of two simple forms which are designed mainly to help you clearly report your observations. One form asks you to report an incident in which the coach, the almost injured or actually injured girl, or one or more other observers who happened to be nearby did something that was especially effective in either preventing an injury or in caring for the injury after it happened. The second of the two forms asks for an incident in which whoever was involved did something (or maybe not enough) that was particularly ineffective (though often well meant) in either preventing an injury or in caring for the injury after it happened.

2. Please try to report as many incidents as there are copies of forms enclosed (3). If you honestly have not observed any of the kinds of incidents needed, then obviously you have nothing to report. Nevertheless, even if you have observed just one incident, that incident is of great value to our understanding of gymnastics injuries and the hope is that you will report it. If you happen to have observed more incidents than the number of forms enclosed, then only report the most serious ones up to the three forms enclosed. Even if you have observed no reportable incidents, please fill out the personal data on the last pages of these materials. Your answers will give us a clearer idea of the rate of these injuries in Michigan.

3. Once you have written your reports, put them in the self-addressed, stamped envelope and get them to me as soon as you can.

Sincerely,

Barbara McKenzie-Hamilton
Assistant Women's Gymnastics Coach, Univ. of Iowa
Doctoral Candidate, Michigan State University
(work) (319) 353-7288.
(home) (319) 338-8939.

PERSONAL DATA

Once you have finished writing your reports, please tell us enough about yourself to help us see where you are coming from as you wrote your reports.

1.I am (check one):
_____High School Athletic Director _____High School Gymnast
_____High School Gymnastics Coach _____Other (Please Describe)
_____

2.Enrollment size of your high school (check one):
_____300 or less students _____1000-2499 students
_____300-599 students _____2,500-4,999 students
_____600-999 students _____more than 5,000 students

3.Your sex (check one):
_____Female _____Male

4.Your age (check one):
_____Over 35 _____20-24
_____30-34 _____Under 20
_____25-29

5.How many years have you been athletic director and/or coach at the high school level at your present high school or any other?_____

(If a high school student, please write a 0. However, at this point tell us that you either
_____have several years of gymnastics experience.
_____are a relative newcomer to girls gymnastics with only about a year's experience.)

6.Your highest level of education to date (check one):
_____Have a graduate degree (M.A., M.S., Ph.D., etc.)
Major_____ Minor_____
_____*B.A. plus some graduate credit
Major_____ Minor_____
_____*B.S. or equivalent
Major_____ Minor_____
_____College or University but not a B.A.
Major_____ Minor_____
_____High School Graduate
_____High School Student but not yet graduated

*If you have a graduate degree, also please show your undergraduate major and minor(s).

7.Briefly describe any first aid training you might have had:
_____
_____
_____
_____

(Over)

8.Any formal classes or informal experiences that have proved particularly effective in helping high school girls gymnastics coaches prevent or take care of gymnastics injuries?_____
_____
_____
_____

9.The primary concern of this project is to obtain facts. If revealing your identify in any way could keep you from having described incidents as you really saw them, then do not answer any of the following.
Your name and mailing address:_____
_____
_____
Name of your high school:_____

In my report, may I list your high school as having cooperated in providing data?(check one): _____Yes _____No

Would you like a copy of the research report?(Be sure you have given your name and address above) (check one):_____Yes _____No

Reminder: Please return the materials in the enclosed, self-addressed, stamped envelope to:
Barbara McKenzie-Hamilton
University of Iowa
110 Halsey Gymnasium
Iowa City, Iowa 52242.

Consent Agreement

The study has been fully explained and I freely consent to participate in it under the following terms: the respondent can discontinue at any time without recrimination; the results will be treated with the strictest confidence, and the respondents will remain anonymous.

_____
(Signature)

_____
(Date)

OBSERVATION OF ESPECIALLY EFFECTIVE BEHAVIOR

Your observation: Think back over the current academic year (1982-1983) beginning last August or September. Write your observation in the spaces provided below. Your report is to focus on the behavior of someone (or several persons) who displayed especially effective behavior in preventing and/or caring for a gymnastics injury or interrelated cluster of injuries. An incident could involve but not be limited to one or more of the following: the gymnasium set-up including the equipment, the gymnast's preparation in performing skills, the coach's preparation for coaching girls gymnastics, something that just happened, etc. It will be especially helpful, in reporting your incident, to include something of what the coach was doing even if not directly involved since coaches are assumed to have some responsibility in these situations.

A. What was the situation or background in which the injury almost occurred or did occur, the circumstances, the antecedents?:

B. What did you personally observe actually happening as the near or actual injury was taking place and/or was being cared for afterwards?:

C. What was the aftermath or consequences, if any, of the near or actual injury?:

When you have finished writing this incident, please circle one:
This incident in my opinion primarily involved: A- PREVENTION
B-POST-INJURY CARE

Did you remember to include in your story what the coach was doing?

THANK-YOU!

OBSERVATION OF ESPECIALLY INEFFECTIVE BEHAVIOR

Your observation: Think back over the **current academic year (1982-1983)** beginning last August or September. **Write out your observation in the spaces** provided below. Your report is to **focus on the behavior of some one** (or several persons) who displayed **especially ineffective behavior in preventing** and/or caring for a gymnastics injury **or interrelated cluster of injuries.** An incident could involve but not be **limited to one of more of the following:** the gymnasium set-up including the **equipment, the gymnast's preparation in** performing skills, the coach's **preparation for coaching girls gymnastics,** something that just happened, etc. **It will be especially helpful, in** reporting your incident, to include **something of what the coach was doing** even if not directly involved since **coaches are assumed to have some** responsibility in these situations.

A. What was the situation or background in which the injury almost occurred or did occur, the circumstances, the antecedents?:

B. What did you personally observe actually happening as the near or actual injury was taking place and/or was being cared for afterwards?:

C. What was the aftermath or consequences, if any, of the near or actual injury?:

When you have finished writing this incident, please circle one:
This incident in my opinion primarily involved: A- PREVENTION
B-POST-INJURY CARE

Did you remember to include in your story what the coach was doing?

THANK-YOU!

May 18, 1983.

Dear Athletic Director,

This is just a note to remind you that the mail questionnaire you received a few weeks ago on the validated competencies of coaches in preventing and caring for injuries to high school girl gymnasts is still needed.

Your identification of critical incidents will allow this project to be extended to other states to further develop this injury reduction information.

Please complete the questionnaire and sent it back to me as soon as possible.

Sincerely,

Barbara

Barbara McKenzie-Hamilton
Ph.D. Candidate, Michigan State University
(319) 353-7288 - Work; (319) 338-8939 - Home.

June 2, 1983.

Dear Athletic Director,

Perhaps you have forgotten to complete the mail questionnaire that was sent to you about a month ago or have misplaced it. It is extremely important to the success of this validation study on competencies of high school girls gymnastics coaches in preventing and caring for injuries to receive the questionnaires as soon as possible.

Enclosed you will find another copy of the cover letter, questionnaire, and self addressed, stamped return envelope. Could you please fill these out and return them?

Your assistance is needed to identify important competencies for high school girl gymnastics coaches as well as obtain a 100% return response. The questionnaire takes about a half an hour or less to complete.

Thank you.

Sincerely,

Barbara Mc Kenzie - Hamilton, M.A.
Assistant Women's Gymnastics Coach, University of Iowa
Ph.D. Candidate, Michigan State University
(319) 353-7288 - Work.

June 2, 1983.

Dear Coach,

Perhaps you have forgotten to complete the mail questionnaire that was sent to you about a month ago or have misplaced it. It is extremely important to the success of this validation study on competencies of high school girls gymnastics coaches in preventing and caring for injuries to receive the questionnaires as soon as possible.

Enclosed you will find two copies of the cover letter, questionnaire, and self addressed, stamped return envelope. Please keep one questionnaire for yourself and distribute the other to a selected gymnast leader who has had a range of gymnastics experiences.

Your assistance is needed to identify important competencies for high school girls gymnastics coaches as well as obtain a 100% return response. The questionnaire takes about a half an hour or less to complete.

Your input into this research is essential to ensure the success of the study.

Thank you.

Sincerely,

Barbara Mc Kenzie - Hamilton, M.A.
Assistant Women's Gymnastics Coach, University of Iowa
Ph.D. Candidate, Michigan State University
(319) 353-7288.

APPENDIX A-2

To: High School Girl's Gymnastics Officials in Michigan

No one ever wants to see a high school girl get injured who's just been putting everything she's got into gymnastics. Unfortunately, the best available information is that injuries in the sport are rising with the increase in both the numbers of participants and the difficulty level of the routines (Bowers, Fie, Schmidt, 1981).

There is every reason to believe you are in a good position to provide information that could eventually lead to a reduction in these unwanted injuries. The research project, of which this letter is a part, is aimed at developing this injury reduction information. This project involves not just another round of collecting random opinions about this important matter. Instead, it involves going directly to gymnastics officials and asking them to make systematic reports of their actual observations of injuries: the situation in which the injury occured, the injury itself, and the aftermath. The observations are to include both prevention and care of these athletic injuries. Once enough of these observations have been collected, they will be objectively (and anonymously) analyzed to discover what the actual facts are about these injuries. Once the facts become available, our profession and gymnastics participants will be in a stronger position to work out what injury-reducing steps to take. (Incidentally the method described has been successfully applied to other safety problem areas, e.g., reduction of airplane accidents--it could be time that we, in gymnastics, take advantage of the method to make some progress toward handling our own increasingly embarassing common problem.)

Mr. Vern Norris, Executive Director for the Michigan High School Athletic Association, and Mrs. Suzanne Martin, Assistant Director support this research.

At first the project is limited to data collection in the state of Michigan only. If resources and the Michigan results justify it, the project could be extended to other states. Every effort will be made to help our sport take full advantage of any outcomes of this research.

Each questionnaire has a code number in the upper right hand corner. This will be used to identify those respondents that have not answered the survey so the investigator can send follow up materials. The data that you provide will be kept confidential.

Now, here's where you come in!

Instructions

1. Enclosed are copies of two simple forms which are designed mainly to help you clearly report your observations. One form asks you to report an incident in which the coach, the almost injured or actually injured girl, or one or more other observers who happened to be nearby did something that was especially effective in either preventing an injury or in caring for the injury after it happened. The second of the two forms asks for an incident in which whoever was involved did something (or maybe not enough) that was particularly ineffective (though often well meant) in either preventing an injury or in caring for the injury after it happened.

2.Please try to report as many incidents as there are copies of forms enclosed. If you honestly have not observed any of the kinds of incidents needed, then obviously you have nothing to report. Nevertheless, even if you have observed just one incident, that incident is of great value to our understanding of gymnastics injuries and the hope is that you will report it. If you happen to have observed more incidents than the number of forms enclosed, then only report the most serious ones up to the two forms enclosed. Even if you have observed no reportable incidents, please fill out the personal data on the last pages of these materials. Your answers will give us a clearer idea of the rate of these injuries in Michigan.

3.Once you have written your reports, put them in the self-addressed, stamped envelope and get them to me as soon as you can.

Sincerely,

Barbara Mc Kenzie-Hamilton
Doctoral Candidate, Michigan State University
High School and Class I Girl's Gymnastics Official
(Home) 313-752-6418.

PERSONAL DATA

Once you have finished writing your reports, please tell us enough about yourself to help us to see where you are coming from as you wrote your reports.

1.I am a (check one):
_____High School Girl's Gymnastics Official
_____High School Girl's Gymnastics Official and a U.S.G.F. Official

2.Your sex (check one):
_____Female _____Male

3.Your age (check one):
_____Over 35 _____25-29 _____Under 20
_____30-34 _____20-24

4.How many years have you judged high school girl's gymnastics? (check one):
_____1 year _____3 years _____5 or more years
_____2 years _____4 years

5.Are you involved with any Michigan high school girl's gymnastics team in any other capacity than an official?
_____Yes _____No

(If you answered Yes to question #5 then proceed to question #6.
If you answered No to question #5 then proceed to question #7.)

6.In what other capacity are you involved with a Michigan high school girl's gymnastics team? (check the appropriate response or responses below):
_____coach
_____choreographer
_____critique routines before competition begins
_____other (Please Describe)_____

7.Your highest level of education to date (check one):
_____Have a graduate degree (M.A., M.S., Ph.D., etc.)
Major_____ Minor_____
_____*B.A. plus some graduate credit
Major_____ Minor_____
_____*B.S. or equivalent
Major_____ Minor_____
_____College or University but not a B.A.
Major_____ Minor_____
_____High School Graduate

*If you have a graduate degree, also please show your undergraduate major and minor(s).

8.The primary concern of this project is to obtain facts. If revealing your identity in any way could keep you from having described the incidents as you really saw them, then do not answer any of the following.
Your name and mailing address:_____
_____
_____

(Over)

In my report, may I list your name as having cooperated in providing data? (check one): _____Yes _____No

Would you like a copy of the research report? (Be sure you have given your name and address above) (check one): _____Yes _____No

Reminder:
Please return the materials in the enclosed, self-addressed, stamped envelope to:

Barbara Mc Kenzie-Hamilton
90 West Predmore Road
Lake Orion, Michigan 48035.

July 18, 1983.

Dear Gymnastics Official,

This is just a note to remind you that the mail questionnaire you received a few weeks ago on the validated competencies of coaches in preventing and caring for injuries to high school girl gymnasts is still needed.

Your identification of critical incidents will allow this project to be extended to other states to further develop this injury reduction information.

Please complete the questionnaire and sent it back to me as soon as possible.

Thank you!

Barbara Mc Kenzie-Hamilton (319) 752-6418.
Ph.D. Candidate, Michigan State University

APPENDIX A-3

February 6, 1984.

Dear Illinois High School Girls Gymnastics Coach and/or Official,

Here are some critical incidents that have recently happened in our sport:

The gymnast was performing a front scale catch between the low and high bar in her competitive routine. She missed catching the high bar on the release. Her coach, standing nearby anticipating her every movement, sensed a "miss" in the routine and immediately stepped in to catch the gymnast in his arms. Carefully he reassured her and set her back to her feet.

During warm ups the coach was heavily spotting a gymnast on a handspring front vault. The coach told the gymnast that she could do the vault by herself in the meet and instructed her to go for the vault and stop being such a baby about the stunt. The gymnast did the vault during competition and landed on her head. She was immediately taken to the hospital by ambulance.

During a balance beam routine the gymnast attempted a cartwheel. She missed the beam with her arm and fell. This resulted in a compound fracture, a severe break, in the forearm. The coach immediately took charge and air splinted the arm, exhibiting excellent first aid techniques. Additionally the coach kept everyone calm including the injured gymnast.

The gymnast was doing a sole circle on the low bar and her hands slipped. When she landed she put her arm out behind her. Several snapping sounds were clearly heard. The coach became totally unglued. The coach screamed and backed away from the gymnast who was in intense pain and bleeding. The gymnast's arm was deformed and had several splinters of bone sticking out. Because of the coach's behavior the entire team started to cry and wail. Meanwhile the hurt girl was still lying on the mat. I realized that the coach was not going to do anything so I quickly stepped in and followed proper first aid procedures.

In warm ups at a meet I noticed that the uneven bars were loose and brought this to the attention of the home coach. She explained that it was too difficult to adjust the bars to correct the problem so the bars were left untouched. My gymnast was in the middle of her routine when one screw in the mount pulled free from the floor plate causing the bars to collapse. The gymnast was thrown to the floor landing on her head and shoulders. The other coach reached my gymnast first and started moving her around. I told the coach not to move the girl, sent for a doctor that I knew was watching the meet, and began questioning the gymnast to determine the seriousness of the injury. The home coach suggested screwing the mount back into the floor and continuing with the meet. I refused to allow my last girl to compete on bars.

It's clear from the above that high school girls gymnastics coaches are doing some things right but at the same time some of them, through how they handle themselves, could and do get into trouble. These dramatic coach behaviors come from the data of a beginning phase of a research project concerned with the role of coaches in preventing injuries and giving post-injury care to high school girl gymnasts.

The next phase of the project needs your help. To show the kind of help needed from you, let me take you through the highlights of the project to date. Then I can better outline for you what you can do for it.

Over the past year I have been collecting systematic reports of actual incidents in which high school girls gymnastics coaches were especially effective or not so effective on the job in both the practice and/or competitive environments. Coaches, officials, and even a few knowledgeable athletic directors and girl gymnasts all over Iowa and Michigan, have gone to a good deal of trouble to write out incidents of coaches in action that they have observed. The essence of these incidents has been boiled down to two lists of coach behaviors, one list of effective behaviors and a second list of ineffective behaviors. Note that these behavior lists are not based on mere vague abstract general opinions that we all too often get exposed to but on hundreds of real happenings out there on the gym floor.

