A COMPARATIVE STUDY OF THE PART METHOD VERSUS THE WHOLE METHOD IN THE LEARNING OF A FLY-AWAY FROM THE HORIZONTAL BAR

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A COMPARATIVE STUDY OF THE PART METHOD VERSUS THE WHOLE METHOD IN THE LEARNING OF A FLY-AWAY FROM THE HORIZONTAL BAR

By

Marshall Robert Claus

AN ABSTRACT OF A THESIS

Submitted to
College of Education of Michigan State University of
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MASTER OF ARTS

Department of Health, Physical Education, and Recreation

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ABSTRACT

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Statement of the Problem

The purpose of this study is to determine the effects of teaching the "fly-away" from the horizontal bar by the "part-method" and by the "whole-method".

Methodology

Eight subjects were chosen from the varsity gymnastic team and from beginning gymnastic classes at Michigan State University. A pre-requisite of a giant circle backwards was used to determine the ability of the performer and for the purpose of pre-ranking. The eight subjects were then placed into two groups, based on the pre-ranking scores. A flip of the coin determined which group was to be the "whole-method" group and which was to be the "part-method" group.

The experiment consisted of eight weeks of training, two sessions per week, and a total of three testing sessions placed at fourth, eighth, and eleventh training sessions. Each subject had an opportunity to attempt the stunt, or the stunts of his assigned group, a total of forty-eight times and a total of nine times for the testing sessions. The judges used a standard gymnastic rating scale of one hundred points and based their scores on the form, execution, and general control of the

whole stunt. All data were statistically treated using analysis of variance.

Conclusion

Within the limitations of the study, the following conclusions:

1. The testings indicated that there was no statistical significant differences between the two groups attributable to the method of instruction used.

ACKNOWLEDGEMENTS

The author wishes to express his sincerest gratitude to Dr. Wayne D. Van Huss and Mr. George Szypula for their unfailing interest and kindness in aiding the author in the preparation of this thesis.

Acknowledgements are also given to all of the subjects of this experiment for their part in making the collection of this data possible.

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CHAPTER I

INTRODUCTION

The teaching of complex stunts has long been a controversial point with coaches and gymnasts. Many people have observed a gymnast successfully execute a complex stunt on the first trial. Others may spend months working up to the stunt through some selected progression of skills. There is relatively little study or research available on the best methods of learning complex large muscle skills.

This particular study was undertaken to find and to determine, if possible, a means of teaching a selected complex stunt from the horizontal bar in a fast, efficient and safe manner to individuals with some gymnastic background.

Statement of the Problem

To determine the effects of teaching the "fly-away" from the horizontal bar by the "part-method" and by the "whole-method" of instruction. The "part-method" of instruction being composed of a specific series of progressive lead-up movements which begins with very simple movements and moves on to the more complex, whole stunt. The "whole-method" of instruction is merely allowing the subject to attempt the whole, complex stunt from the very beginning.

Purpose of the Study

In the past there has been much theorizing about the best methods for the teaching of gymnastic stunts. The data and literature compiled in the past seem to imply that it is a necessity that a selected progression of stunts precede the learning of any complex stunt. The present study was undertaken to compile more information on the subject. The results should be of interest to each gymnastic coach and to every gymnast who has a desire to learn advanced skills in a faster, safer, and a more proficient manner.

Traditional methods emphasize the mastery of fundamentals[1]. This method spends a great deal of time teaching and learning simple stunts and then progressively working toward the learning of the complex stunt. A comparative study of methodologies pointed out that there appeared to be a different learning process when new parts of each stunt were added and that there was a considerable waste of time and motion in the learning process of simple gymnastic stunts[2].

Definition of Terms

Giant Swings:

Giant Swing Backward (Giant Circle Backward); Performer swings completely around the bar in a backward direction with the arms and body extended.

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[1]Bucher, Charles A. Methods and Materials in Physical Education and Recreation. St. Louis, Mo. C. V. Mosby Co. p. 28, 1954.

[2]Wickstrom, Ralph Lee. "A Comparative Study of Methodologies for Teaching Gymnastics and Tumbling Stunts". University of Iowa, 1953.

Half Giant Swings; The performer swings half way around the bar in a backward direction coming to front rest above the bar.

Grasps:

Normal Grasp; In the normal grasp the fingers and the thumbs are on opposite sides of the bar and the thumbs are adjacent.

Body Positions:

Arm-Support Position; In the arm-support position on the horizontal bar, the body is supported by the arms.

