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A study of the value of the admissions requirements in predicting graduation from a physical therapy program and entrance into the profession

Boston University

School of Education

A STUDY OF THE VALUE OF THE ADMISSIONS REQUIREMENTS

IN PREDICTING GRADUATION FROM A PHYSICAL THERAPY

PROGRAM AND ENTRANCE INTO THE PROFESSION

Submitted by

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"Research is conducted essentially for the
purpose of self-education and is supported
because of its potential educational value for others,
with all the secondary benefits which may come from
increased knowledge and understanding"

Frederick J. Moore, M.D.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Statement of the Problem

At present there are thirty-nine schools and colleges
in the United States that offer physical therapy major pro-
grams which are approved by the Council on Medical Education
and Hospitals of the American Medical Association. Together
these schools graduate approximately 1,000 physical thera-
pists each year.

Since there is a current need for 13,600 physical
therapists,[1] college admission officers are constantly faced
with the problem of selecting students who will do well in
the academic program and will continue on into the physical
therapy profession.

Purpose

It is the purpose of this study to reveal, in some
measure, just how adequately Boston University Sargent College
is selecting its students for the physical therapy major pro-
gram. It is the intention of the author to present data
which will show the value of high school rank and test scores

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[1]Mobilization and Health Manpower - II. A Report of
the Subcommittee on Paramedical Personnel in Rehabilitation
and Care of the Chronically Ill. (Washington, U.S. Govern-
ment Printing Office, 1956.)

in predicting completion of the college course and continuation into the physical therapy profession.

Justification of the Problem

Since 1929 Sargent College has been part of Boston University, first as a division of the School of Education and then in 1934, as one of the Colleges of the University. It was in 1933 that the first class of physical therapists was graduated. Also in that year the Council on Medical Education and Hospitals of the American Medical Association published the initial list of approved physical therapy training programs. Sargent College appeared on the first list and through the years has remained in good standing.

As a result of becoming part of Boston University, the admissions to Sargent College have been handled by the Director of Admissions and his associates. To them belongs the responsibility for processing admission applications and evaluating the material each student has submitted.

In the early years of the physical therapy program at Boston University Sargent College, the number of students applying for the physical therapy program was small and the college could easily accommodate these applicants. However, during the past ten years the number of applicants has increased and the problem of choosing the best qualified students has arisen.

In direct result the present admission requirements

have been made. The high school graduate who has taken a college preparatory course must submit, in addition to the high school record, the mathematics and verbal scores from the Scholastic Aptitude Test (College Entrance Examination Board). The high school graduate who has taken the commercial course must submit, in addition to the high school record, the results from the Boston University Test Battery, this battery being composed of the Ohio State University Psychological Examination, Form A and the Cooperative English Test, Form 2T.

It is not the purpose of this study to judge the merits of the admissions requirements. Instead the author will attempt to uncover new knowledge, aimed at prediction of academic success and continuation in the physical therapy profession, using the admissions material as a basis for prediction. All this is with a view toward providing admission officers with an objective basis for selection or rejection of applicants for the physical therapy major program.

Scope of the Study

This study deals with data gathered from the files of physical therapy students admitted to the classes of 1955, 1956, 1957, 1958, of Boston University Sargent College. The material gathered includes the following:

1. From the Admissions Record

    a. Ohio State University Psychological Examination, (Boston University Edition, Form A)

b. Cooperative English Test, Form 2T

c. Verbal and Mathematics scores of the Scholastic Aptitude Test (College Entrance Examination Board)

d. Rank in high school class at graduation

2. From the Academic Record

a. Certification of graduation from the physical therapy major course

b. Notification of termination of matriculation from the physical therapy major course

3. From the Alumnae Record

a. Employment record in the physical therapy profession after graduation

Limitations of the Study

This study is limited in some respects as follows:

1. Certain members of the classes studied were disqualified from the study because of incomplete data.

2. Not all members of the classes were required to take the Ohio State University Psychological Examination, Cooperative English Test, Scholastic Aptitude Test. Thus the conclusions drawn from this data must be interpreted with some recognition of the size of the sample.

3. Teacher's grades, when used as measures of high school rank, must be considered essentially as subjective estimates.

4. Variance of high school background, size of classes, academic program, reveal the heterogeneous background of the students and should be remembered by the reader when interpreting the results.

Procedure

The Bi-serial coefficient of correlation was used to analyze the data obtained for this study. Graduation versus

non-graduation from the physical therapy major course was
correlated with each of the following variables.

1. Ohio State University Psychological Examination
   (Boston University Edition, Form A)

2. Cooperative English Test, Form 2T

3. Verbal and Mathematics scores of the Scholastic
   Aptitude Test (College Entrance Examination Board)

4. Rank in high school class at graduation

Entrance into the physical therapy professional field
versus non-entrance was also correlated with each of the
above variables.

In all cases, the Bi-serial formula employed was:

$$r_b = \frac{Mp - Mt}{r_t} \times \frac{p}{y}^2$$

in which:

Mp is the mean of X values for the higher group in the
dichotomous variable, the ones having more ability
in which the sample is divided into two subgroups

Mt is the mean of the total sample

p is the proportion of the cases in the higher group

y is the ordinate of the normal distribution curve with
surface equal to 1.00, at the point of division be-
tween segments containing p and q proportions of the
cases

q is the proportion of the cases in the lower group

r_t is the Standard Deviation of the total sample

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[2] J. P. Guilford, Fundamental Statistics in Psychology
and Education (New York, McGraw-Hill Book Co., Inc., 1956),
299.