These two lists could be used as is to help revise high school girls gymnastics safety manuals to serve as a basis for coach and officials training workshops, etc.

One problem in using the lists in their present form, as we have learned from experience with this approach in other safety-practices areas, is that the behaviors in the lists do not, as accurately as is desirable, reflect relative frequency and importance. Some behaviors could happen frequently but not be terribly important while others could happen rarely but be really important. Others could be both frequent and important or even infrequent and trivial. If users of the lists such as safety manual writers and leaders of coach training workshops are to have dependable information to work with, both frequency and importance must be made available to them.

Here's where you come in. You are being asked to give the benefit of your personal experience, as long or short as that might be, by checking the relative frequency and importance of each behavior shown. Just going through the lists and seeing what the reported behaviors are has proven to be a fascinating as well as a sometimes mildly disturbing experience to the few coaches we have shown the lists to so far.

Will you please, then, take the very few minutes that are needed to read through and check the attached two lists. Back up the real effort that your colleagues in Iowa and Michigan have already put into this important project. All the high school girls gymnastics coaches and officials on the official rosters in Illinois are being asked to participate. The project needs your personal help if it's going to do the job well for all of us.

Sincerely,

Barbara Mc Kenzie - Hamilton
Doctoral Candidate, Michigan State University
(517) 372-3186.

P.S. I am required by federal regulations governing research with human subjects to advise you that you are under no pressure to participate. Your completion of the attached questionnaire constitutes your agreement to participate.

THE VALIDATION OF EFFECTIVE AND INEFFECTIVE BEHAVIORS OF HIGH SCHOOL GIRLS GYMNASTICS COACHES IN PREVENTING ACCIDENTS AND ADMINISTERING POST-INJURY CARE

Instructions:

You will see that each page in the following set of forms has three columns. Column 1 is the list of coach behaviors developed from the critical incidents. Column 2 provides a scale for you to tell how often, in your extensive personal experience, you have observed the corresponding coach behavior in column 1. Column 3 provides another scale for you to tell how important in your experience the corresponding coach behavior in column 1 is. If you stop to think about it, it is clear that any of the listed behaviors in column 1 may happen quite often but not be very important or vice versa; your answers for any one coach behavior in column 2 and 3 could be very different from each other.

Record your experience regarding "how often?" and "how important?" each coach behavior is by circling appropriate responses. Be sure to circle, in answer to "how often?", one of the numbers from 1 to 6 in column 2 to give your answer to "how often?". If you've never been in a position to observe the coach behavior please circle number 6, "Does Not Apply". For example, if you've been a judge almost exclusively, you probably haven't watched gymnastics practice very much so you can't say what coaches' behaviors in practice might be. To give your answer to "how important?" be sure to circle one of the numbers from 1 to 6 in column 3. There could be a special problem in your understanding of what "how important?" means in this context. "How important?" for the effective coach behaviors means - how important is each behavior in assuring safe gymnasium practices? "How important?" for the ineffective coach behaviors, when you come to the ineffective behaviors on page 3, means - how important is it for the behavior NOT to occur. The concern in this project is to find out about coach behaviors that lead to developing a safer environment for gymnasts and their sport.

When you have finished a page, check to see that for each item you have circled one number in column 2 and one number in column 3. You should have two circled responses to each behavior statement.

Column 1 EFFECTIVE COACH BEHAVIOR STATEMENTS COACH BEHAVIORS FOR EFFECTIVE PREVENTION The coach:	Column 2 How Often? 1-Very Frequently 2-Frequently 3-Sometimes 4-Rarely 5-Never or Practically Never 6-Does Not Apply	Column 3 How Important? 1-Very Important 2-Important 3-Moderately Important 4-Indifferent 5-Unimportant 6-Does Not Apply
Coach Behavior Toward the Gymnast - Mainly During PRACTICE		
1-develops the gymnast's flexibility through having her do structured stretching exercises.	1 2 3 4 5 6	1 2 3 4 5 6
2-develops the gymnast's strength through having her do conditioning and/or weight training.	1 2 3 4 5 6	1 2 3 4 5 6
3-develops the gymnast's cardiovascular endurance through having her do aerobic activities. (Examples: jogging, aerobic dancing, consecutive routines on the apparatus.)	1 2 3 4 5 6	1 2 3 4 5 6
4-teaches new movements to each gymnast only after she has mastered a movement's fundamentals including lead-up skills and progressions.	1 2 3 4 5 6	1 2 3 4 5 6
5-takes full advantage of safety aids and apparatus when teaching new movements. (Examples: spotting belt, padded equipment, mat pit, pit.)	1 2 3 4 5 6	1 2 3 4 5 6
Coach Behavior Toward the Gymnast - During BOTH PRACTICE AND COMPETITION		
6-requires and then systematically checks to see that the gymnasts warm up before practice, a meet, and/or a particular event to insure that their bodies are warm, stretched out, and ready to move.	1 2 3 4 5 6	1 2 3 4 5 6
7-while watching a particular gymnast, has a constructive way of calling attention to faults so that the gymnast actually makes the needed changes.	1 2 3 4 5 6	1 2 3 4 5 6
8-accurately senses the gymnast's mental condition in both practice and competition and either motivates a fearful gymnast to rise above her fear and go for a movement or puts her to wait, despite the pressure to excel.	1 2 3 4 5 6	1 2 3 4 5 6
9-accurately senses the gymnast's physical condition in both practice and competition and does not let the gymnast do a movement for which s/he has reason to believe the gymnast does not have the strength, flexibility, or endurance. (Examples: only lets a beginning gymnast with sufficient strength do a front handspring vault; stops a gymnast with a badly sprained ankle or bruised heel from tumbling; keeps a gymnast with overly tender hands off the uneven bars.)	1 2 3 4 5 6	1 2 3 4 5 6
10-precisely judges when a gymnast needs spotting, positions herself/himself to offer optimum assistance, and steps in at the right moment with the right amount of physical assistance.	1 2 3 4 5 6	1 2 3 4 5 6

COACH BEHAVIORS FOR EFFECTIVE PREVENTION (continued)	How Often? 1-Very Frequently 2-Frequently 3-Sometimes 4-Rarely 5-Never or Practically Never 6-Does Not Apply	How Important? 1-Very Important 2-Important 3-Moderately Important 4-Indifferent 5-Unimportant 6-Does Not Apply
11-prevents a gymnast from doing movements that the coach is not completely prepared to spot and/or asks a coach, who is so prepared to spot the gymnast.	1 2 3 4 5 6	1 2 3 4 5 6
12-encourages the gymnast to stay in shape throughout the year. (Example: arranges ways for gymnasts to attend summer gymnastics clinics or train at local clubs between competitive seasons.)	1 2 3 4 5 6	1 2 3 4 5 6
Coach Behavior with Respect to the Equipment - During BOTH PRACTICE and COMPETITION		
13-examines the quality of the equipment, especially at away meets, and stops gymnasts from warming up, practicing, and/or competing on equipment that does not meet safety standards.	1 2 3 4 5 6	1 2 3 4 5 6
14-examines (1) mat placement to insure that they are under and around the area used by each different gymnast and cover the equipment bases as well as (2) mat thickness. (Example: for a Korbut back somie dismount from the uneven bars pulls in another landing mat so that the gymnast has a double thickness of mats to land on.)	1 2 3 4 5 6	1 2 3 4 5 6
15-moves out of the way any equipment and/or obstacles that are too close to the apparatus in order to provide the gymnast with sufficient space to perform without hitting something.	1 2 3 4 5 6	1 2 3 4 5 6
16-examines the equipment before warm ups and sees to it that the equipment is adjusted to each gymnast, especially at away meets where the equipment may be unfamiliar.	1 2 3 4 5 6	1 2 3 4 5 6
Coach Background		
17-is well trained and experienced in coaching girls gymnastics and updates her/his knowledge in the sport by attending clinics, workshops, seminars, conventions, and/or congresses.	1 2 3 4 5 6	1 2 3 4 5 6
Coach Management of Coaching Assistants		
18-manages coaching assistants in such a way that they improve their teaching and spotting skills.	1 2 3 4 5 6	1 2 3 4 5 6
19-discourages having gymnasts act as spotters when they are not very well trained in spotting, especially when high-level movements are involved.	1 2 3 4 5 6	1 2 3 4 5 6
COACH BEHAVIORS FOR EFFECTIVE POST-INJURY CARE		
Coach Behavior-During Both PRACTICE and COMPETITION		
20-is well trained and experienced in first aid and updates her/his knowledge by attending clinics, workshops, seminars, conventions, and/or congresses.	1 2 3 4 5 6	1 2 3 4 5 6
21-after an injury, makes a quick and accurate assessment of its severity.	1 2 3 4 5 6	1 2 3 4 5 6
22-administers no more than appropriate first aid; in the case of the relatively rare, potentially serious injury accurately judges when to send the gymnast to an athletic trainer and/or physician for further evaluation and treatment.	1 2 3 4 5 6	1 2 3 4 5 6
23-stays in control while examining and treating an injury no matter how severe.	1 2 3 4 5 6	1 2 3 4 5 6
24-stops whatever s/he is doing and gives immediate attention to an injured gymnast. (Example: is involved in spotting some gymnasts on tumbling and runs to a gymnast some distance away who has just been injured on the uneven bars.	1 2 3 4 5 6	1 2 3 4 5 6
25-keeps a stocked first aid kit on hand at all practices and at all home and away meets.	1 2 3 4 5 6	1 2 3 4 5 6

INEFFECTIVE COACH BEHAVIOR STATEMENTS COACH BEHAVIORS IN INEFFECTIVE PREVENTION The coach:	How Often? 1-Very Frequently 2-Frequently 3-Sometimes 4-Rarely 5-Never or Practically Never 6-Does Not Apply	How Important? 1-Very Important 2-Important 3-Moderately Important 4-Indifferent 5-Unimportant 6-Does Not Apply
Coach Behavior Toward the Gymnast - Mainly During PRACTICE		
1-has done little about developing and implementing fitness programs in weight control, strength, flexibility, and/or cardiovascular endurance for the gymnasts. (Example: takes it for granted that the gymnasts on her/his team do conditioning on their own.)	1 2 3 4 5 6	1 2 3 4 5 6
2-rarely uses skill progressions or simply assumes that the gymnasts have mastered fundamentals or lead-up skills. (Example: goes directly into teaching a complex movement to a gymnast without using skill progressions.)	1 2 3 4 5 6	1 2 3 4 5 6
3-develops a dislike, often unconscious, for a particular gymnast or a particular clique of teammembers and then only infrequently works with her/them.)	1 2 3 4 5 6	1 2 3 4 5 6
4-sometimes doesn't use safety aids the way they were intended. (Example: pays no attention when the two ropes of the spotting belt on a twisting movement are turned the opposite way around the gymnast.)	1 2 3 4 5 6	1 2 3 4 5 6
5-assumes the gymnast is doing a particular movement, places herself/himself in a position to spot that movement and then to the coach's surprise the gymnast performs another movement.	1 2 3 4 5 6	1 2 3 4 5 6
Coach Behavior Toward the Gymnast - Mainly During COMPETITION		
6-doesn't get around to teaching the gymnast a new movement or even a complete routine until the meet warm ups and then goes so far as to require the gymnast to perform the movement/routine in the meet.	1 2 3 4 5 6	1 2 3 4 5 6
7-in a meet pressures the gymnast, who isn't even being spotted, into doing a movement that she has not previously mastered.	1 2 3 4 5 6	1 2 3 4 5 6
8-in a meet pressures the gymnast, who at least has the coach spotting her, into doing a movement that she has not previously mastered.	1 2 3 4 5 6	1 2 3 4 5 6
9-against the coach's better judgment permits an injured gymnast to compete. (Example: gets talked into letting a too highly motivated yet not too well recovered gymnast compete; lets the gymnast compete simply on the strength of the written approval of a physician who may not know the circumstances as well as the coach.	1 2 3 4 5 6	1 2 3 4 5 6
10-even though rules permit a coach to talk to a potentially injured gymnast, refrains from talking to the gymnast after she has fallen hard from the apparatus for fear of losing points.	1 2 3 4 5 6	1 2 3 4 5 6
11-permits a gymnast, disoriented from a fall, to continue competing.	1 2 3 4 5 6	1 2 3 4 5 6
12-yells and thereby embarrasses a gymnast who has just fallen or committed some other execution faults.	1 2 3 4 5 6	1 2 3 4 5 6
Coach Behavior Toward the Gymnast - During BOTH PRACTICE and COMPETITION		
13-permits gymnasts to perform away from supervision. (Example: does not designate areas in a large gymnasium off-limits for warming up because supervision is not possible.)	1 2 3 4 5 6	1 2 3 4 5 6
14-assumes that the gymnasts warm up before and during practice and/or a meet on their own and does not make the effort to check that the gymnasts are warm, stretched out, and ready to move.	1 2 3 4 5 6	1 2 3 4 5 6
15-rarely points out the gymnast's execution faults because the coach doesn't recognize them in the first place or lacks the confidence to explain the faults to the gymnast.	1 2 3 4 5 6	1 2 3 4 5 6
16-pushes a frightened gymnast into doing a movement regardless of her anxiety.	1 2 3 4 5 6	1 2 3 4 5 6
17-has an exhausted gymnast continue performing in spite of her overwhelming fatigue.	1 2 3 4 5 6	1 2 3 4 5 6
18-pressures a gymnast to perform while she is experiencing severe pain.	1 2 3 4 5 6	1 2 3 4 5 6
19-has a problem with her/his timing, placement, and/or intensity of the physical spotting used.	1 2 3 4 5 6	1 2 3 4 5 6

COACH BEHAVIORS IN INEFFECTIVE PREVENTION (continued)	How Often? 1-Very Frequently 2-Frequently 3-Sometimes 4-Rarely 5-Never or Practically Never 6-Does Not Apply	How Important? 1-Very Important 2-Important 3-Moderately Important 4-Indifferent 5-Unimportant 6-Does Not Apply
Coach Behavior with Respect to the Equipment - During BOTH PRACTICE and COMPETITION		
20-is so busy coaching that s/he overlooks examining the quality of the equipment, especially at away meets. (Example: does not happen to see that the taped wrestling mats used for the floor exercise event have gaps between them.)	1 2 3 4 5 6	1 2 3 4 5 6
21-permits the gymnast to perform on equipment that does not meet safety standards. (Example: lets a gymnast perform on a set of bars that has a big chip in one of the rails.)	1 2 3 4 5 6	1 2 3 4 5 6
22-doesn't bother to observe the placement of the equipment to make sure that the gymnast has enough space available to perform.	1 2 3 4 5 6	1 2 3 4 5 6
23-neglects to adjust the equipment before warm ups, practice, and/or competition to see to it that it is adjusted for each gymnast, especially at away meets where the equipment may be unfamiliar. (Example: doesn't get around to moving mats to where they are needed for dismounts.)	1 2 3 4 5 6	1 2 3 4 5 6
Coach Background		
24-has had little experience or no formal or informal training and/or experience in coaching girls gymnastics. (Example: admits to no coaching training but took the coaching job on a part time basis because the school administration wanted to keep girls gymnastics as part of their athletic program.)	1 2 3 4 5 6	1 2 3 4 5 6
Coach Management of Coaching Assistants		
25-when given the opportunity, refuses to employ an assistant coach to work with a team too large to be handled by one coach; prefers working with the team all alone.	1 2 3 4 5 6	1 2 3 4 5 6
26-uses unqualified assistants. (Example: is too busy so has an inexperienced teammate or assistant coach work with a gymnast who is beginning to learn a new movement.)	1 2 3 4 5 6	1 2 3 4 5 6
COACH BEHAVIORS IN INEFFECTIVE POST-INJURY CARE		
Coach Behavior - Mainly During PRACTICE		
27-after a gymnast has seen a physician following an accident, and even though the physician's instructions are that the gymnast rest and take time off to recover, orders the gymnast resume practice as of now.	1 2 3 4 5 6	1 2 3 4 5 6
Coach Behavior - Mainly During COMPETITION		
28-so that the meet can continue, tells the gymnast who has fallen hard to move immediately or even pulls the gymnast up to her feet before examining her.	1 2 3 4 5 6	1 2 3 4 5 6
Coach Behavior - During BOTH PRACTICE and COMPETITION		
29-gives first aid low priority. (Examples: after an accident the coach does little or nothing for the gymnast or at best lets someone else administer the first aid care; sees to the performing gymnasts first and then only gets to the injured gymnast when time permits.)	1 2 3 4 5 6	1 2 3 4 5 6
30-misses identifying a serious injury. (Example: tells the gymnast that she has only a sprained ankle; later finds out from a physician that the gymnast has a broken ankle.)	1 2 3 4 5 6	1 2 3 4 5 6
31-has problems using taping to support weak body structures. (Examples: overtapes; undertapes; neglects to tape a gymnast with shin splints before she performs; neglects putting a gymnast on a strengthening program to offset the weakening effect of taping.	1 2 3 4 5 6	1 2 3 4 5 6
32-loses self-control after discovering that the gymnast has a severe injury. (Example: cannot bear to look at a compound fracture.)	1 2 3 4 5 6	1 2 3 4 5 6

COACH BEHAVIORS IN INEFFECTIVE POST-INJURY CARE(continued)	How Often? 1-Very Frequently 2-Frequently 3-Sometimes 4-Rarely 5-Never or Practically Never 6-Does Not Apply	How Important? 1-Very Important 2-Important 3-Moderately Important 4-Indifferent 5-Unimportant 6-Does Not Apply
33-takes misplaced pride in her/his first aid skills and refuses assistance from an athletic trainer or another coach	1 2 3 4 5 6	1 2 3 4 5 6
34-does not have available a stocked first aid kit on hand at all practices and at all home and away meets.	1 2 3 4 5 6	1 2 3 4 5 6
GENERAL COACH BEHAVIORS THAT APPLY TO BOTH INEFFECTIVE PREVENTION AND POST-INJURY CARE		
35-leaves it to someone else to arouse the community including the school administration to make progress toward solving such perennial problems as: too small an athletic budget to obtain or replace desperately needed equipment; insufficient amount of permitted practice time in the school schedule; too many meets in the season; too much pressure to win.	1 2 3 4 5 6	1 2 3 4 5 6
36-accepts the situation as it is with respect to such long term professional problems as not a long enough season to get gymnasts into shape, too few qualified coaches at the high school level, increasingly difficult event requirements, and tougher and tougher competition; takes no initiative in calling these problems to the attention of such parts of the professional power structure as the state high school girls athletic association.	1 2 3 4 5 6	1 2 3 4 5 6

PERSONAL DATA

The personal data would help the investigator determine the extent to which the Illinois group is comparable to the Michigan and Iowa groups in relationship to job titles, sex, age, etc.