Hand-Balance Position; In the hand-balance position the body is inverted and is supported by the hands. The arms may be straight or they may be bent, preferably straight.

Hang Position; In the hanging position the body is upright and is suspended by the hands.

Pike; Bending the body toward the knees, the knees staying straight.

Slight Pike; Bending the body toward the knees, not over forty-five degrees, the knees staying straight.

Tuck; Pulling the knees close to chest, the knees bent.

Arch; A backward bending of the region of the lumbar spine.

Layout; Body extended with back arched.

Swings:

Moderate Swing; A moderate swing is one in which the body raises just slightly above the horizontal plane through the point of support or the point of suspension.

High Swing; A high swing is one in which the body raises approximately forty-five degrees above the horizontal plane through the point of support or the point of suspension.

Very High Swing; A very high swing is one in which the body rises approximately ninety degrees above the horizontal plane through the point of support or the point of suspension.

Half Cast-Out; From support on the bar, extend the body to a position where it is one hundred and eighty degrees to the floor or is horizontal.

Three-Quarter Cast-Out; From support on the bar, extend the body to a position where it is forty-five degrees from being horizontal.

Full Cast-Out; From support on the bar, extend the body to a position where it is ninety degrees to the floor or vertical.

Movements onto and from the Apparatus:

Mount; A mount is a movement from the floor onto the apparatus.

Dismount; A dismount is a movement from the apparatus to the floor.

Fly-Away Dismount; A somersault dismount from the bar at the front or the back end of a swing.

Limitations of the Study

1. Confined to men having a prerequisite of, at least, a giant circle backwards (regular grip).

2. Subjectiveness of the judges.

3. The specific parts which were used in the "part-method" of instruction.

CHAPTER II

REVIEW OF THE LITERATURE

A review of related literature concerning the teaching of "part" versus "whole-method" of instruction will be discussed in this chapter. A number of tumbling stunts, such as the back somersault are similar to the mechanics that would be encountered in the "fly-away" from the horizontal bar. LaPorte states that each step within the progression helps to develop the correct fundamentals for the execution of the most important one, which would be at the end of the series[1].

Cotteral points out that in the learning of complex stunts it is always necessary for a selected progression of stunts to precede the learning of any complex stunt. This would in turn prove to be faster, safer, and more proficient[2].

Ryser states, "Use the 'part-method' of teaching whenever it is feasible. Some stunts can be broken into parts and each part taught independently. Then all of the parts can be put together and the stunt taught as a whole. It is advisable to show the entire stunt first, however, so that the pupils will have a clear picture of the stunt they are working toward"[3].

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[1]LaPorte, William R. and Al G. Renner. The Tumbler's Manual. New York. Prentice-Hall, Inc. pp. 3-5, 1938.

[2]Cotteral, Bonnie and Donnie. The Teaching of Stunts and Tumbling. New York. A. S. Barnes and Co. 1936.

[3]Ryser, Otto E. A Teachers Manual for Tumbling and Apparatus Stunts. Dubuque, Iowa. Wm. C. Brown Co. p. 17, 1948.

Cross in his teaching of simpler unitary skills in basketball found the teaching by "whole-method" more productive and the learning of more complex skills were best taught to ninth-grade boys by the use of the "part-method" of instruction[4].

Niemeyer used large muscle activities to compare the "part" and the "whole-method" of learning. Swimming was to represent individual activity, badminton to represent dual activity, and volleyball a team-type activity. In his findings he found individual activities appeared to be learned best when taught by the "whole-method". Badminton, classified as a dual-type activity, was best learned when taught by the "part-method" of instruction[5].

Shay using sixteen inexperienced college men for subjects taught one group the kip on the horizontal bar by the "whole-method" and the other group by the "part-method". The "part-method's" steps were the swing, arch, flexion of the thigh, bringing the feet to the bar, and extension of the thigh. He found it took 38.5 trials average using the "whole-method" as compared with 48.8 trials using the "part-method"[6].

Knapp and Dixon did a study of learning to juggle three balls using the "whole, part, and the combination method" of learning. The "whole-method" group juggled three balls all the time, the "part-method" group

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[4]Cross, T. J. "A Comparison of the Whole Method, the Minor Game Method, and the Whole-Part Method of Teaching Basketball to Ninth-Grade Boys". The Research Quarterly, 8: 49-54, Dec., 1937.

