THE CONSTRUCTION OF A SKILL TEST

FOR POINT CONTROL IN FENCING

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The purpose of the study was to construct and standardize a point-control test to be used to determine beginning fencing ability in a bouting situation. The specific problem was to determine the reliability and validity of the point-control test.

Twenty-one men and women were subjects in two pilot studies conducted to establish basic test-construction techniques. The subjects for the final test were forty-five men and women, all of whom were participating in physical education fencing classes in the Department of Physical Education at North Texas State University, in the spring semester of 1973. The point-control test was administered to the subjects at the completion of a seven-week round-robin tournament conducted in each of three beginning fencing classes. Performance scores on each of three thirty-second trials were recorded. Two days later, the test was again administered to the subjects.

The Pearson product-moment coefficient of correlation was used to determine the reliability and validity of the point control test for the forty-five subjects as a total group as well as by class rank. The average score of the three thirty-second trials on the pretest was correlated with the average score of the three thirty-second trials on the posttest. The reliability coefficient was .83 for the subjects' performance as a single group and .74, .78, and .87 for subjects' performance when computed on a class basis. The coefficient .74 was significant at the .01 level of confidence. The reliability coefficients indicated a high relationship between the test and retest.

The validity coefficient of correlation was computed between the subjects' average score of three trials on the posttest and their tournament ranking according to the formula used by Singer. Ranking was established by taking the total touches which a fencer made against the opponent and dividing this total by the number of contests in the tournament. The validity coefficient was .33 for the subjects' performance as a single group. This coefficient of correlation was significant at the .05 level of confidence. The validity coefficients were .12, .32, and .34 respectively for the three classes.

None of the coefficients, with fifteen subjects in each class, was significant at the .05 level of confidence. The degree of relationship between the criterion of a round-robin tournament and the point-control test was low.

The study concluded that the point-control test, as administered in the study, is a reliable test. The point control test has a low validity and does not sufficiently predict a beginning fencer's bouting ability.

CONSTRUCTION OF A SKILL TEST FOR POINT CONTROL IN FENCING

THESIS

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North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

By

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CHAPTER I

INTRODUCTION

One of the responsibilities which confronts educators is the evaluation of student achievement through various forms of measurement. Physical educators consider performance an essential criterion in the assessment of student progress. Consequently, skill tests are devised to measure this aspect of motor learning in the activity classes included in the physical education curriculum.

Fencing has only recently begun to gain popularity among students at the high school and college levels (1). The inherent qualities of this activity which include coordination, balance, agility, rapid perception, grace, and a keen sense of timing, make it a desirable sport for the program in physical education. It also is an activity which may be used throughout life, for fencing bouts are appropriate for two people or for small groups competing upon a team basis. The increased emphasis placed upon fencing in the physical education curriculum creates a need for effective evaluative tools to be used in this activity.

Although fencing began as practice for mortal combat, it is now one of the most refined of the combative sports (3). The control of a fencer's blade and the direction of his point become important techniques to master and control.

> The correct execution of the hit is, perhaps, the most important part of a fencer's technique. Before learning any stroke he should be taught to strike correctly from any distance and from a variety of angles. He must, in other words, develop a sense of point that will enable him to control and direct it [hit] (2).

Point control is the basic skill in fencing. Therefore, it is important to develop a valid test which will measure this component. It is hoped that this study will provide test data for teachers and coaches to use in measuring a student's achievement of point control and general fencing ability. Further, it is hoped that the testing instrument developed for this study might serve as an additional apparatus which can be used as a practice device for point control as well as other isolated skills in fencing.

Statement of the Problem

This study involved the construction and validation of a skill test for point control in fencing to be used to determine beginning fencing ability in a bouting situation.

Purposes of the Study

The purposes of the study were

1. To construct and standardize a test to measure point control of beginning fencers.

2. To determine the reliability and validity of the point-control test.

3. To determine the relationship of the point-control test to the general bouting ability of an individual in beginning fencing.

Definition of Terms

The following terms and definitions were used in the study:

1. Fencing Measure.--The practical distance between two fencers which allows for a good touch upon execution of the lunge.

2. Lunge.--Fundamental movement in the attack used to reach the opponent's target.

3. On Guard.--The position of feet, body, and arms, adopted by the fencer preparatory to actions of an offensive or defensive nature.

4. Parry.--Defensive action executed with the blade, or guard, or both, that blocks, deviates, or deflects the opponent's offensive action from scoring.

5. Position of Four.--A parrying position used by fencers to protect their inside line.

6. Point Control.--The ability of the fencer to purposefully move his blade, particularly the point, in a fencing situation.

Scope of the Study

The study was limited to testing the point control of sixty men and women enrolled in three beginning fencing classes at North Texas State University in Denton, Texas, during the spring semester, 1973. It was further limited to a ranking of students competing in a seven week round-robin tournament at the end of the semester.