1-I am (check one):____U.S. Gymnastics Coach ____U.S. Official ____Other (If so, what?_____)

2-Your sex (check one): ____Female ____Male

3-Your age (check one): ____Over 35 ____30-34 ____25-29 ____20-24 ____Under 20

4-How many years have you coached and/or judged high school girls gymnastics? (check one):
____5 or more years ____4 years ____3 years ____2 years ____1 year

5-Your highest level of education to date (check one):
____Have a graduate degree (M.A., M.S., Ph.D.) Major_____ Minor_____
(If you have a graduate degree, also please show your undergraduate major and minor(s).)
____B.S. or equivalent plus some graduate credit Major_____ Minor_____
____B.S. or equivalent and no graduate credit Major_____ Minor_____
____Some College or University experience Major_____ Minor_____
____High school graduate

Reminder: Please return the materials in the enclosed stamped, self-addressed envelope to:

Barbara Mc Kenzie - Hamilton
634 North Mayford Street
Lansing, Michigan 48912.

(517) 372-3186.

(If you would like a copy of the final research report please call me at the above number or write a separate letter requesting the report and listing your name and address.)

Thank you!

February 20, 1984.

Dear Gymnastics Coach and/or Official,

This is just a note to remind you that the mail questionnaire you received a few weeks ago on the validated behaviors of high school coaches effectively and ineffectively preventing and caring for injuries to girl gymnasts is still needed.

Please complete the questionnaire and send it back to me as soon as possible. If you have already returned the questionnaire, consider this a thank you for your participation.

Sincerely,
Barbara
Barbara Mc Kenzie - Hamilton
Ph.D. Candidate, Michigan State University
(517) 372-3186.

March 5, 1984.

Dear Gymnastics Coach and/or Official,

The validation study on the behaviors of high school coaches effectively and ineffectively preventing and caring for injuries to girl gymnasts still needs a much higher return rate to make the study a success. If you have not responded to the questionnaire please complete the survey and return it as soon as possible.

Your support is crucial! The project needs your personal help to collect a sufficient amount of information to develop better guidelines for gymnastics personnel to select, train, and/or evaluate present and future high school girls gymnastics coaches.

Sincerely,
Barb
Barbara Mc Kenzie-Hamilton (517) 372-3186.

APPENDIX B

SAFETY GUIDELINES AND RELATED STATISTICS

APPENDIX B-1

Preliminary Guidelines generated by the Predictor Survey

EFFECTIVE COACH BEHAVIOR STATEMENTS

Prevention

The coach:

Coach Behavior Toward the Gymnast - Mainly during PRACTICE

1-develops the gymnast's flexibility through having her do structured stretching exercises.
2-develops the gymnast's strength through having her do conditioning and/or weight training.
3-develops the gymnast's cardiovascular endurance through having her do aerobic activities.
4-teaches new movements to each gymnast only after she has mastered a movement's fundamentals including lead-up skills and progressions.
5-takes full advantage of safety aids and apparatus when teaching new movements.

Coach Behavior Toward the Gymnast - During both PRACTICE and COMPETITION

7-requires and then systematically checks to see that the gymnasts warm up before practice, a meet, and/or a particular event to insure that their bodies are warm, stretched out, and ready to move.
8-accurately senses the gymnast's mental condition in both practice and competition and either motivates a fearful gymnast to rise above her her fear and go for a movement or gets her to wait, despite the pressure to excel.
9-accurately senses the gymnast's physical condition in both practice and competition and does not let the gymnast do a movement for which s/he has reason to believe the gymnast does not have the strength, flexibility, or endurance.
10-precisely judges when a gymnast needs spotting, positions herself to offer optimum assistance, and steps in at the right moment with the right amount of physical assistance.
11-prevents a gymnast from doing a movement that the coach is not completely prepared to spot and/or asks

a coach, who is so prepared to spot the gymnast.
12-encourages the gymnast to stay in shape throughout the year.

Coach Behavior with respect to the Equipment - During both PRACTICE and COMPETITION

13-examines the quality of the equipment, especially at away meets, and stops gymnasts from warming up, practicing, and/or competing on equipment that does not meet safety standards.
14-examines (1) mat placement to insure that they are under and around the area used by each different gymnast and cover the equipment bases as well as (2) mat thickness.
15-moves out of the way any equipment and/or obstacles that are too close to the apparatus in order to provide the gymnast with sufficient space to perform without hitting something.
16-examines the equipment before warm ups and sees to it that the equipment is adjusted to each gymnast, especially at away meets where the equipment may be unfamiliar.

Coach Background

17-is well trained and experienced in coaching girls gymnastics and updates her/his knowledge in the sport by attending clinics, workshops, seminars, conventions, and/or congresses.

Coach Management of Coaching Assistants

18-manages coaching assistants in such a way that they improve their teaching and spotting skills.
19-discourages having gymnasts act as spotters when they are not very well trained in spotting, especially when high level movements are involved.

EFFECTIVE COACH BEHAVIOR STATEMENTS

Post-Injury Care

The coach:

Coach Behavior - During both PRACTICE and COMPETITION

20-is well trained and experienced in first aid and updates her/his knowledge by attending clinics, workshops, seminars, conventions, and/or congresses.
21-after an injury, makes a quick accurate assessment of its severity.
22-administers no more than appropriate first aid; in the case of the relatively rare, potentially serious injury accurately judges when to send the gymnast to an athletic trainer and/or physician for further evaluation and treatment.
23-stays in control while examining and treating an injury no matter how severe.
24-stops whatever s/he is doing and gives immediate attention to an injured gymnast.
25-keeps a stocked first aid kit on hand at all practices and at all home and away meets.

INEFFECTIVE COACH BEHAVIOR STATEMENTS

Prevention

The coach:

Coach Behavior Toward the Gymnast - Mainly during PRACTICE

1-has done little about developing and implementing fitness programs in weight control, strength, flexibility, and/or cardiovascular endurance for the gymnasts.
2-rarely uses skills progressions or simply assumes that the gymnasts have mastered fundamentals or lead-up skills.
3-develops a dislike, often unconscious, for a particular gymnast or a particular clique of teammembers and then only infrequently works with her/them.
4-sometimes doesn't use safety aids the way they were intended.
5-assumes the gymnast is doing a particular movement, places her/himself in a position to spot that movement and then to the coach's surprise the gymnast performs another movement.

Coach Behavior Toward the Gymnast - Mainly during COMPETITION

6-doesn't get around to teaching the gymnast a new movement or even a complete routine until the meet warm ups and then goes so far as to require the gymnast to perform the movement/routine in the meet.
7-in a meet pressures the gymnast, who isn't even being spotted into doing a movement that she has not previously mastered.
8-in a meet pressures the gymnast, who at least has the coach spotting her, into doing a movement that she has not previously mastered.
9-against the coach's better judgment permits an injured gymnast to compete.
10-even though rules permit a coach to talk to a potentially injured gymnast, refrains from talking to the gymnast after she has fallen hard from the apparatus for fear of losing points.

11-permits a gymnast, disoriented from a fall, to continue competing.
12-yells and thereby embarrasses a gymnast who has just fallen or committed some other execution faults.

Coach Behavior Toward the Gymnast - During both PRACTICE and COMPETITION

13-permits gymnasts to perform away from supervision.
14-assumes that the gymnasts warm up before and during practice and/or a meet on their own and does not make the effort to check that the gymnasts are warm, stretched out, and ready to move.
15-rarely points out the gymnast's execution faults because the coach doesn't recognize them in the first place or lacks the confidence to explain the faults to the gymnast.
16-pushes a freightened gymnast into doing a movement regardless of her anxiety.
17-has an exhausted gymnast continue performing in spite of her overwhelming fatigue.
18-pressures a gymnast to perform while she is experiencing severe pain.
19-has a problem with her/his timing, placement, and/or intensity of the physical spotting used.

Coach Behavior with respect to the Equipment - During both PRACTICE and COMPETITION

20-is so busy coaching that s/he overlooks examining the quality of the equipment, especially at away meets.
21-permits the gymnast to perform on equipment that does not meet safety standards.
22-doesn't bother to observe the placement of the equipment to make sure that the gymnast has enough space available to perform.
23-neglects to adjust the equipment before warm ups, practice, and/or competition to see to it that it is adjusted for each gymnast, especially at away meets where the equipment may be unfamiliar.

Coach Background

24-has had little experience or no formal or informal training and/or experience in coaching girls gymnastics.

Coach Management of Coaching Assistants

25-when given the opportunity, refuses to employ an assistant coach to work with a team too large to be handled by one coach; prefers working with the team all alone.
26-uses unqualified assistants.

INEFFECTIVE COACH BEHAVIOR STATEMENTS

Post-Injury Care

The coach:

Coach Behavior - Mainly during PRACTICE

27-after a gymnast has seen a physician following an accident, and even though the physician's instructions are that the gymnast rest and take time off to recover, orders the gymnast resume practice as of now.

Coach Behavior - Mainly during COMPETITION

28-so that the meet can continue, tells the gymnast who has fallen hard to move immediately or even pulls the gymnast up to her feet before examining her.

Coach Behavior - During both PRACTICE and COMPETITION

29-gives first aid low priority.
30-misses identifying a serious injury.
31-has problems using taping to support weak body structures.
32-loses self-control after discovering that the gymnast has a severe injury.
33-takes misplaced pride in her/his first aid skills and refuses assistance from an athletic trainer or another coach.
34-does not have available a stocked first aid kit on hand at all practices and at all home and away meets.

INEFFECTIVE COACH BEHAVIOR STATEMENTS

Prevention and Post-Injury Care

The coach:

General Coach Behaviors

35-leaves it to someone else to arouse the community including the school administration to make progress toward solving such perennial problems as: to small an athletic budget to obtain or replace desperately needed equipment; insufficient amount of permitted practice time in the school schedule; too many meets in the season; too much pressure to win.

36-accepts the situation as it is with respect to such long term professional problems as not a long enough season to get gymnasts into shape, too few qualified coaches at the high school level, increasingly difficult event requirements, and tougher and tougher competition; takes no initiative in calling these problems to the attention of such parts of the professional power structure as the state high school girls athletic association.

APPENDIX B-2

Means and standard deviations for the individual coach behavior statements for Frequency

Effective Prevention

Statement #	Mean	Standard Deviation
1	1.8	.82
2	2.3	1.15
3	2.4	.93
4	1.9	.80
5	1.7	.83
6	2.0	.94
7	2.1	.89
8	2.3	.98
9	2.2	.79
10	1.9	.76
11	2.2	1.02
12	2.4	1.05
13	2.3	1.17
14	1.7	.90
15	1.9	.89
16	1.7	.89
17	2.3	.95
18	2.5	.91
19	2.4	1.03

Effective Post-Injury Care

Statement #	Mean	Standard Deviation
20	2.5	.97
21	2.2	1.01
22	1.8	.75
23	1.8	.69
24	1.8	.92
25	2.2	1.13

Means and standard deviations for the individual coach behavior statements for Frequency

Ineffective Prevention

Statement #	Mean	Standard Deviation
1	3.6	1.06
2	3.7	1.18
3	3.6	1.12
4	4.1	1.06
5	3.7	.90
6	4.4	.90
7	4.2	.99
8	3.7	1.22
9	3.8	1.03
10	4.4	.85
11	4.3	1.02
12	4.4	.91
13	3.8	1.10
14	3.4	1.12
15	3.6	1.12
16	3.7	1.10
17	4.1	1.00
18	4.4	.97
19	3.7	1.03
20	3.6	1.14
21	4.1	1.04
22	3.9	1.03
23	4.3	.86
24	3.6	1.22
25	4.6	.80
26	3.6	1.01

Ineffective Post-Injury Care

Statement #	Mean	Standard Deviation
27	4.6	.80
28	4.5	.96
29	4.3	.94
30	4.0	1.08
31	3.5	1.10
32	4.4	.88
33	4.4	.92
34	3.8	1.13

Ineffective Prevention and Post-Injury Care

Statement #	Mean	Standard Deviation
35	3.4	1.20
36	3.2	1.14

Means and standard deviations for the individual coach behavior statements for Importance

Effective Prevention

Statement #	Mean	Standard Deviation
1	1.3	.53
2	1.3	.50
3	1.6	.65
4	1.2	.49
5	1.2	.44
6	1.3	.58
7	1.5	.62
8	1.5	.76
9	1.3	.65
10	1.2	.45
11	1.3	.59
12	1.7	.76
13	1.2	.47
14	1.2	.47
15	1.2	.49
16	1.2	.47
17	1.2	.48
18	1.5	.65
19	1.5	.75

Effective Post-Injury Care

Statement #	Mean	Standard Deviation
20	1.4	.61
21	1.3	.52
22	1.1	.39
23	1.1	.34
24	1.3	.57
25	1.3	.67

Means and standard deviations for the individual coach behavior statements for Importance

Ineffective Prevention

Statement #	Mean	Standard Deviation
1	1.4	.70
2	1.4	.65
3	2.0	1.06
4	1.2	.53
5	1.6	.81
6	1.4	.84
7	1.3	.64
8	1.4	.82
9	1.4	.68
10	1.4	.84
11	1.3	.70
12	1.5	.91
13	1.6	.94
14	1.6	.87
15	1.5	.78
16	1.4	.70
17	1.5	.79
18	1.4	.77
19	1.4	.78
20	1.5	.79
21	1.4	.79
22	1.4	.70
23	1.3	.66
24	1.3	.64
25	1.5	.76
26	1.5	.83

Ineffective Post-Injury Care

Statement #	Mean	Standard Deviation
27	1.3	.66
28	1.2	.60
29	1.3	.69
30	1.3	.68
31	1.5	.79
32	1.4	.77
33	1.4	.72
34	1.4	.83

Ineffective Prevention and Post-Injury Care

Statement #	Mean	Standard Deviation
35	1.7	.85
36	1.6	.79

"Grouped" frequency distributions of behavior statement means by frequency and importance for effective and ineffective prevention and effective and ineffective post-injury care

Key:

A= Effective Prevention
B= Ineffective Prevention
C= Effective Post-Injury Care
D= Ineffective Post-Injury Care
E= Ineffective Prevention and Post-Injury Care (General Coach Behaviors)
F= Effective Prevention and Post-Injury Care (A & C)
G= Ineffective Prevention and Post-Injury Care (B, D, & E)