[5]Niemeyer, Roy. "Part Versus Whole Methods and Massed Versus Distributed Practice in the Learning of Selected Large Muscle Activities". (Unpublished Doctoral Dissertation, University of Southern California, 1958.)

[6]Shay, Clayton T. "The progressive-Part Versus the Whole Method of Learning Motor Skills". The Research Quarterly, 4: 62-67, Dec., 1934.

used one, then two, and then three balls and the "combination" group used any method of learning they thought the skill could be obtained by. These authors found that there was little transfer of the initial accuracy by subjects using the "part-method" and that the subjects using the "whole-method" of learning attained the skill most rapidly[7].

Wickstrom stated, "Another observation was made which applies specifically to the 'whole-direct repetitive method', and substantiates the results of studies in psychology of the 'part-method' of learning. There appeared to be a different learning process with the addition of each new part of a stunt. Some interference was involved as the subjects demonstrated a temporary loss of learning of the part or parts previously learned when a new part had been added, until that new part had become integrated with them. The amount of interference varied with difficulty of the stunt and, as a whole, became a further problem. Where increased speed was necessary in executing the whole stunt, this frequently caused errors in executing the part previously learned at a slower tempo. Thus, there appeared to be wasted time and motion in the part learning of some gymnastic stunts"[8].

The review of the literature by Cress, Miemeyer, Shay, Knapp and Dixon, Wickstrom, and Monroe[9] seems to conclude that breaking down a skill and practicing its parts in developing a whole skill seem too wasteful.

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[7]Knapp, Clyde G. and W. Robert Dixon. "Learning to Juggle: II, A Study of Whole and Part-Methods". The Research Quarterly, 23: 398-401, Dec., 1952.

[8]Wickstrom. Ibid.

[9]Monroe, Walter S. Encyclopedia of Educational Research. New York. The MacMillan Co. p. 822, 1950.

The Japanese use an extremely basic progression of stunts and in the beginning has the performer do no swinging, but merely turn over and drop off. Upon the actual "let-go" of the stunt, they recommend the performer tucking up[10].

The Swiss, on the other hand, recommend using a slight amount of progression, but it is very rapid. At no time do they have the performer assume the tucked position[11].

In comparison of these foreign methods of instruction to some of the research presented in favor of the "whole-method" of instruction, it would seem that the coaches, the world over, follow the old traditional teaching method of having the performer do a selected progression of stunts and lastly the completed whole stunt

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[10]Opinion expressed by Masao Takemoto, personal interview (with interpreter) at Chicago Gymnastics Clinic, 1961.

[11]Kunzle, G. C. Olympic Gymnastics, Volume II, Horizontal Bar. London. James Barrie Book Limited, 1957.

CHAPTER III

METHODOLOGY

This study was undertaken to determine the effects of teaching of the "fly-away" from the horizontal bar by the "part-method" and by the "whole-method". In analyzing the effectiveness of the two teaching methods three judges, who were either accomplished gymnasts or had a high degree of knowledge of the sport, were used.

Equipment

A regulation eight-foot horizontal bar was used for this experiment. An overhead safety mechanic and safety belt, and a hand spotting belt were used as teaching aids and as a precautionary procedure for the learning of this complex stunt.

Subjects

Eight subjects were chosen from the varsity gymnastic team and from beginning gymnastic classes at Michigan State University. A prerequisite of a giant circle backwards was required before a subject was allowed to become a member of this study. This prerequisite was used to determine a point of readiness for the learning of this stunt and also to determine some degree of ability of the subject for the purpose of ranking.

The eight subjects were inexperienced in the performing of this particular stunt; however, all had had some experience in turning over or somersaulting from or on other pieces of apparatus.

Experimental Procedure

The eight subjects were rated by George Szypula, head gymnastic coach, and the author, assistant gymnastic coach. The rankings were from one to eight, number one having the most ability, judging from the performance of the prerequisite giant swing. The eight were then divided into two groups with numbers one, four, five, and eight in one group and numbers two, three, six, and seven in the second group. The flip of a coin determined which group was to be the "part-method" group and which group was to be taught by the "whole-method" of instruction.

The eight subjects, having been divided into the two different instruction groups, attended two training sessions per week, for a period of eight weeks. The two groups trained at different times and were not allowed to see or know what the other group was doing. At every training session each subject attempted six executions of the stunt assigned for his group for that period. A total of three tests were given at predetermined intervals and each subject was allowed to attempt the whole stunt three times. During these tests the same three experienced gymnasts were used each time as the judges. Because of the subjectiveness of the judges, the high and the low scores were thrown out and the best of the three attempts was taken as the score for that particular subject during that testing period.

