

A STUDY OF THE RELATIONSHIPS BETWEEN ACHIEVEMENT
IN FIRST YEAR MATHEMATICS AND APTITUDE TESTS,
PREVIOUS GRADES, AND ACHIEVEMENTS

by

TITUS JACOB BURKHOLDER ⁴⁸⁷¹

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CHAPTER I

BACKGROUND FOR THE STUDY

INTRODUCTION

As education becomes more and more specialized, students are finding it necessary to set educational goals in the early years of high school. Objective counseling by guidance workers to aid sound choices on the student's part between algebra and general mathematics depends largely upon the availability of a composite of information from mental ability tests, recommendations by eighth grade mathematics teachers, achievement tests and special purpose prognosis tests. These tests and other data have all been used to predict algebra success. Studies both published and unpublished were concerned with finding some reliable method of predicting satisfactory performance of entering high school students, either as a means of selecting applicants for algebra, elementary algebra or guidance services for students.

PURPOSE

The purpose of the present study was to investigate the relationship of scores on algebra prognosis and aptitude tests, achievement tests, and marks in eighth grade mathematics to achievement in algebra. The problem was to determine the best combination of the instruments for use for advisement purposes

with individual students in determining expectancy of success in algebra. For the purpose of counseling a student with high algebra potential, the chief consideration was that of assuring the student of placement that will result in the maximum development of his capacities. If a student with low ability requests admission to algebra, it was considered to be more profitable to direct the student toward subjects for which his abilities are more suited, by a composite judgment of the teachers, guidance counselor, parents, and the student.

At Bishop Ward High School, Kansas City, Kansas, the students are grouped into algebra or elementary algebra according to their marks in eighth grade and their scores on the mathematics concept section of the Stanford Achievement Test. It would be beneficial to have a reliable criterion by which the membership of the groups could be determined.

If it too frequently happens that a fairly large number of students were permitted to take algebra and failed, it would be a waste of time and money for both the student and the school. If the scores from a suitable prognosis test were available, it would enable the school personnel to help overcome some of the failures due to misassignment and help the school plan a more functional program of mathematics instruction for each student. Thus, there was a need for information that would provide for more accurate placement procedures in the mathematics program at Ward.

With the change in curriculum development that has taken place the last two years at Ward, and with the introduction of team teaching and the emphasis on independent studies by the student, there was a need for a predictive instrument that may be used by teachers as an instructional aid for planning lessons and assignments that will meet the needs of students of different abilities.

The selected factors of the *Differential Aptitude Test* as a predictive indicator were included in this study although they are not given until the beginning of the ninth year. The *Differential Aptitude Test* was included in this study to determine whether it was of sufficient value as an indicator to merit its administration during the latter part of the eighth grade year.

HYPOTHESES

That there is no significant correlation between the achievement of the first year algebra students measured by the teacher's grade and the selected factors as listed below:

1. Aptitude in Algebra as measured by the Orleans-Hanna Algebra Prognosis Test.
2. Mathematical achievement in eighth grade as measured by the eighth grade mark.
3. Mathematical achievement as measured by the selected Stanford Achievement Test scores: Arithmetic Computation, Arithmetic Concepts, Arithmetic Application, at the end of the eighth grade year.

4. Aptitude in Algebra as measured by the selected Differential Aptitude Test scores: Numerical Ability, Verbal Reasoning, and Numerical Ability plus Verbal Reasoning, at the beginning of ninth grade year.
5. Achievement in first year algebra as measured by the Cooperative Achievement Test.

LIMITATIONS

Limitations of the study that will affect the generality and application of the study to other situations are:

1. Use of only that data available from the school records, and usual testing programs.
2. Exclusion of standardized algebra aptitude test at the end of the eighth grade year.
3. Exclusion of eighth grade teacher recommendations.
4. Administration of the Differential Aptitude Test and the Orleans-Hanna Algebra Prognosis Test at the beginning of the ninth grade. If useful, these tests should be administered at the end of the eighth grade, and may cause a change in the results.