Mean	Frequency					Sub-totals		TOTAL (A-E)	Importance					Sub-totals		TOTAL (A-E)
	A	B	C	D	E	F	G		A	B	C	D	E	F	G	
1.00-1.24								0	10	1	4	1		14	2	16
1.25-1.49								0	7	19	2	6		9	25	34
1.50-1.74	3					3		3	2	6		1	2	2	9	11
1.75-1.99	4		3			7		7								0
2.00-2.24	5		2			7		7								0
2.25-2.49	6					6		6								0
2.50-2.74	1		1			2		2								0
2.75-2.99								0								0
3.00-3.24					1		1	1								0
3.25-3.49		1		1	1		3	3								0
3.50-3.74		11					11	11								0
3.75-3.99		4		2			6	6								0
4.00-4.24		4					4	4								0
4.24-4.49		5		4			9	9								0
4.50-4.74		1		1			2	2								0
4.75-4.99								0								0
TOTAL	19	26	6	8	2	25	36	61	19	26	6	8	2	25	36	61

"Grouped" frequency distributions of behavior category means by frequency and importance for effective and ineffective prevention and effective and ineffective post-injury care

Distribution of the Means for each Coach Behavior Category

Key:
A= Effective Prevention
B= Ineffective Prevention
C= Effective Post-Injury Care
D= Ineffective Post-Injury Care
E= Ineffective Prevention and Post-Injury Care (General Coach Behaviors)
F= Effective Prevention and Post-Injury Care (A & C)
G= Ineffective Prevention and Post-Injury Care (B,D, & E)

Means	Frequency					Sub-totals		TOTALS (A-E)	Importance					Sub-totals		TOTALS (A-E)
	A	B	C	D	E	F	G		A	B	C	D	E	F	G	
1.00-1.24								0	2		1			3		3
1.25-1.49								0	2	5		2		2	7	9
1.50-1.74								0	1	1			1	1	2	3
1.75-1.99	2					2		2				1			1	1
2.00-2.24	2		1			3		3								0
2.25-2.49	1					1		1								0
2.50-2.74								0								0
2.75-2.99								0								0
3.00-3.24								0								0
3.25-3.49					1		1	1								0
3.50-3.74		1					1	1								0
3.75-3.99		2					2	2								0
4.00-4.24		3		1			4	4								0
4.25-4.49				1			1	1								0
4.50-4.74				1			1	1								0
4.75-4.99								0								0
Total	5	6	1	3	1	6	10	16	5	6	1	3	1	6	10	16

APPENDIX B-5

Factor Analysis of the Criterion Instrument's Categories

A. Frequency

# of Factors Identified	Eigenvalues for each identified factor	% of the Variance
13	1- 15.075	35.0
	2- 11.326	26.0
	3- 3.359	7.8
	4- 2.375	5.5
	5- 1.873	4.4
	6- 1.595	3.7
	7- 1.442	3.4
	8- 1.371	3.2
	9- 1.160	2.7
	10- .964	2.2
	11- .897	2.1
	12- .825	1.9
	13- .756	1.8

B. Importance

# of Factors Identified	Eigenvalues for each identified factor	% of the Variance
25	1- 28.034	46.3
	2- 5.772	9.5
	3- 3.875	6.4
	4- 3.095	5.1
	5- 2.676	4.4
	6- 2.135	3.5
	7- 1.805	3.0
	8- 1.536	2.5
	9- 1.295	2.1
	10- 1.205	2.0
	11- 1.036	1.7
	12- .893	1.5
	13- .756	1.2
	14- .691	1.1
	15- .559	.9
	16- .514	.8
	17- .446	.7
	18- .408	.7
	19- .367	.6
	20- .339	.6
	21- .312	.5
	22- .289	.5
	23- .276	.5
	24- .255	.4
	25- .227	.4

APPENDIX B-6

Pearson r's for each individual coach behavior statement (frequency vs. importance)

Effective Prevention

Statement #	r
1	.24
2	.27
3	.41
4	.29
5	.48
6	.40
7	.27
8	.27
9	.40
10	.20
11	.29
12	.33
13	.31
14	.33
15	.51
16	.35
17	.17
18	.17
19	.47

Effective Post-Injury Care

Statement #	r
20	.37
21	.17
22	.29
23	.30
24	.46
25	.48

Ineffective Prevention

Statement #	r
1	-.01
2	.05
3	-.07
4	.03
5	.01
6	.17
7	-.04
8	-.06

Ineffective Prevention (continued)

Statement #	r
9	.05
10	-.04
11	-.30
12	-.08
13	-.17
14	-.01
15	-.02
16	-.04
17	.00
18	-.07
19	.03
20	.02
21	.08
22	-.12
23	.03
24	.17
25	-.06
26	-.02

Ineffective Post-Injury Care

27	-.09
28	.06
29	-.10
30	-.08
31	-.05
32	.02
33	-.09
34	-.18

Ineffective Prevention and Post-Injury Care - General Coach Behaviors that apply to both

35	-.27
36	-.22

(Pearson r's were rounded off to the nearest one hundredth)

APPENDIX B-7

Pearson r's for each coach behavior category (frequency vs. importance)

Category	r	N
Effective Prevention	.48	19
Ineffective Prevention	.05	26
Effective Post-Injury Care	.57	6
Ineffective Post-Injury Care	.09	8

APPENDIX B-8

Means and standard deviations for each coach behavior category by frequency and importance

Frequency Mean	S.D.	Effective Prevention Category	Importance Mean	S.D.
2.1	.52	Coach behavior toward the gymnast -mainly during practice (n=5)*	1.3	.31
2.0	.63	Coach behavior toward the gymnast during both practice and competition (n=7)	1.4	.43
1.9	.82	Coach behavior with respect to the equipment during both practice and competition (n=4)	1.2	.38
2.3	.95	Coach background (n=1)	1.2	.48
2.4	.87	Coach management of coaching assistants (n=2)	1.5	.59
		Effective Post-Injury Care Category		
2.0	.67	Coach behavior during both practice and competition (n=6)	1.3	.32
		Ineffective Prevention Category		
3.8	.67	Coach behavior toward the gymnast -mainly during practice (n=5)	1.5	.62
4.2	.76	Coach behavior toward the gymnast -mainly during competition (n=7)	1.3	.59
3.8	.80	Coach behavior toward the gymnast during both practice and competition (n=7)	1.4	.68
4.0	.86	Coach behavior with respect to the equipment during both practice and competition (n=4)	1.4	.67
3.6	1.22	Coach background (n=1)	1.3	.64
4.7	.80	Coach management of coaching assistants (n=2)	1.5	.59

* N = number of items included in the category

Frequency Mean	S.D.	Ineffective Post-Injury Care Category	Importance Mean	S.D.
4.4	.89	Coach behavior mainly during practice (n=1)	1.4	.77
4.4	.92	Coach behavior mainly during competition (n=1)	1.4	.72
4.3	.94	Coach behavior during both practice and competition (n=6)	1.3	.32
		Ineffective Prevention and Post-Injury Care-General Coach Behaviors that Apply to Both		
3.3	1.07	General coach behaviors that apply to both (n=2)	1.7	.75

APPENDIX B-9

Significance of the differences between the effective and ineffective coach behavior statement means in frequency and importance

	Effective Mean	Ineffective Mean	Difference	t
Frequency	2.09	3.93	1.84	* 6.94
Importance	1.30	1.41	.11	.98
Difference	.79	2.52		
t	* 5.64	* 10.07		

* The 1% level of signifiance for t = 1.96

APPENDIX B-10

Analysis of variance: effective and ineffective for frequency and importance

	Effective Mean	Ineffective Mean	Difference	F Value
Frequency	2.09	3.93	1.84	*21.45
Importance	1.30	1.41	.11	5.64
Difference	.79	2.52		
F Value	4.54	*139.64		

*$p < .01$
(the 1% level of significance for F = 6.63)

APPENDIX B-11

Means and N's for each coach behavior and characteristic and category

Category	Frequency Mean	Importance Mean	N*
Effective Prevention	(C.M.*=2.1)	(C.M.=1.3)	
-Coach behavior towards the gymnast -mainly during practice	2.1	1.3	5
-Coach behavior towards the gymnast during both practice and competition	2.0	1.4	7
-Coach behavior with respect to the equipment during both practice and competition	1.9	1.2	4
-Coach background	2.3	1.2	1
-Coach management of coaching assistants	2.5	1.5	2
Ineffective Prevention	(C.M.=4.0)	(C.M.=1.4)	
-Coach behavior towards the gymnast -mainly during practice	3.8	1.5	5
-Coach behavior towards the gymnast -mainly during competition	4.2	1.3	7
-Coach behavior towards the gymnast during both practice and competition	3.8	1.4	7
-Coach behavior with respect to the equipment during both practice and competition	4.0	1.4	4
-Coach background	3.6	1.3	1
-Coach management of coaching assistants	4.7	1.5	2
Effective Post-Injury Care	(C.M.=2.0)	(C.M.=1.2)	
-Coach behavior during both practice and competition	2.0	1.2	6

*C.M. = category mean

*N = number of statements in a category

Category	Frequency Mean	Importance Mean	N
Ineffective Post-Injury Care	(C.M.=4.3)	(C.M.=1.3)	
-Coach behavior-mainly during practice	4.4	1.4	1
-Coach behavior-mainly during competition	4.4	1.4	1
-Coach behavior during both practice and competition	4.3	1.3	6
Ineffective Prevention and Post-Injury Care	(C.M.=3.3)	(C.M.=1.7)	
-General coach behaviors that apply to both	3.3	1.7	2

APPENDIX B-12

Analysis of variance: prevention and post-injury care for frequency and importance

	Effective $\bar{X}$		Ineffective $\bar{X}$		Difference	F Value
	Prev.	PIC	Prev.	PIC		
Frequency	1.97	2.01			.04	.13
			3.93	4.17	.24	6.27
Importance	1.27	1.24			.03	3.85
			1.43	1.31	.12	*11.11

*$p < .01$
(the 1% level of significance for F = 7.56)

APPENDIX B-13

Significance of the differences between the effective and ineffective prevention and post-injury care means in frequency and importance

	Effective		Ineffective		Difference	t Value	p
	Prev.	PIC	Prev.	PIC			
Frequency	1.97	2.01			.04	.10	N.S.
			3.93	4.17	.24	.91	N.S.
Importance	1.27	1.24			.03	.40	N.S.
			1.43	1.31	.12	1.28	N.S.

(the 1% level of significance for t = 1.645)

APPENDIX B-14

Analysis of variance for prevention and post-injury care coach behavior statements

Source	df	MS	F
-Effective Prevention (1.97) and Effective Post-Injury Care (2.01) for frequency	1	.01	.13
-Ineffective Prevention (3.93) and Ineffective Post-Injury Care (4.17) for frequency	1	.69	6.27
-Effective Prevention (1.27) and Effective Post-Injury Care (1.24) for importance	1	.05	3.85
-Ineffective Prevention (1.43) and Ineffective Post-Injury Care (1.31) for importance	1	.01	*11.11

*$p < .01$
(the 1% level of significance for F = 7.56)

APPENDIX B-15

The 19 Effective Prevention Coach Behaviors in order of their Frequency

The coach:

1-takes full advantage of safety aids and apparatus when teaching new movements. (Examples: spotting belt, padded equipment, mat pit, pit,) (5)*

2-examines (1) mat placement to insure that they are under and around the area used by each different gymnast and cover the equipment bases as well as (2) mat thickness. (Example: for a Korbut back somie dismount from the uneven bars pulls in another landing mat so that the gymnast has a double thickness of mats to land on) (14)

3-examines the equipment before warm ups and sees to it that the equipment is adjusted to each gymnast, especially at away meets where the equipment may be unfamiliar. (16)

4-develops the gymnast's flexibility through having her do structured stretching exercises (1)

5-teaches new movements to each gymnast only after she has mastered a movement's fundamentals including lead-up skills and progressions. (4)

6-moves out of the way any equipment and/or obstacles that are too close to the apparatus in order to provide the gymnast with sufficient space to perform without hitting something. (15)

7-precisely judges when a gymnast needs spotting, positions herself/himself to offer optimum assistance, and steps in at the right moment with the right amount of physical assistance. (10)

8-requires and then systematically checks to see that the gymnasts warm up before practice, a meet, and/or a particular event to insure that their bodies are warm, stretched out, and ready to move. (6)

9-while watching a particular gymnast, has a constructive way of calling attention to faults so that the gymnast actually makes the needed changes. (7)

10-accurately senses the gymnast's physical condition in both practice and competition and does not let the gymnast do a movement for which s/he has reason to believe the gymnast does not have the strength, flexibility, or endurance. (Example: only lets a beginning gymnast with sufficient strength do a front handspring vault). (9)

*The number in parentheses after each individual coach behavior statement reflects the statement number in the predictor survey shown in Appendix 4-1. This applies to all the safety guidelines that follow.

11-prevents a gymnast from doing movements that the coach is not completely prepared to spot and/or asks a coach, who is so prepared to spot the gymnast. (11)

12-accurately senses the gymnast's mental condition in both practice and competition and either motivates a fearful gymnast to rise above her fear and go for a movement or gets her to wait, despite the pressure to excel. (8)

13-develops the gymnast's strength through having her do conditioning and/or weight training. (2)

14-examines the quality of the equipment, especially at away meets, and stops gymnasts from warming up, practicing, and/or competing on equipment that does not meet safety standards. (13)

15-is well trained and experienced in coaching girls gymnastics and updates her/his knowledge in the sport by attending clinics, workshops, seminars, conventions, and/or congresses. (17)

16-develops the gymnast's cardiovascular endurance through having her do aerobic activities. (Examples: jogging, aerobic dancing, consecutive routines on the apparatus.) (3)

17-discourages having gymnasts act as spotters when they are not very well trained in spotting, especially when high-level movements are involved. (19)

18-encourages the gymnast to stay in shape throughout the year. (Example: arranges ways for gymnasts to attend summer gymnastics clinics or train at local clubs between competitive seasons.) (12)

19-manages coaching assistants in such a way that they improve their teaching and spotting skills. (18)

APPENDIX B-16

The 26 Ineffective Prevention Coach Behaviors in order of their Frequency

The coach:

1-assumes that the gymnasts warm up before and during practice and/or a meet on their own and does not make the effort to check that the gymnasts are warm, stretched out, and ready to move. (14)

2-has had little experience or no formal or informal training and/or experience in coaching girls gymnastics. (Example: admits to no coaching training but took the coaching job on a part time basis because the school administration wanted to keep girls gymnastics as part of their athletic program.) (24)

3-develops a dislike, often unconscious, for a particular gymnast or a particular clique of teammembers and then only infrequently works with her/them. (3)

4-uses unqualified assistants. (Example: is too busy so has an inexperienced teammate or assistant coach work with a gymnast who is beginning to learn a new movement.) (26)

5-rarely points out the gymnast's execution faults because the coach doesn't recognize them in the first place or lacks the confidence to explain the faults to the gymnast. (15)

6-has done little about developing and implementing fitness programs in weight control, strength, flexibility, and/or cardiovascular endurance for the gymnasts. (Example: takes it for granted that the gymnasts on her/his team do conditioning on their own.) (1)

7-is so busy coaching that s/he overlooks examining the quality of the equipment, especially at away meets. (Example: does not happen to see that the taped wrestling mats used for the floor exercise event have gaps between them.) (20)

8-rarely uses skills progressions or simply assumes that the gymnasts have mastered fundamentals or lead-up skills. (2)

9-pushes a freightened gymnast into doing a movement regardless of her anxiety. (16)

10-has a problem with her/his timing, placement, and/or intensity of the physical spotting used. (19)

11-assumes the gymnast is doing a particular movement, places her/himself in a position to spot that movement and then to the coach's surprise the gymnast performs another movement. (5)

12-in a meet pressures the gymnast, who at least has the coach spotting her, into doing a movement that she has not previously mastered. (8)

13-permits gymnasts to perform away from supervision. (Example: does not designate areas in a large gymnasium off-limits for warming up because supervision is not possible. (13)

14-against the coach's better judgment permits an injured gymnast to compete. (Example: gets talked into letting a too highly motivated yet not too well recovered gymnast compete; lets the gymnast compete simply on the strength of the written approval of a physician who may not know the circumstances as well as the coach.) (9)

15-doesn't bother to observe the placement of the equipment to make sure that the gymnast has enough space available to perform. (22)

16-pressures the gymnast to perform while she is experiencing severe pain. (18)