Every subject had the opportunity to attempt the stunt which was assigned to his particular group a total of forty-eight times and a total of nine times during the three testing sessions.

The procedure for training and testing is as follows:

Group I (whole method)

First Day

Instructions given on mechanics of the stunt and sequential pictures of a correct "fly-away" shown to each subject. Performing the full "layed-out fly-away" from a full "cast-out" position. Six attempts.

Second and Third Day

Performing the full"layed-out fly-away" from a full "cast-out" position. Six attempts.

Fourth Day

Testing session. Performing full "cast-out" to a full "layed-out fly-away". Three attempts.

Fifth, Sixth, and Seventh Day

Performing the full "layed-out fly-away" from a full "cast-out" position. Six attempts.

Eighth Day

Testing session. Performing full "cast-out" to a full "layed-out fly-away". Three attempts.

Ninth and Tenth Day

Performing the full "layed-out fly-away" from a full "cast-out" position. Six attempts.

Eleventh Day

Final testing session. Full "cast-out" to a full "layed-out fly-away". Three attempts.

Group II (part-method)

First Day

Instructions given on mechanics of stunt and sequential pictures of a correct "fly-away" shown to each subject. Performing a jump to short "under-swing" on low bar to a "tuck fly-away". Six attempts.

Second Day

Performing a half "under-swing" from the high horizontal bar to a "tuck fly-away". Six attempts.

Third Day

Performing a half "cast-out" from support, from the high horizontal bar to a "tuck fly-away". Six attempts.

Fourth Day

Testing session. Full "cast-out" to a full "layed-out fly-away". Three attempts.

Fifth Day

Performing a three-quarter "cast-out" from support, from the high horizontal bar to a "tuck fly-away". Six attempts.

Sixth Day

Performing a full "cast-out" from support, from the high horizontal bar to a "tuck fly-away". Six attempts.

Seventh Day

Performing a full "cast-out" from support, from the high horizontal bar to a full "layed-out fly-away". Six attempts.

Eighth Day

Testing session. Full "cast-out" to a full "layed-out fly-away". Three attempts.

Ninth Day

Performing a full "cast-out" from support, from the high horizontal bar to a full "layed-out fly-away". Six attempts.

Tenth Day

Performing a full "cast-out" from support, from the high horizontal bar to a full "layed-out fly-away". Six attempts.

Eleventh Day

Final testing session. Full "cast-out" to a full "layed-out fly-away". Three attempts.

It might be noted here that the spotting techniques used in the first two sessions on the "part-method" group was done by the use of a hand spotting belt. The rest of the sessions of the "part-method" group, as well as all the sessions of the "whole-method" group, were spotted by the use of an overhead spotting belt. Assistance was only given when it seemed necessary.

Statistical Methods

The results of the two groups were statistically compared using analysis of variance[1]. Test results for succeeding trials were correlated by the rank order method[2].

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[1]Goulden, C. H. Method of Statistical Analysis. New York. John Wiley and Sons. pp. 63-98, 1952.

[2]O'Dell, C. W. An Introduction to Educational Statistics. New York. Prentice-Hall, Inc. pp. 162-164, 1946.

CHAPTER IV

RESULTS

The effectiveness of the two methods of instruction, "part-method" versus "whole-method", were determined by the ratings of the three judges. There were no significant differences between the groups which could be attributed to the method of instruction used.