Summary

Fencing has only recently begun to gain popularity among students at the high school and college levels. This increased emphasis in fencing creates a need for effective evaluative tools to be used in this activity. The present investigation is an attempt to construct and validate a skill test for point control in fencing.

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CHAPTER II

REVIEW OF LITERATURE

An extensive investigation of the literature revealed a limited number of studies directly related to the activity of fencing. The literature reviewed was selected because of its relationship to test construction, fencing skill tests, and essential qualities in fencing performance. Studies pertaining to the evaluation of selected aspects of sports skills are also included in this chapter.

Several authorities in test construction have established criteria which are essential for the development of skill tests. According to Scott (16) a skill test of any type should be constructed so that it meets certain standards:

1. The test should be as nearly identical to the skill as possible and should measure the individual's ability to perform a skill basic to the sport.

2. The test should be easily administered.

3. The test should be made so that it can be scored objectively.

4. The test should provide a sufficient number of trials.

Johnson and Nelson (10) emphasized that validity, reliability, objectivity, and norms are the four most basic concepts in test construction and evaluation, and these factors are to be assessed according to the following operational definitions:

1. Validity refers to the degree to which a test measures what it is designated to measure.

2. Reliability is the consistency to which the test measures each student's ability.

3. Objectivity pertains to the clarity of the directions for administering and scoring the test.

4. Norms are values that represent a specified population, and are important in providing information for interpretation of scores obtained on a given test.

Individuals with expertise in fencing have emphasized the need to develop specific skills for quality performance. Joseph Vince (21) stated that correct distance, timing, lightening-like speed, and accuracy of the point are essential attributes for a successful attack. The importance of accuracy and control of the point becomes an essential aspect of the fencing bout. He further explains that accuracy of the point is based upon perfect control of the blade. If the blade is not under

refined control, the point may land flat, thus invalidating the touch.

Nadi (14) and Castello (2) consider the attack and parry riposte to be the "backbone" of foil fencing and each skill is dependent upon the fencer's ability to control his point. Other well-known fencing authorities (4, 5, 20, 21) report that the key phrase used by instructors when teaching offensive and defensive patterns is to "keep the foil in line."

Only three studies have been conducted which were related to the development of specific skill tests in fencing. General fencing ability as well as other experimental variables were included in the investigations.

Rabke (15) constructed a battery of tests to measure a fencer's leg quickness, arm quickness, point control of foil, length of lunge, and vision. In the assessment of point control, Rabke used a wall test that consisted of concentric circles twelve inches in diameter. Subjects were placed behind a restraining line at lunging distance from the wall. She assumed that her test had face validity and determined the reliability by an odd-even correlation. The test consisted of six lunges by each subject with an obtained reliability of .26. This obtained coefficient was increased to .41 by application of the Spearman-Brown prophecy formula. If the total

number of trials had been increased the predicted reliability would have been .74. Rabke concluded that (a) all the experimental tests used in her investigation represented a portion of general fencing ability and (b) the point-control test, with the number of trials increased from six to twenty-four, was a reliable fencing measure.

Singer (17) devised an apparatus to determine reaction time, response time, and accuracy of the thrust movement in fencing of sixty-six female college students. The apparatus consisted of a target of concentric circles and a device to record the reaction-response time of each lunge. He concluded that the research was inadequate due to the laboratory tasks for predicting foil-fencing success, but that reaction and responses as well as accurate movements are thought to play a large role in determining fencing achievement.

Cooper (3) developed a fencing skill test to measure the ability of beginning collegiate women fencers to use the advance, beat, and lunge. The test consisted of three trials. Subjects were instructed to watch for a delayed neon light signal, take one advance, beat a foil away that was extended mechanically in the path of the fencer, and lunge at a target on the wall. The interval of time between the light stimulus and the completed touch on the target was recorded, and no

significant differences were found between extremes of tall and short performers. A correlation of .28 indicated no significant relationship between form ratings and speed scores for beginners.

Several studies have been conducted which used the results of a round-robin tournament as the criterion measure for validation of skill tests. This particular method has been incorporated in a variety of sport activities.

Hewitt (8) investigated the validity of the backboard tennis test with the results of a round-robin tournament for beginning players. In his revision of the Dyer backboard tennis test, three thirty-second trials were given and the average of the three was used for computation. Correlation coefficients ranging from .68 to .73 indicated that the backboard test was a valid measure of playing ability.

Miller (13) used a round-robin tournament and a skill test to determine the ability of a badminton player to hit high clears. The subject volleyed the shuttlecock above a net line marked seven feet six inches on a wall space. Three thirty-second trials were given each subject. The sum of the three trials on the pre-test was correlated with the sum of the three trials on the post-test revealing a reliability coefficient of .94. A round-robin tournament was used as the criterion to

validate the test, and a coefficient of .83 was found. The results indicated the volley test was a reliable and valid measure of total playing ability in badminton.