17-has an exhausted gymnast continue performing in spite of her overwhelming fatigue. (17)

18-permits the gymnast to perform on equipment that does not meet safety standards. (21)

19-sometimes doesn't use safety aids the way they were intended. (4)

20-in a meet pressures the gymnast, who isn't even being spotted, into doing a movement that she has not previously mastered. (7)

21-permits a gymnast, disoriented from a fall, to continue competing. (11)

22-neglects to adjust the equipment before warm ups, practice, and/or competition to see to it that it is adjusted for each gymnast, especially at away meets where the equipment may be unfamiliar. (23)

23-yells and thereby embarrasses a gymnast who has just fallen or committed some other execution faults. (12)

24-doesn't get around to teaching the gymnast a new movement or even a complete routine until the meet warm ups and then goes as far as to require the gymnast to perform the movement/routine in the meet. (6)

25-even tough rules permit a coach to talk to a potentially injured gymnast, refrains from talking to the gymnast after she has fallen hard from the apparatus for fear of losing points. (10)

26-when given the opportunity, refuses to employ an assistant coach to work with a team too large to be handled by one coach; prefers working with the team all alone. (25)

APPENDIX B-17

The 6 Effective Post-Injury Care Coach Behaviors in order of their Frequency

The coach:

1-stays in control while examining and treating an injury no matter how severe. (23)

2-stops whatever s/he is doing and gives immediate attention to an injured gymnast. (Example: is involved in spotting some gymnasts on tumbling and runs to a gymnast some distance away who has just been injured on the uneven bars.) (24)

3-administers ho more than appropriate first aid; in the case of the relatively rare, potentially serious injury accurately judges when to send the gymnast to an athletic trainer and/or physician for further evaluation and treatment. (22)

4-keeps a stocked first aid kit on hand at all practices and at all home and away meets. (25)

5-after an injury, makes a quick and accurate assessment of its severity. (21)

6-is well trained and experienced in first aid and updates her/his knowledge by attending clinics, workshops, seminars, conventions, and/or congresses. (20)

APPENDIX B-18

The 8 Ineffective Post-Injury Care Coach Behaviors in order of their Frequency

The coach:

1-has problems using taping to support weak body structures. (Example: overtapes). (31)

2-does not have available a stocked first aid kit on hand at all practices and at all home and away meets. (34)

3-misses identifying a serious injury. (Example: tells the gymnast that she has only a sprained ankle; later finds out from a physician that the gymnast has a broken ankle.) (30)

4-gives first aid low priority. (Example: after an accident the coach does little or nothing for the gymnast or at best lets someone else administer the first aid care.) (29)

5-takes misplaced pride in her/his first aid skills and refuses assistance from an athletic trainer or another coach. (33)

6-loses self-control after discovering that the gymnast has a severe injury. (Example: cannot bear to look at a compound fracture.) (32)

7-so that the meet can continue, tells the gymnast who has fallen hard to move immediately or even pulls the gymnast up to her feet before examining her. (28)

8-after a gymnast has seen a physician following an accident, and even though the physician's instructions are that the gymnast rest and take time off to recover, orders the gymnast resume practice as of now. (27)

APPENDIX B-19

The 2 General Coach Behaviors that apply to both Ineffective Prevention and Post-Injury Care in order of their Frequency

The coach:

1-leaves it to someone else to arouse the community including the school administration to make progress toward solving such perennial problems as: too small an athletic budget to obtain or replace desperately needed equipment; insufficient amount of permitted practice time in the school schedule; too many meets in the season; too much pressure to win. (36)

2-accepts the situation as it is with respect to such long term professional problems as not a long enough season to get gymnasts into shape, too few qualified coaches at the high school level, increasingly difficult event requirements, and tougher and tougher competition; takes no initiative in calling these problems to the attention of such parts of the professional power structure as the state high school girls athletic association. (35)

APPENDIX B-20

Coach Behavior and Characteristics Categories in the order of their Frequency

Category	Mean	S.D.	N
Effective Prevention	2.1		
1-Coach behavior with respect to the equipment during both practice and competition	1.9	.82	4
2-Coach behavior towards the gymnast during both practice and competition	2.0	.63	7
3-Coach behavior towards the gymnast-mainly during practice	2.1	.52	5
4-Coach background	2.3	.95	1
5-Coach management of coaching assistants	2.5	.87	2
			19
Ineffective Prevention	4.0		
1-Coach background	3.6	1.2	1
2-Coach behavior towards the gymnast-mainly during practice	3.8	.67	5
3-Coach behavior towards the gymnast-during both practice and competition	3.8	.80	7
4-Coach behavior with respect to the equipment during both practice and competition	4.0	.86	4
5-Coach behavior towards the gymnast-mainly during competition	4.2	.76	7
6-Coach management of coaching assistants	4.7	.80	2
			26
Effective Post-Injury Care	2.0		
1-Coach behavior during both practice and competition	2.0	.67	6
			6
Ineffective Post-Injury Care	4.3		
1-Coach behavior during both practice and competition	4.3	.94	6
2-Coach behavior - mainly during competition	4.4	.92	1
3-Coach behavior - mainly during practice	4.4	.88	1
			8
Ineffective Prevention and Post-Injury Care	3.3		
1-General coach behaviors that apply to both	3.3	1.1	2
			2

APPENDIX B-21

The 19 Effective Prevention Coach Behaviors in order of their Importance

1-accurately senses the gymnast's physical condition in both practice and competition and does not let the gymnast do a movement for which s/he has reason to believe the gymnast does not have the strength, flexibility, or endurance. (9)

2-manages coaching assistants in such a way that they improve their teaching and spotting skills. (18)

3-prevents a gymnast from doing movements that the coach is not completely prepared to spot and/or asks a coach, who is so prepared to spot the gymnast. (11)

4-accurately senses the gymnast's mental condition in both practice and competition and either motivates a fearful gymnast to rise above her fear and go for a movement or gets her to wait, despite the pressure to excel. (8)

6-requires and then systematically checks to see that the gymnasts warm up before practice, a meet, and/or a particular event to insure that their bodies are warm, stretched out, and ready to move. (6)

6-is well trained and experienced in coaching girls gymnastics and updates her/his knowledge in the sport by attending clinics, workshops, seminars, conventions, and/or congresses. (17)

6-encourages the gymnast to stay in shape throughout the year. (12)

8-takes full advantage of safety aids and apparatus when teaching new movements. (5)

9-precisely judges when a gymnast needs spotting, positions her/himself to offer optimum assistance, and steps in at the right moment with the right amount of physical assistance. (10)

10-examines the equipment before warm ups and sees to it that the equipment is adjusted to each gymnast especially at away meets where the equipment may be unfamiliar. (16)

11-discourages having gymnasts act as spotters when they are not very well trained in spotting, especially when high-level movements are involved. (19)

12-develops the gymnast's flexibility through having her do structured stretching exercises. (1)

13-teaches new movements to each gymnast only after she has mastered a movement's fundamentals including lead-up skills and progressions. (4)

14-moves out of the way any equipment and/or obstacles that are too close to the apparatus in order to provide the gymnast with sufficient space to perform without hitting something. (15)

15-develops the gymnast's cardiovascular endurance through having her do aerobic activities. (3)

16-develops the gymnast's strength through having her do conditioning and weight training. (2)

17-examines (1) mat placement to insure that they are under and around the area used by each different gymnast and cover the equipment bases as well as (2) mat thickness. (14)

18-examines the quality of the equipment, especially at away meets, and stops gymnasts from warming up, practicing, and/or competing on equipment that does not meet safety standards. (13)

19-while watching a particular gymnast, has a constructive way of calling attention to faults so that the gymnast actually makes the needed changes. (7)

APPENDIX B-22

The 26 Ineffective Prevention Coach Behaviors in order of their Importance

1-neglects to adjust the equipment before warm ups, practice, and/or competition to see to it that it is adjusted for each gymnast, especially at away meets where the equipment may be unfamiliar. (23)

2-doesn't bother to observe the placement of the equipment to make sure that the gymnast has enough space available to perform. (22)

3.5-rarely uses skills progressions or simply assumes that the gymnasts have mastered lead-up skills. (2)

3.5-when given the opportunity, refuses to employ an assistant coach to work with a team too large to be handled by one coach; prefers working with the team all alone. (25)

5-has had little experience or no formal or informal training and/or experience in coaching girls gymnastics. (24)

6-doesn't get around to teaching the gymnast a new movement or even a complete routine until the meet warm ups and then goes as far as to require the gymnast to perform the movement/ routine in the meet. (6)

7-permits gymnasts to perform away from supervision. (Example: does not designate areas in a large gymnasium off-limits for warming up because supervision is not possible.) (13)

8-assumes that the gymnasts warm up before and during practice and/or a meet on their own and does not make the effort to check that the gymnasts are warm, stretched out, and ready to move. (14)

9-sometimes doesn't use safety aids the way they were intended. (Example: pays no attention when the two ropes of the spotting belt on a twisting movement are turned the opposite way around the gymnast.) (4)

10.5-pushes a freightened gymnast into doing a movement regardless of her anxiety. (16)

10.5-has an exhausted gymnast continue performing in spite of her overwhelming fatigue. (17)

12-develops a dislike, often unconscious, for a particular gymnast or a particular clique of teammembers and then only infrequently works them her/them. (3)

13-has done little about developing and implementing fitness programs in weight control, strength, flexibility, and/or cardiovascular endurance for the gymnasts. (1)

14-assumes the gymnast is doing a particular movement, places her/himself in a position to spot that movement and then to the coach's surprise the gymnast performs another movement. (5)

15-permits a gymnas, disoriented from a fall, to continue competing. (11)

16.5-yells and thereby embarrasses a gymnast who has just fallen or committed some other execution faults. (12)

16.5-rarely points out the gymnast's execution faults because the coach doesn't recognize them in the first place or lacks the confidence to explain the faults to the gymnast. (15)

18-has a problem with her/his timing, placement, and/or intensity of the physical spotting used. (19)

19-in a meet pressures the gymnast, who isn't even being spotted, into doing a movement that she has not previously mastered. (7)

20-is so busy coaching that s/he overlooks examining the quality of the equipment, especially at away meets. (20)

21-pressures the gymnast to perform while she is experiencing severe pain. (18)

22-uses unqualified assistants. (Example: is too busy so has an inexperienced teammate or assistant coach work with a gymnast who is beginning to learn a new movement.) (26)

23-permits the gymnast to perform on equipment that does not meet safety standards. (21)

24-even though rules permit a coach to talk to a potentially injured gymnast, refrains from talking to the gymnast after she has fallen hard from the apparatus for fear of losing points. (10)

25-against the coach's better judgment permits an injured gymnast to compete. (9)

26-in a meet pressures the gymnast, who at least has the coach spotting her, into doing a movement that she has not previously mastered. (8)

APPENDIX B-23

The 6 Effective Post-Injury Care Coach Behaviors in order of their Importance

1-stays in control while examining and treating an injury no matter how severe. (23)

2-administers no more than appropriate first aid; in the case of the relatively rare, potentially serious injury accurately judges when to send the gymnast to an athletic trainer and/or physician for further evaluation and treatment. (22)

3-after an injury, makes a quick and accurate assessment of its severity. (21)

4-stops whatever s/he is doing and gives immediate attention to an injured gymnast. (Example: is involved in spotting some gymnasts on tumbling and runs to a gymnast some distance away who has just been injured on the uneven bars. (24)

5-keeps a stocked first aid kit on hand at all practices and at all home and away meets. (25)

6-is well trained and experienced in first aid and updates her/his knowledge by attending clinics, workshops, seminars, conventions, and/or congresses. (20)

APPENDIX B-24

The 8 Ineffective Post-Injury Care Coach Behaviors in order of their Importance

1-so that the meet can continue, tells the gymnast who has fallen hard to move immediately or even pulls the gymnast up to her meet before examining her. (28)

2-after a gymnast has seen a physician following an accident, and even though the physician's instructions are that the gymnast resume and take time off to recover, orders the gymnast resume practice as of now. (27)

3-misses identifying a serious injury. (Example: tells the gymnast that she has only a sprained ankle; later finds out from a physician that the gymnast has a broken anile.) (30)

4-gives first aid low priority. (Example: after an accident the coach does little or nothing for the gymnast or at best lets someone else administer the first aid care.) (29)

5-takes misplaced pride in her/his first aid skills and refuses assistance from an athletic trainer or another coach. (33)

6-loses self-control after discovering that the gymnast has a severe injury. (Example: cannot bear to look at a compound fracture.) (32)

7-does not have available a stocked first aid kit on hand at all practices and at all home and away meets. (34)

8-has problems using taping to support weak body structures. (Example: overtapes) (31)

APPENDIX B-25

The 2 General Coach Behaviors that apply to both Ineffective Prevention and Post-Injury Care in order of their Importance

1-leaves it to someone else to arouse the community including the school administration to make progress toward solving such perennial problems as: too small an athletic budget to obtain or replace desperately needed equipment; insufficient amount of permitted practice time in the school schedule; too many meets in the season; too much pressure to win. (36)

2-accepts the situation as it is with respect to such long term professional problems as not a long enough season to get gymnasts into shape, too few qualified coaches at the high school level, increasingly difficult event requirements, and tougher and tougher competition; takes no initiative in calling these problems to the attention of such parts of the professional power structure as the state high school girls athletic association. (35)

APPENDIX B-26

Coach Behavior and Characteristics Categories in the order of their Importance

Category	Mean	S.D.	N
Effective Prevention	1.3		
1-Coach behavior with respect to the equipment during practice and competition	1.2	.38	4
2-Coach Background	1.2	.48	1
3-Coach behavior towards the gymnast-mainly during practice	1.3	.31	5
4-Coach behavior towards the gymnast during both practice and competition	1.4	.43	7
5-Coach management of coaching assistants	1.5	.59	2
			19
Ineffective Prevention	1.4		
1-Coach background	1.3	.57	1
2-Coach behavior towards the gymnast-mainly during competition	1.3	.59	7
3-Coach behavior towards the gymnast during both practice and competition	1.5	.68	7
4-Coach behavior towards the gymnast-mainly during practice	1.5	.62	5
5-Coach behavior with respect to the equipment during both practice and competition	1.5	.62	4
6-Coach management of coaching assistants	1.5	.73	2
			26
Effective Post-Injury Care	1.2		
1-Coach behavior during both practice and competition	1.2	.32	5
Ineffective Post-Injury Care	1.4		
1-Coach behavior during both practice and competition	1.3	.60	6
2-Coach behavior-mainly during practice	1.4	.65	1
3-Coach behavior-mainly during competition	2.0	1.1	1
			7
Ineffective Prevention and Post-Injury Care	1.7		
1-General coach behaviors that apply to both	1.7	.75	2
			2

APPENDIX B-27

EFFECTIVE PREVENTION

Individual Coach Behaviors that are Very Important and occur Very Frequently

1-develops the gymnast's flexibility through having her do structured stretching exercises. (1)

2-takes full advantage of safety aids and apparatus when teaching new movements. (Examples: spotting belt, padded equipment, mat pit, pit.) (5)

Individual Coach Behaviors that are Very Important and occur Frequently

1-requires and then systematically checks to see that the gymnasts warm up before practice, a meet, and/or a particular event to insure that their bodies are warm, stretched out, and ready to move. (6)

2-accurately senses the gymnast's physical condition in both practice and competition and does not let the gymnast do a movement for which s/he has reason to believe the gymnast does not have the strength, flexibility, or endurance. (Examples: only lets a beginning gymnast with sufficient strength do a front handspring vault; stops a gymnast with a badly sprained ankle or bruised heel from tumbling; keeps a gymnast with overly tender hands off the uneven bars.) (9)

3-accurately senses the gymnast's mental condition in both practice and competition and either motivates a fearful gymnast to rise above her fear and go for a movement or gets her to wait, despite the pressure to excel. (8)

4-prevents a gymnast from doing movements that the coach is not completely prepared to spot and/or asks a coach, who is so prepared to spot the gymnast. (11)

Individual Coach Behaviors that are Very Important and occur with Moderate Frequency

1-encourages the gymnast to stay in shape throughout the year. (Example: arranges ways for gymnasts to attend summer gymnastics clinics or train at local clubs between competitive seasons.)