Table I

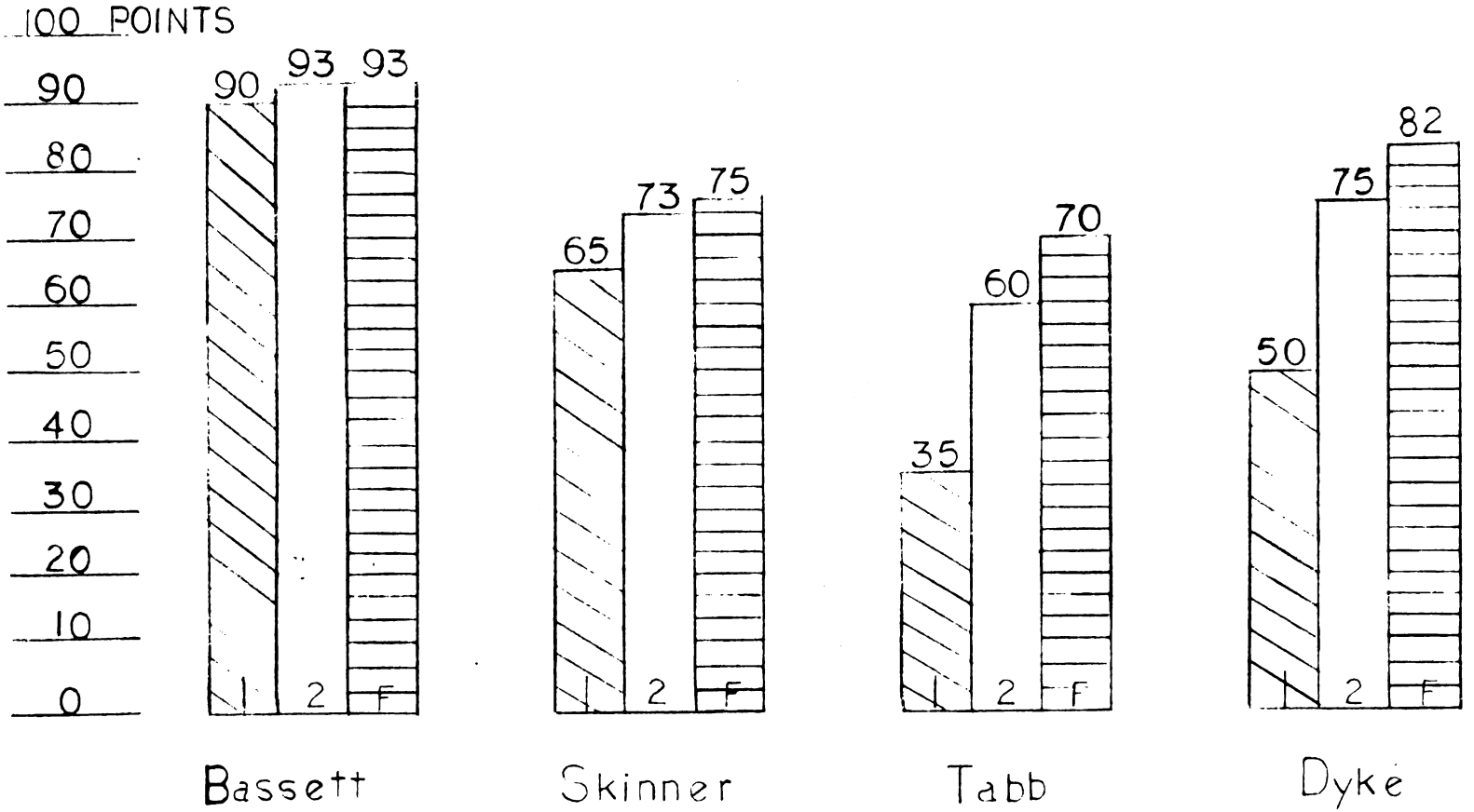
Analysis of Variance Results

Source of Variance	df	SS	MS	F
Total	24	4894		
Groups	1	33	33	.65
Tests	2	1697	848.5	16.84**
Individuals	6	2486	414.7	8.22**
Groups & Test	2	21	10.5	.21
Error	13	655	50.4	