Hilding (9) conducted a study to determine a suitable tennis wallboard test to measure playing ability. A round-robin tournament was used to rank the beginning players. Subjects were timed for thirty and sixty-seconds for hits executed behind restraining lines at five, fifteen, twenty-five, and thirty-five feet. A total of three trials on each of eight tests was given. A validity coefficient of .89 was found between the tournament ranking and the thirty-second test at a distance of thirty-five feet.

A limited number of studies have been designed to objectively predict general playing ability in specified motor activities. Methods of measurement, subject variability, and type of activity have been considered in these investigations.

Stoup (18) developed a test using game results to determine test validity in basketball. A three-item test, including a wall volley test with a restraining line six feet from the wall, was used. Subjects volleyed the ball against the wall for one minute. Ten-minute games were played and the percentage of wins in the game and the average scores on the tests were

correlated. Eighty percent of the games were won by the team having the highest score on the test. Game results were considered a valid measure in determining playing ability in basketball.

Bratzmann and Montague (1) conducted a study to determine if the results of a doubles handball tournament would serve as a valid measure of handball ability. Fifty-two male students were used as subjects. The doubles teams were selected at random from the experimental sample. All students played from eight to eleven matches in both a singles and a doubles tournament. Results of the two tournaments were correlated by per cent of games won, total scores, and the average score.

Coefficients of correlation ranging from .64 to .84 were found when the percentage of total games won was used as the criterion measure. The investigators concluded that results of a doubles tournament is a valid measure of handball ability and is practical for use in a grading plan where a measure of performance is desired.

Ferguson (7) developed a test to determine the number of trials required for a valid measure of skill for the softball throw and the standing broad jump. Seventh grade girls were randomly assigned to four groups for the two tests. The groups

were given three, five, eight, and ten trials respectively. The test-retest method was used. A coefficient of correlation was computed for the best score in each of the groups on the test and on the retest to determine the number of trials which yielded the most valid measure of skill. The highest coefficient was .94. Three trials for the softball throw and ten trials for the standing broad jump were found to be the most valid measures for these skills. It was concluded that the complexity of the skill being tested affects the number of trials needed to obtain the most valid measure of performance, and the number of trials is specific for a given skill.

A study designed to objectively predict basketball playing ability was developed by Knox (12). Fifty high school students served as subjects for the four tests, one of which was a wall-bounce test. Each subject was timed to determine how long it took to execute fifteen chest-passes against a wall from a five-foot restraining line. A total of four trials was recorded including a pre-test and a post-test. The scores for varsity basketball players were used to establish the validity of the tests. The reliability coefficient for the wall-bounce test was .78.

Swartz (19) developed a skill test for senior high school girls in basketball. The pass and catch drill against the wall

included two trials to account for an improvement factor which occured on the second trial. The better score of the two trials was used, since the investigator sought to obtain the best effort of the student. The range varied from ten to forty-two. Reliability and validity coefficients were not established in this study.

Kemp and Vincent (11) constructed a rally test in tennis to alleviate the major criticism of many tennis skill tests which do not measure skill under game conditions, require special equipment, and extensive testing time. Students were asked to rally for a three-minute test period. The total number of hits for the two players were counted and recorded as well as the errors committed by each individual player. Each player's score is determined by subtracting his error from the total score. The validity of the test was found to be .84 for beginners and .93 for intermediate players when correlated with round-robin tournament rankings. When validated against the Iowa revision of the Dyer test, the validity coefficient was .80. Test-retest reliability coefficients were .86 for beginners and .90 for intermediate players.

Summary

A review of the literature revealed a limited number of studies related to the activity of fencing. A resume of investigations in this chapter focused upon criteria used in construction of skill tests, factors influencing fencing performance, and methodologies used to determine test reliability and validity.

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CHAPTER III

PROCEDURES

The problem of this study was to construct and validate a skill test for point control in fencing to be used to determine beginning fencing ability in a bouting situation. The study further sought to determine if a testing apparatus could be designed which would adequately test point control and general fencing skill in a realistic bouting situation on a simulated strip.

Preliminary Procedures

A review of the literature in the areas of test construction, fencing skill tests, and factors influencing fencing performance was conducted. Information from these studies was utilized in the present investigation.

It was important to construct a skill test which was similar to bouting performance, therefore, the initial procedure was to conduct a pilot study to determine the effectiveness of the proposed testing apparatus.

Sixteen college students, seven male and nine female subjects, were selected from two beginning fencing classes at North Texas State University during the spring semester, 1972, to take part in the pilot program. Subjects were asked to take three thirty-second trials on the testing device similar to the one used in the final study. The apparatus was functional and appropriate for scoring total contact hits made by a fencer. A moving target was added to the testing instrument to provide a better simulation of an opponent moving back and forth on a strip. Subjects expressed an interest in the test because the equipment was unique, challenging, and provided immediate feedback of results.