2-is well trained and experienced in coaching girls gymnastics and updates her/his knowledge in the sport by attending clinics, workshops, seminars, conventions, and/or congresses. (17)

3-manages coaching assistants in such a way that they improve their teaching and spotting skills. (18)

Individual Coach Behaviors that are Important and occur Very Frequently

1-teaches new movements to each gymnast only after she has mastered a movement's fundamentals including lead-up skills and progressions. (4)

2-examines the equipment before warm ups and sees to it that the equipment is adjusted to each gymnast, especially at away meets where the equipment may be unfamiliar. (16)

Individual Coach Behaviors that are Important and occur Frequently

1-precisely judges when a gymnast needs spotting, positions her/himself to offer optimum assistance, and steps in at the right moment with the right amount of physical assistance. (10)

Individual Coach Behaviors that are Important and occur with Moderate Frequency

1-discourages having gymnasts act as spotters when they are not very well trained in spotting, especially when high-level movements are involved. (19)

Individual Coach Behaviors that are Moderately Important and occur Very Frequently

1-examines (1) mat placement to insure that they are under and around the area used by each different gymnast and cover the equipment bases as well as (2) mat thickness. (Example: for a Korbut back somie dismount from the uneven bars pulls in another landing mat so that the gymnast has a double thickness of mats to land on.) (14)

2-moves out of the way any equipment and/or obstacles that are too close to the apparatus in order to provide the gymnast with sufficient space to perform without hitting something. (15)

Individual Coach Behaviors that are Moderately Important and occur Frequently

1-develops the gymnast's strength through having her do conditioning and/or weight training. (2)

2-while watching a particular gymnast, has a constructive way of calling attention to faults so that the gymnast actually makes the needed changes. (7)

Individual Coach Behaviors that are Moderately Important and occur with Moderate Frequency

1-develops the gymnast's cardiovascular endurance through having her do aerobic activities. (Examples: jogging, aerobic dancing, consecutive routines on the apparatus.) (3)

2-examines the quality of the equipment, especially at away meets, and stops gymnasts from warming up, practicing, and/or competing on equipment that does not meet safety standards. (13)

APPENDIX B-28

INEFFECTIVE PREVENTION

Individual Coach Behaviors that are Very Important Not to Occcur and occur Very Frequently.

1-rarely uses skill progressions or simply assumes that the gymnasts have mastered fundamentals or lead-up skills. (Example: goes directly into teaching a complex movement to a gymnast without using skill progressions.) (2)

2-has had little experience or no formal or informal training and/or experience in coaching girls gymnastics. (Example: admits to no coaching training but took the coaching job on a part time basis because the school administration wanted to keep girls gymnastics as part of their athletic program.) (24)

Individual Coach Behaviors that are Very Important Not to Occur and occur Frequently.

1-permits gymnasts to perform away from supervision. (Example: does not designate areas in a large gymnasium off-limits for warming up because supervision is not possible.) (13)

2-has a problem with her/his timing, placement, and/or intensity of the physical spotting used. (19)

3-doesn't bother to observe the placement of the equipment to make sure that the gymnast has enough space available to perform. (22)

Individual Coach Behaviors that are Very Important Not to Occur and occur with Moderate Frequency.

1-doesn't get around to teaching the gymnast a new movement of even a complete routine until the meet warm ups and then goes so far as to require the gymnast to perform the movement/routine in the meet. (6)

2-pressures a gymnast to perform while she is experiencing severe pain (18)

3-neglects to adjust the equipment before warm ups, practice, and/or competition to see to it that it is adjusted for each gymnast, especially at away meets where the equipment may be unfamiliar. (Example: doesn't get around to moving mats to where they are needed for dismounts.) (23)

4-when given the opportunity, refuses to employ an assistant coach to work with a team too large to be handled by one coach; prefers working with the team all alone. (25)

Individual Coach Behaviors that are Important Not to Occur and occur Very Frequently

1-has done little about developing and implementing fitness programs in weight control, strength, flexibility, and/or cardiovascular endurance for the gymnasts. (Example: takes it for granted that the gymnasts on her/his team do conditioning on their own.) (1)

2-develops a dislike, often unconscious, for a particular gymnast or a particular clique of teammembers and then only infrequently works with her/them.) (3)

3-assumes that the gymnasts warm up before and during practice and/or a meet on their own and does not make the effort to check that the gymnasts are warm, stretched out, and ready to move. (14)

4-pushes a frightened gymnast into doing a movement regardless of her anxiety. (16)

Individual Coach Behaviors that are Important Not to Occur and occur Frequently.

1-assumes the gymnast is doing a particular movement, places her/himself in a position to spot that movement and then to the coach's surprise the gymnast performs another movement. (5)

2-has an exhausted gymnast continue performing in spite of her overwhelming fatigue. (17)

Individual Coach Behaviors that are Important Not to Occur and occur with Moderate Frequency.

1-sometimes doesn't use safety aids the way they were intended. (Example: pays no attention when the two ropes of the spotting belt on a twisting movement are turned the opposite way around the gymnast.) (4)

2-permits a gymnast, disoriented from a fall, to continue competing. (11)

3-yells and thereby embarrasses a gymnast who has just fallen or committed some other execution faults. (12)

Individual Coach Behaviors that are Moderately Important Not to Occur and occur Very Frequently.

1-rarely points out the gymnast's execution faults because the coach doesn't recognize them in the first place or lacks the confidence to explain the faults to the gymnast. (15)

2-is so busy coaching that s/he overlooks examining the quality of the equipment, especially at away meets. (Example: does not happen to see that the taped wrestling mats used for the floor exercise event have gaps between them.) (20)

3-uses unqualified assistants. (Example: is too busy so has an inexperienced teammate or assistant coach work with a gymnast who is beginning to learn a new movement.) (26)

Individual Coach Behaviors that are Moderately Important Not to Occur and occur Frequently.

1-in a meet pressures the gymnast, who at least has the coach spotting her, into doing a movement that she has not previously mastered. (8)

2-against the coach's better judgment permits an injured gymnast to compete. (Example: gets talked into letting a too highly motivated gymnast compete simply on the strength of the written approval of a physician who may not know the circumstances as well as the coach.) (9)

3-permits the gymnast to perform on equipment that does not meet safety standards. (Example: lets a gymnast perform on a set of bars that has a big chip in one of the rails.) (21)

Individual Coach Behaviors that are Moderately Important Not to Occur and occur with Moderate Frequency.

1-in a meet pressures the gymnast, who isn't even being spotted, into doing a movement that she has not previously mastered. (7)

2-even though the rules permit a coach to talk to a potentially injured gymnast, refrains from talking to the gymnast after she has fallen hard from the apparatus for fear of losing points. (10)

APPENDIX B-29

EFFECTIVE POST-INJURY CARE

Individual Coach Behaviors that are Very Important and occur Very Frequently.

1-stays in control while examining and treating an injury no matter how severe. (23)

Individual Coach Behaviors that are Very Important and occur Frequently.

1-administers no more than appropriate first aid; in the case of the relatively rare, potentially serious injury accurately judges when to send the gymnast to an athletic trainer and/or physician for further evaluation and treatment. (22)

Individual Coach Behaviors that are Important and occur Very Frequently.

1-stops whatever s/he is going and gives immediate attention to an injured gymnast. (Example: is involved in spotting some gymnasts on tumbling and runs to a gymnast some distance away who has just been injured on the uneven bars.) (24)

Individual Coach Behaviors that are Important and occur with Moderate Frequency.

1-after an injury, makes a quick and accurate assessment of its severity. (21)

Individual Coach Behaviors that are Moderately Important and occur Frequently.

1-keeps a stocked first aid kit on hand at all practices and at all home and away meets. (25)

Individual Coach Behaviors that are Moderately Important and occur with Moderate Frequency.

1-is well trained and experienced in first aid and updates her/his knowledge by attending clinics, workshops, seminars, conventions, and/or congresses. (20)

APPENDIX B-30

INEFFECTIVE POST-INJURY CARE

Individual Coach Behaviors that are Very Important Not to Occur and occur Very Frequently.

1-misses identifying a serious injury. (Example: tells the gymnast that she has only a sprained ankle; later finds out from a physician that the gymnast has a broken ankle.) (30)

Individual Coach Behaviors that are Very Important Not to Occur and occur with Moderate Frequency.

1-after a gymnast has seen a physician following an accident, and even though the physician's instructions are that the gymnast rest and take time off to recover, orders the gymnast resume practice as of now. (27)

2-so that the meet can continue, tells the gymnast who has fallen hard to move immediately or even pulls the gymnast up to her feet before examining her. (28)

Individual Coach Behaviors that are Important Not to Occur and occur Frequently.

1-gives first aid low priority. (Examples: after an accident the coach does little or nothing for the gymnast or at best lets someone else administer the first aid care; sees to the performing gymnasts first and then only gets to the injured gymnast when time permits.) (29)

2-loses self-control after discovering that the gymnast has a severe injury. (Example: cannot bear to look at a compound fracture.) (32)

3-takes misplaced pride in her/time first aid skills and refuses assistance from an athletic trainer or another coach. (33)

Individual Coach Behaviors that are Moderately Important Not to Occur and occur Very Frequently.

1-has problems using taping to support weak body structures. (Examples; overtapes; undertapes.) (31)

2-does not have available a stocked first aid kit on hand at all practices and at all home and away meets. (34)

APPENDIX B-31

INEFFECTIVE PREVENTION AND POST-INJURY CARE - GENERAL COACH BEHAVIORS THAT APPLY TO BOTH

Individual Coach Behaviors that are Very Important Not to Occur and Occur Very Frequently

1-leaves it to someone else to arouse the community including the school administration to make progress toward solving such perennial problems as: too small an athletic budget to obtain or replace desperately needed equipment; insufficient amount of permitted practice time in the school schedule; too many meets in the season; too much pressure to win. (36)

Individual Coach Behaviors that are Important Not to Occur and Occur Frequently

1-accepts the situation as it is with respect to such long term problems as not a long enough season to get gymnasts into shape, increasingly difficult event requirements, and tougher and tougher competition; takes no initiative in calling these problems to the attention of such parts of the professional power structure as the state high school girls gymnastics association. (35)

APPENDIX B-32

INEFFECTIVE PREVENTION

Coach Behavior Categories that are Very Important Not to Occur and occur Very Frequently

1-Coach background.

Coach Behavior Categories that are Very Important Not to Occur and occur Frequently

1-Coach behavior with respect to the equipment during both practice and competition.

Coach Behavior Categories that are Very Important Not to Occur and occur with Moderate Frequency

1-Coach behavior towards the gymnast - mainly during competition.

Coach Behavior Categories that are Important Not to Occur and occur Frequently

1-Coach behavior with respect to the equipment during both practice and competition.

Coach Behavior Categories that are Moderately Important Not to Occur and occur Very Frequently

1-Coach behavior towards the gymnast - mainly during practice.

Coach Behavior Categories that are Moderately Important Not to Occur and occur with Moderate Frequency

1-Coach management of coaching assistants.

APPENDIX B-33

INEFFECTIVE POST-INJURY CARE

Coach Behavior Categories that are Very Important Not to Occur and occur Very Frequently

1-Coach behavior toward the gymnast during both practice and competition.

Coach Behavior Categories that are Important Not to Occur and occur Frequently

1-Coach behavior toward the gymnast - mainly during competition.

Coach Behavior Categories that are Moderately Important Not to Occur and occur with Moderate Frequency

1-Coach behavior toward the gymnast - mainly during practice.

APPENDIX B-34

Frequency and Corresponding Importance of Categorized Individual Coach Behaviors

EFFECTIVE PREVENTION

Frequency				Importance		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
1	1.7	.82	-takes full advantage of safety aids and apparatus when teaching new movements. (5)	8	1.2	.45
2	1.7	.90	-examines (1) mat placement to insure that they are under and around the area used by each different gymnast and cover the equipment bases as well as (2) mat thickness. (14)	17	1.5	.75
3	1.7	.89	-examines the equipment before warm ups and sees to it that the equipment is adjusted to each gymnast, especially at away meets where the equipment may be unfamiliar. (16)	10	1.2	.52
4	1.8	.82	-develops the gymnast's flexibility through having her do structured stretching exercises. (1)	12	1.3	.58
5	1.9	.81	-teaches new movements to each gymnast only after she has mastered a movement's fundamentals including lead-up skills and progressions. (4)	13	1.4	.65
6	1.9	.89	-moves out of the way any equipment and/or obstacles that are too close to the apparatus in order to provide the gymnast with sufficient space to perform without hitting something. (15)	14	1.4	.61
7	1.9	.76	-precisely judges when a gymnast needs spotting, positions her/himself to offer optimum assistance and steps in at the right moment with the right amount of physical assistance. (10)	9	1.3	.49
8	2.0	.98	-requires and then systematically checks to see that the gymnasts warm up before practice, a meet, and/or a particular event to insure that their bodies are warm, stretched out, and ready to move. (6)	6	1.2	.48

Frequency				Importance		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
9	2.1	.89	-while watching a particular gymnast, has a constructive way of calling attention to faults so that the gymnast actually makes the needed changes. (7)	19	1.7	.76
10	2.2	.79	-accurately senses the gymnast's physical condition in both practice and competition and does not let the gymnast do a movement for which s/he has reason to believe the gymnast does not have the strength, flexibility, or endurance. (9)	1	1.2	.47
11	2.2	1.0	-prevents a gymnast from doing movements that the coach is not completely prepared to spot and/or asks a coach, who is so prepared to spot the gymnast. (11)	3	1.2	.47
12	2.3	.98	-accurately senses the gymnast's mental condition in both practice and competition and either motivates a fearful gymnast to rise above her fear and go for a movement or gets her to wait, despite the pressure to excel.(8)	4	1.2	.47
13	2.3	1.2	-develops the gymnast's strength through having her do conditioning and/or weight training. (2)	16	1.5	.62
14	2.3	1.1	-examines the quality of the equipment, especially at away meets, and stops gymnasts from warming up, practicing, and/or competing on equipment that does not meet safety standards. (13)	18	1.5	.65
15	2.3	.95	-is well trained and experienced in coaching girls gymnastics and updates her/his knowledge in the sport by attending clinics, workshops, seminars, conventions, and/or congresses. (17)	6	1.2	4.8

Frequency				Importance		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
16	2.4	.99	-develops the gymnast's cardiovascular endurance through having her do aerobic activities. (3)	15	1.5	.76
17	2.4	1.0	-discourages having gymnasts act as spotters when they are not very well trained in spotting, especially when high-level movementa are involved. (19)	11	1.3	.57
18	2.4	1.1	-encourages the gymnast to stay in shape throughout the year. (12)	6	1.2	.48
19	2.5	.92	-manages coaching assistants in such a way that they improve their teaching and spotting skills. (18)	2	1.1	.34

APPENDIX B-35

Importance and Corresponding Frequency of Categorized Individual Coach Behaviors

EFFECTIVE PREVENTION

Importance				Frequency		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
1	1.2	.47	-accurately senses the gymnast's physical condition in both practice and competition and does not let the gymnast do a movement for which s/he has reason to believe the gymnast does not have the strength, flexibility, or endurance. (9)	10	2.2	.79
2	1.1	.34	-manages coaching assistants in such a way that they improve their teaching and spotting skills. (18)	19	2.5	.92
3	1.2	.47	-prevents a gymnast from doing movements that the coach is not completely prepared to spot and/or asks a coach, who is so prepared to spot the gymnast. (11)	11	2.2	1.0
4	1.2	.47	-accurately senses the gymnast's mental condition in both practice and competition and either motivates a fearful gymnast to rise above her fear and go for a movement or gets her to wait, despite the pressure to excel. (8)	12	2.3	.98
6	1.2	.47	-requires and then systematically checks to see that the gymnasts are warmed up before practice, a meet, and/or a particular event to insure that their bodies are warm, stretched out, and ready to move. (6)	8	2.0	.98
6	1.2	.48	-is well trained and experienced in coaching girls gymnastics and updates her/his knowledge in the sport by attending clinics, workshops, seminars, conventions, and/or congresses. (17)	15	2.3	.95
6	1.2	.48	-encourages the gymnast to stay in shape throughout the year. (12)	18	2.4	1.1