** P = less than .01

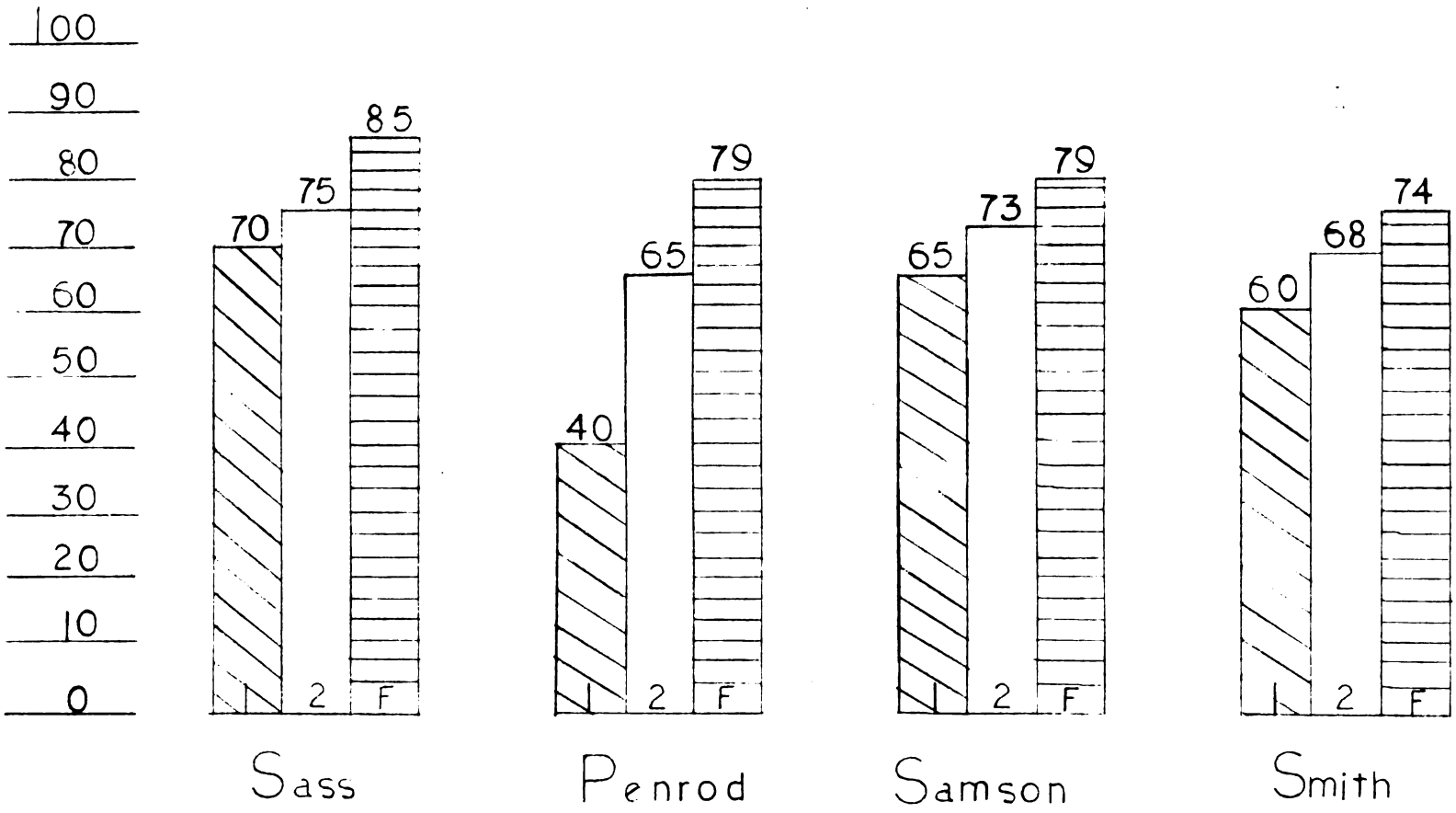
The subjects were significantly different as would be expected. Both groups improved significantly over the experimental period, indicating the training effects (Chart III). Since neither the groups nor the groups x test interaction were statistically significant, none of the differences obtained can be attributed to any differences in the training methods.

CHART I
COMPARATIVE ANALYSIS OF TEST SCORES



Group I
(whole-method)