It was equally important to determine if a triangular target could be used in the study rather than the concentric circles employed in most investigations. Five subjects ranging in fencing experience from the novice to the advanced performer were used in this study.

A step-down transformer was used to transfer 110 A. C. volts (regular outlet) to a 12-volt charge for the buzzer mechanism which was used to determine a hit on target. A three-inch equilateral triangular target covered with metallic jacket material was selected as the primary target and included a backing of construction paper with twelve inches square

surrounding the target to denote placement of hits which deviated from the preferred target area. A foil blade placed in a position to the left of all fencers to allow a threatening attack was used for a parry four riposte action before hitting the target. An area outlined on the floor to keep all fencers at the same angle from the target was marked. All participants had to keep their rear foot in the designated area to allow for a consistency of area covered by the lunge, and to provide a variation for each participant's fencing measure.

Each subject was given twenty trials. The results of this initial investigation are listed in Table I.

TABLE I

Percentage of Hits Related to Target Size

Subject	Three-inch Target	Four-inch Target
S_1*	20	45
S_5*	45	90
S_2*	50	95
S_4**	55	95
S_3***	60	90

*Beginning Fencer
**Intermediate Fencer
***Advanced Fencer

The results of this study indicated that if the target was expanded to a four-inch equilateral triangle, there would be no variation of scores between a good fencer and one of little experience. The present three-inch target differentiated among fencers of different abilities with an increase in the percentage of correct hits accompanying an increase in previous experience.

Subjects

The subjects were sixty men and women enrolled in three beginning fencing classes at North Texas State University during the spring semester, 1973. None of the students had prior experience in fencing. The twenty-one men and women used in the pilot studies were excluded from the study.

Testing Instrument

The testing apparatus was designed to duplicate an actual fencing situation. A three-inch target composed of metallic material was placed on a metal rod which was connected to a pulley system adjusted for reverse action of the target throughout the test. The moving target simulated the backward movement of the fencer.

A foil blade was placed in a position to the left of the right-handed fencers to allow a thrust[illegible]

be parried in a position of four before hitting the target area. The position of the blade was reversed for left-handed fencers. The foil blade was mounted on a vertical stand and was adjusted for variation of height of the subject. Placement of the attacking foil blade was determined by each subject's fencing measure. When the two foil blades made contact, a mechanical switch was activated which initiated a reverse movement of the target.

A simulated strip area was marked on the floor to keep all fencers at the same angle from the target and threatening foil. A rear foot position was marked for each individual according to his fencing measure from the target.

To eliminate subjective evaluation of touches a step down transformer with a buzzer system scored correct hits. The total number of hits was obtained by adding the audible signals delivered during a thirty-second trial.