Importance				Frequency		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
8	1.2	.45	-takes full advantage of safety aids and apparatus when teaching new movements. (5)	1	1.7	.82
9	1.2	.49	-precisely judges when a gymnast needs spotting, positions her/himself to offer optimum assistance, and steps in at the right moment with the right amount of physical assistance. (10)	7	1.9	.76
10	1.3	.52	-examines the equipment before warm ups and sees to it that the equipment is adjusted to each gymnast especially at away meets where the equipment may be unfamiliar. (16)	3	1.7	.90
11	1.3	.57	-discourages having gymnasts act as spotters when they are not very well trained in spotting, especially when high-level movements are involved. (19)	17	2.4	1.03
12	1.3	.58	-develops the gymnast's flexibility through having her do structured stretching exercises. (1)	4	1.8	.82
13	1.4	.65	-teaches new movements to each gymnast only after she has mastered a movement's fundamentals including lead-up skills and progressions. (4)	5	1.9	.80
14	1.4	.61	-moves out of the way any equipment and/or obstacles that are too close to the apparatus in order to provide the gymnast with sufficient space to perform without hitting something. (15)	6	1.9	.89
15	1.5	.76	-develops the gymnast's cardiovascular endurance through having her do aerobic activities. (3)	16	2.4	1.00
16	1.5	.62	-develops the gymnast's strength through having her do conditioning and weight training. (2)	13	2.3	1.2
17	1.5	.75	-examines (1) mat placement to insure that they are under and around the area used by each different gymnast and cover the equipment bases as well as (2) mat thickness. (14)	2	1.7	.90

Importance				Frequency		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
18	1.5	.65	-examines the quality of the equipment, especially at away meets and stops gymnasts from warming up, practicing, and/or competing on equipment that does not meet safety standards. (13)	14	2.3	1.2
19	1.7	.77	-while watching a particular gymnast, has a constructive way of calling attention to faults so that the gymnast actually makes the needed changes. (7)	9	2.1	.89

APPENDIX B-36

Frequency and Corresponding Importance of Categorized Individual Coach Behaviors

INEFFECTIVE PREVENTION

Frequency				Importance		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
1	3.4	1.1	-assumes that the gymnasts warm up before and during practice and/or a meet on their own and does not make the effort to check that the gymnasts are warm, stretched out, and ready to move. (14)	8	1.4	.78
2	3.6	1.2	-has had little experience or no formal or informal training and/or experience in coaching girls' gymnastics. (24)	5	1.3	.70
3	3.6	1.1	-develops a dislike, often unconscious, for a particular gymnast or a particular clique of teammembers and then only infrequently works with her/them. (3)	12	1.4	.82
4	3.6	1.0	-uses unqualified assistants. (26)	22	1.5	.79
5	3.6	1.1	-rarely points out the gymnast's execution faults because the coach doesn't recognize them in the first place or lacks the confidence to explain the faults to the gymnast. (15)	16.5	1.5	.80
6	3.6	1.1	-has done little about developing and implementing fitness programs in weight control, strength, flexibility, and/or endurance for the gymnasts; (1)	13	1.4	.84
7	3.6	1.2	-is so busy coaching that s/he overlooks examining the quality of the equipment, especially at away meets. (20)	20	1.5	.76
8	3.7	1.2	-rarely uses skills progressions or simply assumes that the gymnasts have mastered lead-up skills. (2)	3.5	1.3	.64
9	3.7	1.1	-pushes a freightened gymnast into doing a movement regardless of her anxiety. (16)	10.5	1.4	.79

Frequency				Importance		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
10	3.7	1.0	-has a problem with her/his timing, placement, and/or intensity of the physical spotting used. (19)	18	1.5	.75
11	3.7	.90	-assumes the gymnast is doing a particular movement, places her/himself in a position to spot that movement and then to the coach's surprise the gymnast performs another movement. (5)	14	1.4	.84
12	3.7	1.2	-in a meet pressures the gymnast, who at least has the coach spotting her, into doing a movement that she has not previously mastered. (8)	26	1.6	.94
13	3.8	1.1	-permits gymnasts to perform away from supervision. (13)	7	1.4	.77
14	3.8	1.0	-against the coach's better judgment permits an injured gymnast to compete. (9)	25	1.6	.87
15	3.9	1.0	-doesn't bother to observe the placement of the equipment to make sure that the gymnast has enough space available to perform. (22)	2	1.3	.66
16	3.9	1.0	-pressures the gymnast to perform while she is experiencing severe pain. (18)	21	1.5	.65
17	4.0	1.0	-has an exhausted gymnast continue performing in spite of her overwhelming fatigue. (17)	10.5	1.4	.79
18	4.1	1.0	-permits the gymnast to perform on equipment that does not meet safety standards. (21)	23	1.5	.83
19	4.1	1.1	-sometimes doesn't use safety aids the way they were intended. (4)	9	1.4	.68
20	4.2	.99	-in a meet pressures the gymnast, who isn't even being spotted, into doing a movement that she has not previously mastered. (7)	19	1.5	.91
21	4.3	1.0	-permits a gymnast, disoriented from a fall, to continue competing. (11)	15	1.4	.70

Frequency				Importance		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
22	4.3	.86	-neglects to adjust the equipment before warm ups, practice, and/or competition to see to it that it is adjusted for each gymnast, especially at away meets where the equipment may be unfamiliar. (23)	1	1.2	.60
23	4.4	.91	-yells and thereby embarrasses a gymnast who has just fallen or committed some other execution faults. (12)	16.5	1.5	.79
24	4.4	.90	-doesn't get around to teaching the gymnast a new movement or even a complete routine until the meet warm ups and then goes as far as to require the gymnast to perform the movement/routine in the meet. (6)	6	1.3	.70
25	4.4	.85	-even though rules permit a coach to talk to a potentially injured gymnast, refrains from talking to the gymnast after she has fallen hard from the apparatus for fear of losing points. (10)	24	1.5	.78
26	4.6	.80	-when given the opportunity, refuses to employ an assistant coach to work with a team too large to be handled by one coach; prefers working with the team all alone. (25)	3.5	1.3	.68

APPENDIX B-37

Importance and Corresponding Frequency of Categorized Individual Coach Behaviors

INEFFECTIVE PREVENTION

Importance				Frequency		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
1	1.2	.60	-neglects to adjust the equipment before warm ups, practice, and/or competition to see to it that it is adjusted for each gymnast, especially at away meets where the equipment may be unfamiliar. (23)	22	4.3	.86
2	1.3	.66	-doesn't bother to observe the placement of the equipment to make sure that the gymnast has enough space available to perform. (22)	15	3.9	1.0
3.5	1.3	.68	-rarely uses skills progressions or simply assumes that the gymnasts have mastered lead-up skills. (2)	8	3.7	1.2
3.5	1.3	.69	-when given the opportunity, refuses to employ an assistant coach to work with a team too large to be handled by one coach; prefers working with the team all alone. (25)	26	4.6	.80
5	1.3	.70	-has had little experience or no formal or informal training and/or experience in coaching girls gymnastics. (24)	2	3.6	1.2
6	1.3	.70	-doesn't get around to teaching the gymnast a new movement or even a complete routine until the meet warm ups and then goes as far as to require the gymnast to perform the movement/routine in the meet. (6)	24	4.4	.90
7	1.4	.77	-permits gymnasts to perform away from supervision. (13)	13	3.8	1.1
8	1.4	.78	-assumes that the gymnasts warm up before and during practice and/or a meet on their own and does not make the effort to check that the gymnasts are warm, stretched out, and ready to move. (14)	1	3.4	1.1

Importance				Frequency		
Rank	Mean	S.D.	Individual Coach Behavior Statement	Rank	Mean	S.D.
9	1.4	.68	-sometimes doesn't use safety aids the way they were intended. (4)	19	4.1	1.1
10.5	1.4	.79	-pushes a freightened gymnast into doing a movement regardless of her anxiety. (16)	9	3.7	1.1
10.5	1.4	.79	-has an exhausted gymnast continue performing in spite of her overwhelming fatigue. (17)	17	4.1	1.0
12	1.4	.82	-develops a dislike, often unconscious, for a particular gymnast or a particular clique of teammembers and then only infrequently works with her/them. (3)	3	3.6	1.1
13	1.4	.84	-has done little about developing and implementing fitness programs in weight control, strength, flexibility, and/or cardiovascular endurance for the gymnasts. (1)	6	3.6	1.1
14	1.4	.84	-assumes the gymnast is doing a particular movement, places her/himself in a position to spot that movement and then to the coach's surprise the gymnast performs another movement. (5)	11	3.7	.90
15	1.4	.70	-permits a gymnast, disoriented from a fall, to continue competing. (11)	21	4.3	1.0
16.5	1.5	.79	-yells and thereby embarrasses a gymnast who has just fallen or committed some other execution faults. (12)	5	3.6	1.1
16.5	1.5	.79	-rarely points out the gymnast's execution faults because the coach doesn't recognize them in the first place or lacks the confidence to explain the faults to the gymnast. (15)	23	4.4	.91
18	1.5	.75	-has a problem with her/his timing, placement, and/or intensity of the physical spotting used. (19)	10	3.7	1.0

Importance				Frequency		
Rank	Mean	S.D.	Individual Coach Behavior Statements	Rank	Mean	S.D.
19	1.5	.91	-in a meet pressures the gymnast, who isn't even being spotted, into doing a movement that she has not previously mastered. (7)	20	4.2	.99
20	1.5	.76	-is so busy coaching that s/he overlooks examining the quality of the equipment, especially at away meets. (20)	7	3.6	1.1
21	1.5	.65	-pressures the gymnast to perform while she is experiencing severe pain. (18)	16	3.9	1.0
22	1.5	.79	-uses unqualified assistants. (26)	4	3.6	1.0
23	1.5	.83	-permits the gymnast to perform on equipment that does not meet safety standards. (21)	18	4.1	1.0
24	1.5	.78	-even though rules permit a coach to talk to a potentially injured gymnast, refrains from talking to the gymnast after she has fallen hard from the apparatus for fear of losing points. (10)	25	4.4	.85
25	1.6	.87	-against the coach's better judgment permits an injured gymnast to compete. (9)	14	3.8	1.0
26	1.6	.94	-in a meet pressures the gymnast, who at least has the coach spotting her, into doing a movement that she has not previously mastered. (8)	12	3.7	1.2

APPENDIX B-38

Frequency and Corresponding Importance of Categorized Individual Coach Behaviors

EFFECTIVE POST-INJURY CARE

Frequency				Importance		
Rank	Mean	S.D.	Individual Coach Behavior Statements	Rank	Mean	S.D.
1	1.8	.69	-stays in control while examining and treating an injury no matter how severe. (23)	1	1.1	.34
2	1.8	.92	-stops whatever s/he is doing and gives immediate attention to an injured gymnast. (24)	4	1.3	.57
3	1.8	.75	-administers no more than appropriate first aid; in the case of the relatively rare, potentially serious injury accurately judgen when to send the gymnast to an athletic trainer and/or physician for further evaluation and treatment.(22)	2	1.1	.39
4	2.2	1.1	-keeps a stocked first aid kit on hand at all practices and at all home and away meets. (25)	5	1.3	.66
5	2.2	1.0	-after an injury, makes a quick and accurate assessment of its severity. (21)	3	1.3	.52
6	2.5	.96	-is well trained and experienced in first aid and updates her/his knowledge by attending clinics, workshops, seminars, conventions, and/or congresses. (20)	6	1.4	.61

APPENDIX B-39

Importance and Corresponding Frequency of Categorized Individual Coach Behaviors

EFFECTIVE POST-INJURY CARE

Importance				Frequency		
Rank	Mean	S.D.	Individual Coach Behavior Statements	Rank	Mean	S.D.
1	1.1	.34	-stays in control while examining and treating an injury no matter how severe. (23)	1	1.8	.69
2	1.1	.39	-administers no more than appropriate first aid; in the case of the relatively rare, potentially serious injury accurately judges when to send the gymnast to an athletic trainer and/or physician for further evaluation and treatment. (22)	3	1.8	.75
3	1.3	.52	-after an injury, makes a quick and accurate assessment of its severity. (21)	5	2.2	1.0
4	1.3	.57	-stops whatever s/he is doing and gives immediate attention to an injured gymnast. (24)	2	1.8	.92
5	1.3	.66	-keeps a stocked first aid kit on hand at all practices and at all home and away meets. (25)	4	2.2	1.1
6	1.4	.61	-is well trained and experienced in first aid and updates her/his knowledge by attending clinics, workshops, seminars, conventions, and/or congresses. (20)	6	2.5	.96

APPENDIX B-40

Frequency and Corresponding Importance of Categorized Individual Coach Behaviors

INEFFECTIVE POST-INJURY CARE

Frequency				Importance		
Rank	Mean	S.D.	Individual Coach Behavior Statements	Rank	Mean	S.D.
1	3.5	1.1	-has problems using taping to support weak body structures.(31)	8	1.5	.79
2	3.8	1.1	-does not have available a stocked first aid kit on hand at all practices and at all home and away meets. (34)	7	1.4	.83
3	4.0	1.1	-misses identifying a serious injury. (30)	3	1.3	.68
4	4.3	.94	-gives first aid low priority. (29)	4	1.3	.69
5	4.4	.92	-takes misplaced pride in her/his first aid skills and refuses assistance from an athletic trainer or another coach. (33)	5	1.4	.72
6	4.4	.88	-loses self-control after discovering that the gymnast has a severe injury. (32)	6	1.4	.77
7	4.5	.96	-so that the meet can continue, tells the gymnast who has fallen hard to move immediately or ven pulls the gymnast up to her feet before examining her. (28)	1	1.2	.60
8	4.6	.80	-after a gymnast has seen a physician following an accident and even though the physician's instructions are that the gymnast rest and take time off to recover, orders the gymnast resume practice as of now. (27)	2	1.3	.66

APPENDIX B-41

Importance and Corresponding Frequency of Categorized Individual Coach Behaviors

INEFFECTIVE POST-INJURY CARE

Importance				Frequency		
Rank	Mean	S.D.	Individual Coach Behavior Statements	Rank	Mean	S.D.
1	1.2	.60	-so that the meet can continue, tells the gymnast who has fallen hard to move immediately or even pulls the gymnast up to her feet before examining her. (28)	7	4.5	.96
2	1.3	.66	-after a gymnast has seen a physician following an accident and even though the physician's instructions are to recover, orders the gymnast resume practice as of now. (27)	8	4.6	.80
3	1.3	.68	-misses identifying a serious injury. (30)	3	4.0	1.1
4	1.3	.69	-gives first aid low priority. (29)	4	4.3	.94
5	1.4	.72	-takes misplaced pride in her/his first aid skills and refuses assistance from an athletic trainer or another coach. (33)	5	4.4	.92
6	1.4	.77	-loses self-control after discovering that the gymnast has a severe injury. (32)	6	4.4	.88
7	1.4	.83	-does not have available a stocked first aid kit on hand at all practices and at all home and away meets. (34)	2	3.8	1.1
8	1.5	.79	-has problems using taping to support weak body structures. (31)	1	3.5	1.1

APPENDIX B-42

Frequency and Corresponding Importance of Categorized Individual Coach Behaviors

INEFFECTIVE PREVENTION AND POST-INJURY CARE - General Behaviors that apply to both

Frequency				Importance		
Rank	Mean	S.D.	Individual Coach Behavior Statements	Rank	Mean	S.D.
1	3.2	1.1	-leaves it to someone else to arouse the community including the school administration to make progress toward solving such perennial problems as: too small an athletic budget to obtain or replace desperately needed equipment; insufficient amount of permitted practice time in the school schedule; too many meets in the season; too much pressure to win. (36)	1	1.6	.79
2	3.4	1.2	-accepts the situation as it is with respect to such long term professional problems as not a long enough season to get gymnasts into shape, too few qualified coaches at the high school level, increasingly difficult event requirements, and tougher and tougher competition; takes no initiative in calling these problems to the attention of such parts of the professional power structure as the state high school girls athletic association. (35)	2	1.7	.85

APPENDIX B-43

Frequency and Corresponding Importance of Categorized Coach Behavior Categories

EFFECTIVE PREVENTION

Frequency				Importance		
Rank	Mean	S.D.	Coach Behavior Categories	Rank	Mean	S.D.
1	1.8	.75	Coach background.(N=1)	2	1.2	.48
2	1.9	.82	Coach behavior with respect to the equipment during practice and competition. (N=4)	1	1.2	.38
3	2.0	.63	Coach behavior towards the gymnast-mainly during practice.(N=5)	3	1.3	.31
4	2.1	.58	Coach behavior towards the gymnast-during both practice and competition. (N=7)	4	1.4	.43
5	2.5	.87	Coach management of coaching assistants.(N=2)			

Key

N = the number of individual coach behaviors within each category.