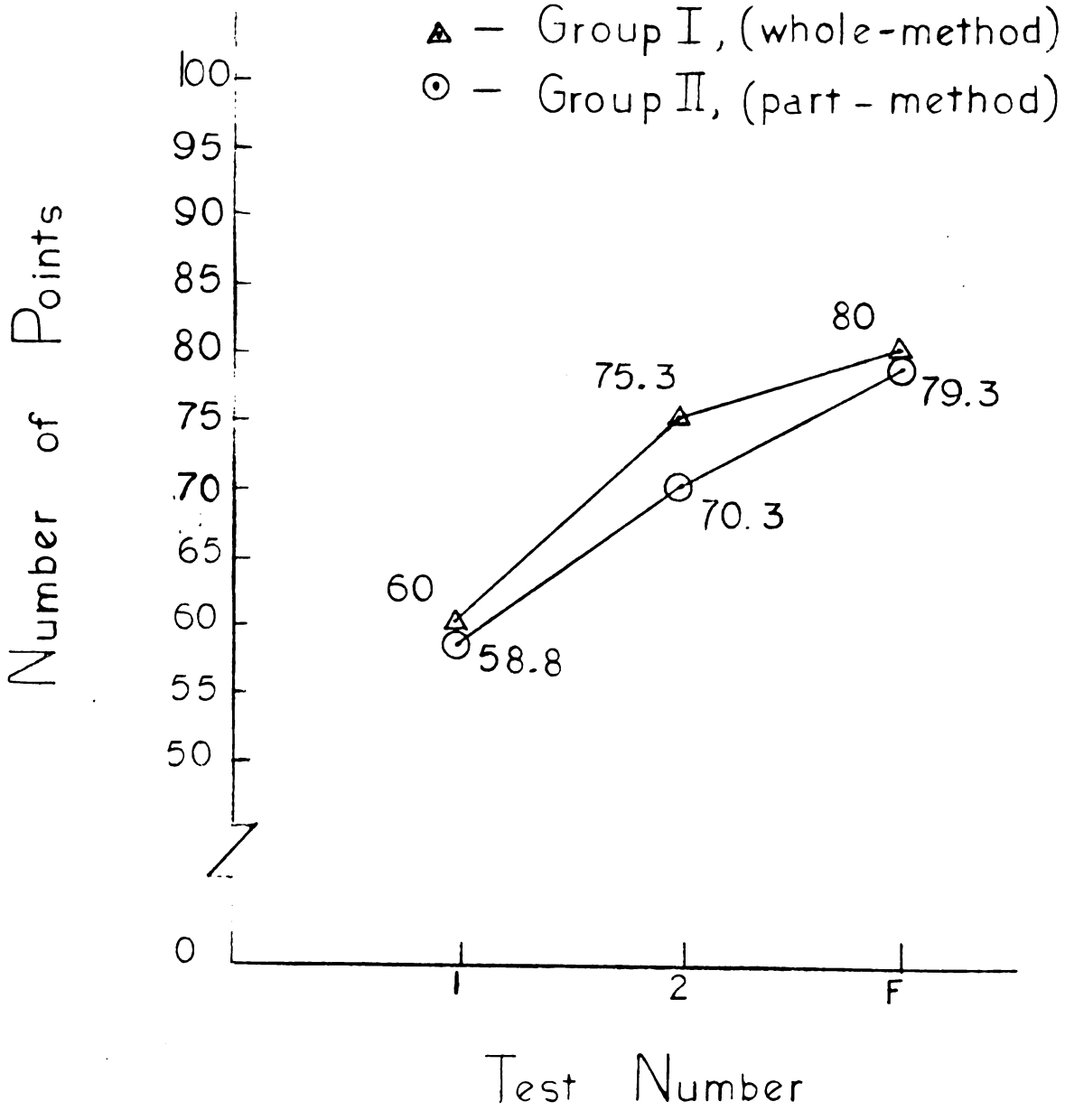
CHART II
COMPARATIVE ANALYSIS OF TEST SCORES



Group II
(part-method)

CHART III

Graph Showing Progress of Groups by Their Mean Test Scores



It was thought by the author that the "whole-method" group would show a marked difference in the results of the first two testing sessions, since they had been practicing the whole stunt from the beginning. This, however, did not take place. Chart III of the group's mean scores shows that there was no more variance than five points, out of a possible hundred. The final test scores showed that at the end of training the two separate groups obtained approximately the same level of achievement.

The correlations of the matching variable with the three test results as well as initial test with final test results are presented in Table II.

Table II

Correlation of Test Results

	Initial	T_1	T_2	T_3
Initial	---	.55	.31	.51
T_1	---	---	---	.70

The correlation of T_1 with the final test T_3 is high indicating a close relation with the final test results.

The correlations of the subject's ranking on the prerequisite, giant circle backwards, are not high. In all cases except one, however, those who were ranked high on the prerequisite were also the ones who received the highest scores in the final test. The one case was markedly different, and since the number of cases was small it lowered the correlations considerably.

Due to the magnitude of the correlation between T_1 and T_3, analysis of covariance was considered and possibly should have been calculated. It was decided not to calculate the analysis of covariance because of the extremely small differences between groups in the analysis of variance results. It was the author's opinion that this analysis would contribute little to the overall results of the study.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was undertaken to determine the effectiveness of teaching the "fly-away" from the horizontal bar by the "whole" and "part-methods" of instruction. Eight subjects with some gymnastic background were selected, matched, randomly placed into groups, and were then trained and tested. The "part-method" of instruction was composed of a series of progressive stunts with the progression being a number of lead-up movements starting from simple and moving to the whole, more complex stunt. The "whole-method" of instruction consisted of allowing the subjects to attempt the whole, complex stunt from the very beginning and to use no progression what-so-ever. The training and testing lasted for a period of eight weeks. At the end of this eight-week period, the data were statistically treated using analysis of variance. The judgments were based on form and completeness of execution. Specifically, the criteria for the completeness of execution was judged on the release from the bar, height of turn-over, the landing, and general control throughout the whole stunt.