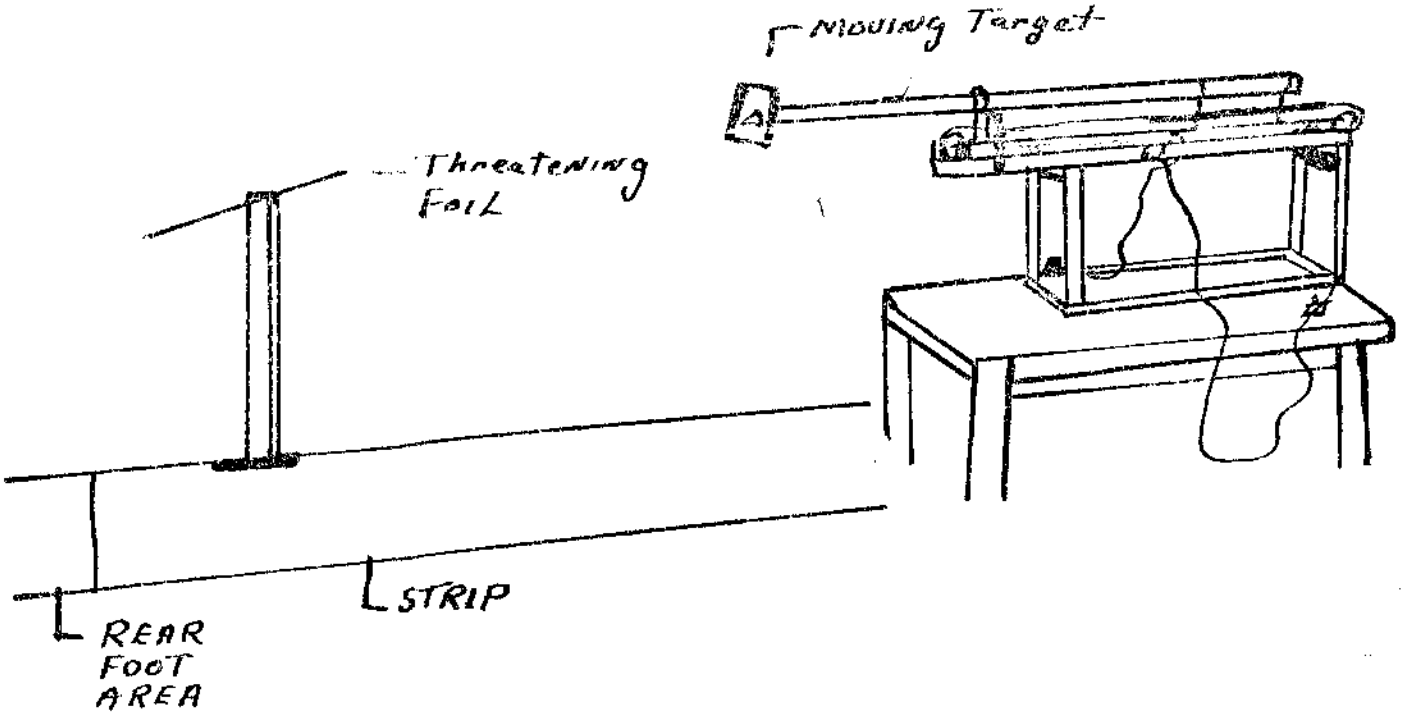

Fig. 1--Mechanical fencing apparatus
(Patent Number Pending)

Test Administration

The test was administered by the investigator in the motor learning research laboratory in the women's gymnasium at North Texas State University. Two assistants helped in the scoring, timing, and readjustment of the testing apparatus. The equipment and facilities were prepared and checked for accurate and functional use prior to the testing program.

The subjects were randomly selected within each class to determine the testing order. Testing was conducted during a specified class period for all students in the class to prevent

environmental variability. In addition, all three classes were tested on the same day. Students who were absent on the testing date were tested the first day they returned to class.

The instructions for taking the test were read to all subjects. A complete description of the instructions read to the subjects is found in Appendix A. Each subject was asked to take four practice lunges at the target to determine his fencing measure and placement of the attacking foil. An assistant marked the rear foot area to designate the subject's placement of the back foot throughout the test.

The subject then took an on-guard position keeping his back foot stationary and made a correct parry four against the threatening blade before each attempted lunge to contact the target area. Upon completion of each lunge the subject returned to his on-guard position and repeated the parry-riposte action, making as many good hits as possible within a given thirty-second period. A total of three thirty-second trials was given to each subject. The first trial was used for warm-up purposes and to familiarize subjects with the task. The second and third trials were used to create fatigue which occurs in a fencing bout.

Each trial began with a verbal cue by the time keeper who started the Compass stopwatch (accurate to hundredths of a

second) when the subject made contact with the attacking foil. The total number of hits was recorded on prepared score sheets. Two days later, subjects were retested using the order prescribed in the pretest.

A round-robin tournament was conducted in the three fencing classes over a period of seven weeks. The investigator served as the director for each bout in all classes. Each subject was assigned a number which was his position for the tournament. After each bout, the scores were recorded.

Ranking in the tournament was determined by a method suggested by Pennington (1) and used by Singer (3).

$$\text{Criterion I (touches per contest)} \quad 10\frac{\text{total touches fencer made against opponents}}{\text{number of contests fenced}}$$

$$\text{Criterion II (relative touches)} \quad 100\frac{\text{total touches fencer made against opponents}}{\text{total touches opponents made against fencer}}$$

The rank scores from the tournament were correlated with the average score from the three trials in the post-test.

During the investigation, fifteen subjects were dropped from the study because of illness or withdrawal from the physical education activity class.

Analysis of Data

Scores from the point-control test in fencing were used to determine test reliability. The Clarke and Clarke (2) single group design for the test-retest method was employed. Test validity was determined, using the Pearson product-moment method, by correlating the average score from three thirty-second trials for each subject with his position or rank at the conclusion of the tournament. Validity was determined between test results and tournament standings for the sixty subjects as a total group as well as by class rank.

Data were analyzed by the IBM Model 360 Computer System at the North Texas State University Computer Center.

Summary

This chapter described the experimental design and procedures used in the investigation. It included a discussion of the pilot studies, subjects tested, testing apparatus, testing procedures, and the statistical analysis of test results.

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CHAPTER IV

PRESENTATION OF DATA

Findings of the Study

The purpose of the present investigation was to construct and validate a skill test to measure a beginning fencer's point control. Data secured for the investigation included pre-and post-test scores from the point-control test to determine test reliability. Scores from the post-test were correlated with the subject's ranking in a round-robin tournament to determine test validity. Reliability and validity were established for the forty-five subjects as a group as well as by standings within the three classes.