APPENDIX B-44

Importance and Corresponding Frequency of Categorized Coach Behavior Categories

EFFECTIVE PREVENTION

Importance				Frequency		
Rank	Mean	S.D.	Coach Behavior Categories	Rank	Mean	S.D.
1	1.2	.38	-Coach behavior with respect to the equipment during practice and competition.(N=4)	2	1.0	.82
2	1.2	.48	-Coach background.(N=1)	1	1.8	.75
3	1.3	.31	-Coach behavior towards the gymnast-mainly during practice.(N=5)	3	2.0	.63
4	1.4	.43	-Coach behavior towards the gymnast during both practice and competition.(N=7)	4	2.1	.58
5	1.5	.59	-Coach management of coaching assistants.(N=2)	5	2.5	.87

APPENDIX B-45

Frequency and Corresponding Importance of Categorized Coach Behavior Categories

INEFFECTIVE PREVENTION

Frequency				Importance		
Rank	Mean	S.D.	Coach Behavior Categories	Rank	Mean	S.D.
1	3.6	1.2	-Coach background.(N=1)	1	1.3	.57
2	3.8	.81	-Coach behavior towards the gymnast-mainly during practice.(N=5)	4.5	1.5	.62
3	3.8	.80	-Coach behavior towards the gymnast-during both practice and competition. (N=7)	3	1.5	.68
4	4.0	.86	-Coach behavior with respect to the equipment during both practice and competition. (N=4)	4.5	1.5	.62
5	4.1	.80	-Coach management of coaching assistants.(N=2)	6	1.5	.73
6	4.2	.76	-Coach behavior towards the gymnast-mainly during competition.(N=7)	2	1.3	.59

APPENDIX B-46

Importance and Corresponding Frequency of Categorized Coach Behavior Categories

INEFFECTIVE PREVENTION

Importance				Frequency		
Rank	Mean	S.D.	Coach Behavior Categories	Rank	Mean	S.D.
1	1.3	.57	-Coach background.(N=1)	1	3.6	1.2
2	1.3	.59	-Coach behavior towards the gymnast-mainly during competition.(N=7)	6	4.2	.76
3	1.5	.68	-Coach behavior towards the gymnast during both practice and competition.(N=7)	3	3.8	.80
4.5	1.5	.62	-Coach behavior towards the gymnast-mainly during practice.(N=5)	2	3.8	.81
4.5	1.5	.62	-Coach behavior with respect to the equipment during both practice and competition.(N=4)	4	4.0	.[illegible]
6	1.5	.73	-Coach management of coaching assistants.(N=2)	5	4.1	.80

APPENDIX B-47

Frequency and Corresponding Importance of Categorized Coach Behavior Categories

EFFECTIVE POST-INJURY CARE

Frequency				Importance		
Rank	Mean	S.D.	Coach Behavior Category	Rank	Mean	S.D.
1	2.0	.67	-Coach behaviors during both practice and competition.(N=5)	1	1.2	.32

INEFFECTIVE POST-INJURY CARE

Frequency				Importance		
Rank	Mean	S.D.	Coach Behavior Category	Rank	Mean	S.D.
1	4.0	.79	-Coach behavior during both practice and competition.(N=6)	1	1.3	.60
2	4.5	.96	-Coach behavior mainly during competition.(N=1)	3	2.0	1.1
3	4.6	.80	-Coach behavior mainly during practice.(N=1)	2	1.3	.65

APPENDIX B-48

Importance and Corresponding Frequency of Categorized Coach Behavior Categories

EFFECTIVE POST-INJURY CARE

Importance				Frequency		
Rank	Mean	S.D.	Coach Behavior Category	Rank	Mean	S.D.
1	1.2	.32	-Coach behaviors during both practice and competition.(N=5)	1	2.0	.67

INEFFECTIVE POST-INJURY CARE

Importance				Frequency		
Rank	Mean	S.D.	Coach Behavior Category	Rank	Mean	S.D.
1	1.3	.60	-Coach behavior during both practice and competition.(N=6)	1	4.0	.78
2	1.3	.65	-Coach behavior mainly during practice.(N=1)	3	4.6	.80
3	1.9	1.1	-Coach behavior mainly during competition.(N=1)	2	4.5	.96

APPENDIX B-49

Frequency and Corresponding Importance of Categorized Coach Behavior Categories

INEFFECTIVE PREVENTION AND POST-INJURY CARE

Frequency				Importance		
Rank	Mean	S.D.	Coach Behavior Category	Rank	Mean	S.D.
1	3.3	1.1	-General coach behaviors that apply to both ineffective prevention and post-injury care.(N=2)	1	1.7	.75

Importance and Corresponding Frequency of Categorized Coach Behavior Categories

INEFFECTIVE PREVENTION AND POST-INJURY CARE

Importance				Frequency		
Rank	Mean	S.D.	Coach Behavior Category	Rank	Mean	S.D.
1	1.7	.75	-General coach behaviors that apply to both ineffective prevention and post-injury care.(N=2)	1	3.3	1.1

BIBLIOGRAPHY

BIBLIOGRAPHY

Albohm, Marge. "How Injuries Occur in Girls' Sports." The Physician and Sportsmedicine 3 (February 1976): 46-49.

Allman, Fred L. "The Major Concerns and Challenges in Sports Safety." Sports Safety 2. Proceedings of the Second National Sports Safety Conference, 1976.

American Association for Health, Physical Education and Recreation. "Liability for Injuries in Athletics." Coaches Handbook. Washington, D.C.: AAHPER Publications, 1974.

_____. Professional Preparation in Physical Education and Coaching. Washington, D.C.: AAHPER Publications, 1974.

Bailey, F. Lee. "Coach's Liability, The Coach's Day in Court." Coach and Athlete (March 1981): 14-18.

Beckley, Sissley. "Professional Preparation of Women Coaches--A Plea to Provide Opportunities for Women to Develop Coaching Competencies." Journal of Health, Physical Education, and Recreation (May 1976): 87-91.

Blake, Roland P. Industrial Safety. 2nd ed. Englewood Cliffs, N.J.: Prentice-Hall, 1953.

Bowers, Carolyn Osborn; Fie, Jackie Klein; and Schmidt, Andrea Bodo. Judging and Coaching Women's Gymnastics. 2nd ed. Palo Alto, Calif.: Mayfield Publishing Co., 1981.

Buckley, William E. "Five Year Overview of Sports Injuries: The NAIRS Model." Journal of Physical Education, Recreation, and Dance (June 1982): 36-40.

Carr, Gerald A. Safety in Gymnastics. North Vancouver, B.C.: Hancock House Publishers, 1980.

Christensen, Charlene; Clarke, Kenneth S.; Cardinal, Rod; and Arnold, Don. Third Annual National Gymnastic Catastrophic Injury Report 1980-1981. Urbana-Champaign: University of Illinois, March 1981.

_____, Fourth Annual Gymnastic Catastrophic Injury Report 1981-1982. Urbana-Champaign: University of Illinois, April 1982.

Christian, Vaughn. "Certification of Coaches." The Athletic Educator's Report (February 1980): 1-8.

Clarke, Kenneth S. Second Annual National Gymnastic Catastrophic Injury Report 1979-1980. Urbana-Champaign: University of Illinois, December 1980. (a)

_____, "Women's Injuries in Collegiate Sports." The American Journal of Sports Medicine 8 (1980): 187-91. (b)

Dolan, Joseph P., and Lloyd J. Holladay. Treatment and Prevention of Athletic Injuries. 3rd ed. Danville, Ill.: The Interstate Printers and Publishers, 1967.

Ebel, Robert L. Essentials of Educational Measurement. 3rd ed. Englewood Cliffs, N.J.: Prentice-Hall, 1979.

Eisenberg, Iris, and Allen, William C. "Injuries in a Women's Varsity Athletic Program." The Physician and Sportsmedicine (March 1978): 112-20.

Esslinger, Arthur A. "Certification for High School Coaches." Journal of Health, Physical Education, and Recreation (October 1968): 42-45.

_____, "A Proposed Plan for Certification of High School Coaches." Certification of High School Coaches. Washington, D.C.: AAHPER Publications, 1971.

Finkle, R. B. "A Study of the Critical Requirements of Foremanship." University of Pittsburgh Bulletin 46 (1950): 291-297. (Abstract)

Flanagan, John C. "The Critical Incident Technique." Psychological Bulletin 51 (July 1954): 327-58.

_____, "Critical Requirements: A New Approach to Employee Evaluation." Personnel Psychology 2 (1949): 419-25.

_____, "Principles and Procedures in Evaluating Performance." Personnel 28 (July 1951-May 1952): 373-86.

Folley, J. D., Jr. "Development of a List of Critical Requirements for Retail Sales Personnel From the Standpoint of Customer Satisfaction." Master's thesis, University of Pittsburgh, 1953.

Frazier, Charles S. "Sports Litigation." Coach and Athlete (1979): 11, 19.

Ganim, Ronald, and Weiker, Garron. "A Prospective Statistical Analysis of Gymnastics Injuries on the Club Gymnastics Level." Included in correspondence to the writer from Ronald Ganim, October 22, 1983.

Garrick, James G., and Requa, Ralph. "Epidemiology of Women's Gymnastics Injuries." The American Journal of Sportsmedicine 8 (1980): 261-64.

_____, "Girls' Sport Injuries in High School Athletics." Journal of the American Medical Association 239 (May 26, 1978): 2245-48.

_____, "Medical Care and Injury Surveillance in the High School Setting." The Physician and Sportsmedicine 9 (February 1981): 115-20.

Giles, John Warren. "Liability of Coaches and Athletic Instructors." The Athletic Journal (February 1962): 18-19.

Gillette, Joan V. "When and Where Women Are Injured in Sports." The Physician and Sportsmedicine 3 (May 1975): 61-63.

Good, Carter V. Essentials of Education Research. New York: Appleton-Century-Crofts, 1966.

Gregory, Charles F. "Orthopaedics and the Impact of Learning Theory." Journal of Medical Education 44 (July-December 1969): 777-83.

Greenwald, Andrew E. "When Is It My Fault?" USGF Gymnastics (September/October 1983): 30-31.

Grimaldi, John V., and Simmonds, Roland H. Safety Management. 3rd ed. Homewood, Ill.: R. D. Irwin, 1975.

Haddon, William; Suchman, Edward A.; and Klein, David. Accident Research: Methods and Approaches. New York: Harper and Row, 1964.

Hage, Philip. "Gymnastics Injuries Due to Poor Spotting." The Physician and Sportsmedicine 11 (May 1983): 26.

_____, and Moore, Mike. "Medical Care for Athletes: What Is the Coach's Role?" The Physician and Sportsmedicine 9 (1981): 140-51.

Hansen, James; Himes, Bonnie; Dowd, Thomas; and Sartone, Richard. "Critical Incidents in Consultation." Elementary School Guidance and Counseling 11 (1976-1977): 291-95.

Haycock, Christine E., and Gillette, Joan V. "Susceptibility of Women Athletes to Injury." Journal of the American Medical Association 236 (July 12, 1976): 163-65.

Heinrich, H. W. Industrial Accident Prevention. New York: McGraw-Hill, 1959.

Holdren, Edward. "Improving the Preparation of High School Coaches." Certification of High School Coaches. Washington, D.C.: AAHPER Publications, 1971.

Ingram, Cregg G., and Blackhurst, A. Edward. "Teaching and Advising Competencies of Special Education Professors." Exceptional Children 42 (1975-1979): 85-93.

International Labour Office. Accident Prevention. 4th ed. Geneva: La Tribune de Geneve, 1964.

Isabelle, Edmund; Feigley, David A.; and Kruger, Hayes. "Developing Safety Awareness." Gymnastics Safety Manual. University Park: The Pennsylvania State University Press, 1977.

Jackson, Douglas W.; Wiltsse, Leon L.; and Cirincione, Robert G. "Sponsylosis in the Female Gymnast." Clinical Orthopaedic and Related Research 117 (June 1976): 68-73.

Jensen, Alfred C. "Determining Critical Requirements for Teachers." Journal of Experimental Education 20 (September 1951-June 1952): 79-85.

Kaufman, H. G. "A Critical Incident Study of Personal Characteristics Associated With Technical Obsolescence Among Engineers." Personnel Psychology 5 (Spring 1973): 63-67.

Kay, Brian R. "Key Factors in Effective Foreman Behavior." Personnel 36 (1959): 25-31.

Kirchner, Wayne K., and Dunnette, Marvin D. "Identifying the Critical Factors in Successful Salesmanship." Personnel (September-October 1957): 54-59.

Komaki, Judi; Barwick, Kenneth; and Scott, Lawrence. "A Behavioral Approach to Occupational Safety: Pinpointing and Reinforcing Safe Performance in a Food Manufacturing Plant." Journal of Applied Psychology 63 (1978): 434-45.

Landy, Frank J. The Measurement of Work Performance Methods, Theory and Application. New York: Academic Press, 1985.

Langerman, Samuel, and Fidel, Noel. "Responsibility Is Also Part of the Game." TRIAL Magazine (January 1977): 22-25.

Leibee, Howard C. "Standard of Care in Coaching Sports." Certification of High School Coaches. Washington, D.C.: AAHPER Publications, 1971.

Leles, Sam. "Using the Critical Incident Technique to Develop a Theory of Educational Professionalism: An Exploratory Study." Journal of Teacher Education 29 (Spring 1968): 59-69.

Lindstrom, David J., and Kalenak, Alexander. "Medical Responsibility in the Gymnasium." Gymnastics Safety Manual. University Park: The Pennsylvania State University Press, 1977.

Lippert, Frederick G. Accident Prevention Administration. New York: McGraw-Hill, 1947.

Lloyd, Frank S. Safety in Physical Education in Secondary Schools. New York: National Bureau of Casualty and Surety Underwriters, 1933.

Lowerberg, Geula. "Interindividual Consistencies in Determining Behavior-Based Dimensions of Teaching Effectiveness." Journal of Applied Psychology 64 (1979): 492-501.

Lowry, Cathy, and Leveau, Barney F. "A Retrospective Study of Gymnastics Injuries to Competitors and Noncompetitors in Private Clubs." The American Journal of Sports Medicine 10 (1982): 237-39.

Machungwa, Peter David. "Work Motivation in Zambia: An Exploratory Study." Ph.D. dissertation, Michigan State University, 1981.

Maetozo, Matthew. "Standards of Professional Preparation for Athletic Coaches." Certification of High School Coaches. Washington, D.C.: AAHPER Publications, 1971.

_____, ed. "Required Specialized Preparation for Coaching." Journal of Health, Physical Education, and Recreation (April 1971): 12-13.

Muckle, David Sutherland. Football Fitness and Injuries. London: Pelham, 1975.

Nathanson, Stephen J. "Athletic Coaching Competencies." Journal of Physical Education and Recreation (May 1979): 37, 60. (a)

_____. "The Identification of Competencies Appropriate for Athletic Coaches and Recommendations for a Competency Based Coaching Education Program for the Four Year Colleges and Universities in the City University of New York and the State University of New York." Ed.D. dissertation, New York University, 1979. (b)

Nevins, Charlotte I. "An Analysis of Reasons for the Success or Failure of Bookkeepers in Sales Companies." Master's thesis, University of Pittsburgh, 1949.

Obremsky, Peter L. "Instructor's Duty Includes Supervision of Athletes." The First Aider 46 (February 1977): 1, 7, 14.

Orlofsky, Fred. "A Study of Injuries in the Sport of Gymnastics in Selected Schools and Colleges and Proposed Standards for Improved Safety." The Modern Gymnast (October 1968): 50.

Priest, James D., and Weise, Debra J. "Elbow Injury in Women's Gymnastics." The American Journal of Sports Medicine 9 (1981): 288-95.

Redfearn, Richard W. "Are High School Athletes Getting Good Health Care?" The Physician and Sportsmedicine 3 (August 1975): 24-29.

_____. "Emergency Medical Skills in High School Coaches." The Physician and Sportsmedicine 8 (November 1980): 115-16. (a)

_____. "The Physician's Role in School Sports Programs." The Physician and Sportsmedicine 8 (September 1980): 67-71. (b)

Reilly, Richard R. "Factors in Graduate Student Performance." American Educational Research Journal 13 (Spring 1976): 125-28.

Roff, Merrill. "A Study of Combat Leadership in the Air Force by Means of a Rating Scale: Group Differences." Journal of Psychology 30 (1950): 229-39.

Sands, Bill. "Data Reveals Potential Patterns, Injury Data NCAA Female Gymnasts 1983-1984." United States Gymnastics Federal Technique Journal (October 1981): 7, 22.

Santapolo, Frank A., and Kell, Karolyn. "Paraprofessionals: Critical Job Requirements." Journal of Extension 14 (1976): 6-10.

Shaffer, Thomas E. "For Women, Greater Risks in Gymnastics." The Physician and Sportsmedicine 2 (1974): 23.

Shroyer, George F. "Coach's Legal Liability for Athletic Injuries." Scholastic Coach 34 (1977): 18-19.