Conclusions

No differences were found between the "part" and "whole" method groups which could be attributed to the method of instruction.

Recommendations

1. A study of this nature should be carried out on this same stunt only using a different progression of stunts in the "part-method" of instruction.

2. A study of this type should be carried out for a longer period of time to determine, after the two methods of instruction have been employed and the subjects perform the "fly-away" without any mechanical means of assistance, whether the psychological factor is operative during the performance.

3. A study of the effects of "whole-method" versus "part-method" of instruction be attempted in teaching of other complex stunts on or from other apparatus.

4. A study that would attempt to find the significance of the "carry-over" value that would come from similar stunts on other apparatus.

BIBLIOGRAPHY

BOOKS

Bucher, Charles A. Methods and Materials in Physical Education and Recreation. St. Louis. The C. V. Mosby Co. p. 28, 1954.

Burns, Ted. Tumbling Techniques Illustrated. New York. The Ronald Press Co. p. 90, 1957.

Cotteral, Bonnie and Donnie. The Teaching of Stunts and Tumbling. New York. A. S. Barnes and Co. p. 46, 1936.

Goulden, C. H. Method of Statistical Analysis. New York. John Wiley and Sons. pp. 63-98, 1952.

Kungle, G. C. Olympic Gymnastics, Volume II, Horizontal Bar. London. James Barrie Books Limited. pp. 15-16, 1957.

LaPorte, William R. and Al G. Renner. The Tumbler's Manual. New York. Prentice-Hall, Inc. pp. 3-5, 1938.

Loken, Newton C. and Robert J. Willoughby. Complete Book of Gymnastics. Englewood Cliffs, New Jersey. Prentice-Hall, Inc. p. 97, 1959.

O'Dell, C. W. An Introduction to Educational Statistics. New York. Prentice-Hall, Inc. pp. 162-164, 1946.

Ryser, Otto E. A Teachers Manual for Tumbling and Apparatus Stunts. Dubuque, Iowa. Wm. C. Brown Co. p. 17, 1948.

Szypula, George. Tumbling and Balancing for All. Dubuque, Iowa. Wm. C. Brown Co. p. 6, 1957.

West, Wilbur D. The Gymnast's Manual. New York. Prentice-Hall, Inc. 1946.

PERIODICALS

Cross, T. J. "A Comparison of the Whole Method, the Minor Game Method, and the Whole-Part Method of Teaching Basketball to Ninth-Grade Boys". The Research Quarterly, 8: 49-54, December, 1937.

Knapp, C. G. and W. R. Dixon. "Learning to Juggle: II, A Study of Whole and Part Methods". The Research Quarterly, 23: 398-401, December, 1952.

McCloy, C. H. "The Organization and Teaching of Apparatus Work and Tumbling". Journal of Physical Education, 34: 2-6, January, February, March, April, 1937.

Monroe, W. S. Encyclopedia of Educational Research. New York. The MacMillan Co. p. 822, 1950.

Shay, C. T. "The Progressive - Part Versus the Whole Method of Learning Motor Skills". The Research Quarterly, 4: 62-67, December, 1934.

Wickstrom, R. L. "A Comparative Study of Methodologies for Teaching Gymnastics and Tumbling Stunts". University of Iowa, 1953.

UNPUBLISHED MATERIAL

Niemeyer, R. "Part Versus Whole Methods and Massed Versus Distributed Practice in the Learning of Selected Large Muscle Activities". (Unpublished Doctoral Dissertation, University of Southern California, 1958.)

PERSONAL CONSULTATION

Takemoto, Masao. Member of Japanese Olympic Team, 1956 and 1960. Interviewed at Chicago Gymnastic Clinic, 1961.

APPENDIX

APPENDIX A

Raw Scores of Group I and II During All Testing Sessions

Group I (part-method)	Prerequisite Scores	First Test Scores	Second Test Scores	Final Test Scores
Bassett	85	90	93	93
Skinner	70	65	73	75
Tabb	67.5	35	60	70
Dyke	45	50	75	82
Group II (whole-method)				
Sass	80	70	75	85
Penrod	72.5	40	65	79
Samson	65	65	73	79
Smith	50	60	68	74