Reliability of the Point-Control Test

The Pearson product-moment coefficient of correlation was used to determine the reliability of the point-control test. Table II includes the mean, standard deviation, and correlation coefficient for forty-five subjects as a total group on the point-control test.

TABLE II

TEST RELIABILITY FOR SUBJECTS AS A SINGLE GROUP ON THE POINT-CONTROL TEST

SUBJECTS	MEAN	STANDARD DEVIATION	CORRELATION COEFFICIENT
I (N=45)	5.34	2.68	.83

The correlation was computed between the average score of the three thirty-second trials on the pretest and the average score of the three thirty-second trials on the posttest. The reliability coefficient for the point-control test was .83, which was significant at the .01 level of confidence (11). The reliability coefficient of .83 indicated a high relationship between the test and retest and denotes a measure of consistency when the skill test is employed (7).

Table III contains the mean, standard deviation, and coefficient for the three classes' pre-and posttest performances on the point-control test.

TABLE III

TEST RELIABILITY OF THREE CLASSES
ON THE POINT-CONTROL TEST

CLASSES	MEAN	STANDARD DEVIATION	CORRELATION COEFFICIENT
1 (N=15)	4.48	1.99	.87
2 (N=15)	6.60	2.66	.74
3 (N=15)	4.93	2.65	.78

The reliability coefficient for the point-control test was .87 for class one indicating a high relationship and consistency between the tests. Class two and class three had reliability coefficients of .74 and .78 respectively denoting a high relationship between the tests (7).

The test-retest method was effective and yielded a high reliability coefficient. Although the tests were not administered on successive days, it appears that the physical condition of the subjects was similar on both testing days. In addition there was no opportunity for the subjects to practice the skill during the intervening days.

It was interesting to note that there was a decrease in the scores during the last of the three trials indicating a degree of fatigue. These findings suggest that three thirty-second trials were sufficient for this particular test and similar to bouting conditions. Scott and French (9) state that tests involving an all-out performance require fewer trials than do tests where the element of chance plays a major role, and Fergason (4) found that the number of trials necessary for a particular test tends to be specific for a given skill.

Validity of the Point-Control Test

The Pearson product-moment method of correlation was computed to determine the relationship between the round-robin tournament and the point-control test. The coefficient of correlation was computed between the subject's average score of three trials on the posttest, a method suggested by Hewitt (5), and his tournament ranking according to the formula used by Singer. Ranking was established by taking the total touches which a fencer made against the opponent and dividing this total by the number of contests in the tournament.

Table IV includes the mean, standard deviation, and the correlation coefficient for forty-five subjects as a total group on the point-control test.

TABLE IV

MEAN, STANDARD DEVIATION AND TEST VALIDITY FOR SUBJECTS AS A SINGLE GROUP ON THE POINT-CONTROL TEST

Subjects	Mean	Standard Deviation	Correlation Coefficient
1 (N=45)	169.93	128.66	.33

The validity coefficient of .33 indicates a slight relationship between the tournament standings and the point-control test. The validity coefficient of .33, with forty-five subjects, was significant at the .05 level of confidence (11). The degree of relationship between the criterion of a round-robin tournament and the point-control test was low, but it was not a chance relationship.

Table V contains the mean, standard deviation, and correlation coefficients for each of the three fencing classes. The correlation coefficients for the classes were .12, .34, and .32 respectively. With fifteen subjects in each class, the correlation coefficients were not significant at the .05 level of confidence indicating a chance relationship (11).

TABLE V

MEAN, STANDARD DEVIATION AND TEST VALIDITY FOR SUBJECTS OF THREE CLASSES ON THE POINT-CONTROL TEST

Classes	Mean	Standard Deviation	Correlation Coefficient
1 (N=15)	139.69	78.51	.12
2 (N=15)	200.11	192.20	.34
3 (N=15)	170.00	83.47	.32

The validity coefficients for all three classes were low and not of predictive value. There was a substantial difference between the coefficients of class one and classes two and three. A plausible explanation to account for this difference might exist in the time of day at which the classes met. The first class met prior to the noon hour, and the other two classes met during the late afternoon. It may be that afternoon activity classes function better than morning classes.

A possible reason for the low validity coefficient between the point-control test and the tournament when subjects were considered as a single group and when subjects were

considered as three separate groups may be found in the skill level of the subjects. The subjects were beginning fencers, inexperienced in the specific movements of the activity, and low validity coefficients are sometimes produced in studies with beginners as subjects in test construction. In an investigation by Scott (8), the French short serve was administered to 159 beginners and seventy-two intermediate players. The correlation coefficients were .43 for the beginners and .70 for the intermediate players.

Hilding (6) used a round-robin tournament to determine the test validity for a tennis wallboard test. The validity coefficient for the beginners was .89, while the coefficient for the intermediate players was .97. In the Broer-Miller (1) study, the validity coefficient was .61 for beginners when correlated with subjective ratings and .85 for the intermediate players.

It was observed that some of the beginning fencers, intent on making a successful score on the test, would deviate from the prescribed form used in a bouting situation causing an actual loss of point control. The fencers' inability to maintain correct form may have been a result of their limited bouting experience.

The novice fencer's perception of the actual target size may have been another factor influencing the validity of the test. Beginners tend to perceive the complete torso of an opponent as the target area, thereby creating a loss of point control in foil play. It is essential in fencing to maintain correct body form so that a minimal target area is exposed. The inability of beginning fencers to restrict the target area would give them greater success in a class tournament than in an isolated movement with a smaller target.

It appears that the point-control test is not a good indicator of playing ability at the beginning level. Although fencing authorities (2, 3, 9, 10) have indicated that point control is an essential factor for bouting success, it would seem more appropriate to compare the scores from the point-control test with an isolated skill involving point control than with general fencing ability.

Although point control is important, fencing in a bouting situation involves additional variables. Motivation, reaction-movement time, agility, and the competitive spirit of the subjects may have influenced the fencing performance.

Functional Use of Testing Apparatus for Point Control

It was observed throughout the experimental period that the subjects possessed an interest in the skill test. A main factor contributing to this interest, according to self-reports made by the subjects, was the testing apparatus. There was an eagerness to increase the duration of the practice time, and many subjects requested permission to use the equipment at the conclusion of the investigation. The similarity between the condition of an actual bouting situation and the skill test with a moving target provided motivation for the beginning fencer.

The design of the apparatus helped to create a realistic bouting situation. The testing device mechanically performed the backward movement of a fencer. Although the speed of the machine was regulated, it provided the subjects with a moving target rather than the traditional stationary target giving them an opportunity to coordinate backward movement with depth perception.

The apparatus simulated the parry four-riposte action which is the most common attack used in fencing. Within the design of this attack, the subjects' attention was focused upon a limited target area which approximates good fencing technique.

Summary

This chapter included a discussion of the findings of the study. A reliability coefficient of .83 for the point-control test was high indicating a consistent test. The validity coefficient of .33 showed a low relationship between the point control test and the round-robin tournament. The skill test for point control in fencing is not an adequate indicator of general fencing ability.

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CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Purposes and Procedures

The purpose of this study was to construct and validate a skill test for point control in fencing to be used to determine beginning fencing ability in a bouting situation.

Twenty-one men and women were subjects in two pilot studies conducted to establish basic test-construction techniques. Forty-five men and women, all of whom were participating in physical education fencing classes at North Texas State University, were selected to participate in the study. The point-control test was administered at the completion of a seven-week round-robin tournament conducted in each of three beginning fencing classes. Performance scores on each of three thirty-second trials were recorded. Two days later, the test was again administered to the subjects. The Pearson product-moment coefficient of correlation was used to determine the reliability and validity of the point-control test.

Results

The following are the results of the present investigation:

1. A high, positive relationship was found between the test and retest scores denoting a measure of consistency between tests and a substantial reliability.

2. There was a low relationship between the point-control test and tournament standings when scores were computed for the subjects as a single group and when scores were computed by standings within the three specified classes. Therefore, the validity coefficient is not of predictive value.

Conclusions

The results of the study would seem to justify the following conclusions:

1. The point-control test, as administered in the study, is a reliable test.

2. The point-control test does not sufficiently predict a beginning fencer's bouting ability.

Recommendations

The following recommendations are presented for further investigation in the study of test construction in fencing:

1. Conduct a similar study using subjective ratings of fencing ability rather than tournament standings.

2. Administer the point-control test to fencers at the intermediate and advanced level of skill.

3. Employ the testing apparatus as a learning device as well as a testing instrument to determine what skills are essential to the sport of fencing.

Summary

This chapter presented a summary of the purposes and procedures of the present investigation, as well as the results and conclusions of the study. Recommendations for further investigations involving the parameter of this study were included.

APPENDIX A

INSTRUCTIONS FOR POINT-CONTROL TEST

Each subject was asked to take four practice lunges at the target area to determine his fencing measure and placement of the attacking foil. The assistant in charge of apparatus adjustment marked the rear foot area with tape to designate the subjects' placement of back foot throughout the test. The subject was then given the following instructions:

1. Take an on-guard position, keeping your back foot stationary in the designated area.

2. Make a correct parry four against the threatening blade before each attempted lunge to contact the target area.

3. Make as many good hits as possible within a given thirty second trial. The buzzer will sound when a good hit has been made.

4. You will be given three, thirty-second trials.

Any Questions?

SCORE SHEET

Class_____

NAME	DATE	TRIALS 1	2	3	SUM	AVE.	DATE	TRIALS 1 1	2	3	SUM	AVE.

APPENDIX B

TABLE VI

INDIVIDUAL SCORES ON PRE-TEST IN CLASS I

Subject	Test Trials 1	2	3	Average
1	4	6	4	4.67
2	4	3	3	3.33
3	3	12	7	7.33
4	2	7	6	5.00
5	2	2	5	3.00
6	3	5	5	4.33
7	1	6	5	4.00
8	1	5	5	3.67
9	3	10	7	6.67
10	2	1	4	2.33
11	6	7	5	6.00
12	4	4	6	4.67
13	1	5	4	3.33
14	2	4	6	4.00
15	2	8	5	5.00

TABLE VII

INDIVIDUAL SCORES ON PRE-TEST IN CLASS II

Subject	Test Trials 1	2	3	Average
1	3	3	5	3.67
2	9	9	9	9.00
3	6	8	6	6.67
4	4	4	1	3.00
5	7	11	10	9.33
6	3	11	8	7.33
7	4	2	4	3.33
8	0	0	4	1.33
9	7	9	5	7.00
10	7	6	8	7.00
11	8	12	18	12.67
12	5	5	3	4.33
13	6	6	11	7.67
14	9	10	7	8.67
15	7	7	7	7.00

TABLE VIII

INDIVIDUAL SCORES ON PRE-TEST IN CLASS III

Subject	Test Trials 1	2	3	Average
1	3	11	5	6.33
2	1	2	0	1.00
3	3	3	1	2.33
4	2	4	6	4.00
5	3	3	4	3.33
6	3	3	3	3.00
7	1	2	2	1.67
8	7	12	7	8.67
9	8	9	10	9.00
10	4	6	4	4.67
11	5	8	7	6.67
12	3	2	3	2.67
13	10	5	9	8.00
14	4	10	7	7.00
15	4	6	7	5.67

TABLE IX

INDIVIDUAL SCORES ON POST-TEST IN CLASS I

Subject	Test Trials 1	2	3	Average
1	8	5	2	5.00
2	3	3	2	2.67
3	9	11	6	8.67
4	7	5	5	5.67
5	3	2	5	3.33
6	7	3	6	5.33
7	5	8	7	6.67
8	4	2	2	2.67
9	8	9	11	9.33
10	0	1	4	1.67
11	6	9	9	8.00
12	6	6	5	5.33
13	2	5	6	4.33
14	2	4	4	3.33
15	9	8	11	9.33

TABLE X

INDIVIDUAL SCORES ON POST-TEST IN CLASS II

Subject	Test Trials 1	2	3	Average
1	5	9	6	6.67
2	15	15	15	15.00
3	5	12	6	7.67
4	8	5	3	5.33
5	7	5	12	8.00
6	7	10	10	9.00
7	1	3	3	2.33
8	4	1	3	2.67
9	8	6	12	8.67
10	9	11	11	10.33
11	11	21	17	16.00
12	4	5	7	5.33
13	8	10	9	9.00
14	5	7	6	6.00
15	8	12	9	9.67

TABLE XI

INDIVIDUAL SCORES ON POST-TEST IN CLASS III

Subject	Test Trials 1	2	3	Average
1	9	4	7	6.67
2	5	3	5	4.33
3	3	2	2	2.33
4	3	1	6	3.33
5	1	6	2	3.00
6	3	4	4	3.67
7	2	3	1	2.00
8	7	7	10	8.00
9	9	16	9	11.33
10	5	11	7	7.67
11	12	5	13	10.00
12	4	2	2	2.67
13	8	6	7	7.00
14	4	1	6	3.67
15	8	4	4	5.33

TABLE XII

TOURNAMENT RESULTS IN CLASS I

Subject	Singer's formula score	Ranking
1	75.25	12
2	96.63	9
3	120.72	8
4	203 97	5
5	81.76	10
6	305.07	1
7	50.59	15
8	51.84	14
9	218.57	2
10	198.33	6
11	211.17	3
12	138.01	7
13	205.72	4
14	80.63	11
15	57.14	13

TABLE XIII

TOURNAMENT RESULTS IN CLASS II

Subject	Singer's formula score	Ranking
1	86.62	12
2	153.53	8
3	88.10	11
4	108.19	9.5
5	56.18	14
6	72.23	13
7	153.57	7
8	15.20	15
9	259.94	5
10	263.23	4
11	280.00	3
12	108.19	9.5
13	405.96	2
14	165.96	6
15	784.76	1

TABLE XIV

TOURNAMENT RESULTS IN CLASS III

Subject	Singer's formula score	Ranking
1	386.07	1
2	153.76	10
3	159.73	9
4	64.16	15
5	126.91	11
6	164.13	8
7	248.93	2
8	179.74	5
9	235.71	3
10	232.58	4
11	175.47	7
12	72.23	14
13	81.43	13
14	172.77	6
15	96.43	12

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