CHAPTER II

REVIEW OF RELATED RESEARCH

Specifically related studies

In 1954, Wallace Gobetz reported the results of a
three year nationwide test research program, aimed at predic-
tion of academic achievement and clinical performance of
physical therapy students. A test battery was composed by the
New York University Testing and Advisement Center, which pre-
sumed to measure intelligence, mechanical reasoning, scien-
tific knowledge and knowledge of contemporary social problems.
Dr. Gobetz study using the aforementioned test battery,
yielded results which, when compared with the didactic
average, correlated to the extent of (.48) for female stu-
dents and (.38) for the male students.[3]

Another study was done at the University of Wisconsin
with seventy-six physical therapy students and one hundred
fifty-eight occupational therapy students. Included in a
test battery were the following:

1. Intelligence tests

    a. Wechsler-Bellevue
    b. California Mental Maturity

2. Achievement tests

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[3]Wallace Gobetz, "Report on Student Selection Test
Research Program - Part III, "Physical Therapy Review, XXXIV
(October 1954), 513-519.

a. Wide Range Achievement
b. Speed of Reading

These four tests seemed to measure the same things and had high correlations which would warrant further use of them in research and study dealing with success in both physical therapy and occupational therapy. The rest of the study was hampered by the lack of a large enough sample, or insignificant correlations.[4]

Generally related studies

There are numerous studies of the factors relating to success in teachers college and are notable because of the similarity of the physical therapy curriculum to that of the teacher.

Dwight Arnold, reporting for a study group at Kent State University, lists the following criteria as the group's choice for a composite entrance record, this record to be used as a means of predicting success in teaching.

1. High school marks

2. Scholastic Aptitude Test scores

3. Achievement test scores

4. Personality Interest Test scores

5. Record of Personal-Social participation and development.[5]

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[4]Nick John Topetzes, "A Program for the Selection of Trainees in Physical Medicine," Journal of Experimental Education, XXV (June 1957), 263-332.

[5]Dwight Arnold, "Selection and Guidance," Educational Research Bulletin (December 13, 1950), 232-236.

In a study done with physical education and physical therapy majors, Barbara Cowe attempted to determine the influence that personality traits, psychosomatic symptoms, high school records, Scholastic Aptitude Test scores and extra-curricular activities had on academic success.

The results that seemed most interesting to this author's study were:

1. Correlation between college grades and high school grades were within the range found in other studies. (.40 and .38)[6]

2. Scholastic Aptitude Test scores and college grades for freshmen (.44) were nearer to the median (.50) for thirty-five independent studies than was the correlation for the sophomores (.17).[7]

3. There was little relationship between success in college and the number or severity of the psychosomatic complaints as measured at the time of the study.[8]

In a study done among the same student body Esther Odell concluded that the Scholastic Aptitude Test scores have sufficient relationship to academic success to warrant their use as an admissions requirement.[9]

Alexander and Woodruff in a study done at the University of New Hampshire found that personal adjustment,

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[6]Barbara Cowe "Predicting Success of Students in a Physical Education College" (unpublished Master's thesis, Boston University, School of Education, 1952), 23.

[7]Ibid., 24.

[8]Ibid., 27.

[9]Esther Odell, "Prediction of Academic Success at Bouve-Boston School" (unpublished Master's thesis, Boston University, School of Education, 1953), 25.

finances, family problems, dissatisfaction with the academic
program and social development all influenced the academic
status of the student.[10] In 1934 Segal had also published
the information that high relationships existed between voca-
tional interest scores and academic achievement.[11]

Nursing schools also require many of the same academic
courses as are taught in the schools of physical therapy.
Jex, in his prediction study of success in the College of
Nursing, reveals the correlation (.56) of the Cooperative
Total English Test with scholarship, this test having been
given to eighty-five entering freshmen.[12]

Stuit et al, in his study predicting success in
nursing schools reported the following data:

1. Tests of general scholastic aptitude can be used....
   scores earned on tests of this type usually correlate
   significantly with performance in nursing school.[13]

2. The degree of success which a student may achieve in
   nursing school will also depend in large measure upon
   the extent of his proficiency in the natural sciences
   and mathematics.[14]

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[10]Norman Alexander & Ruth Woodruff, "Determinants of
College Success," Journal of Higher Education, XI (December
1940), 479-485.

[11]David Segal, "Differential Prediction of Scholastic
Success," School and Society, XXXIX (Jan. 20, 1934), 91.

[12]Frank B. Jex, University of Utah Studies in the Pre-
diction of Academic Success (University of Utah, Research
Monographs in Education, Vol. 1, No. 1, The University of
Utah, 1957) 28.

[13]Dewey Stuit et al., Predicting Success in Profes-
sional Schools (Washington, American Council on Education,
1949), 181.

[14]Ibid., 184.

3. To improve the estimate of an individual's chances for doing satisfactory work in nursing school, careful consideration should be given to the quality of his previous scholastic record.[15]

Perhaps, however, nothing is as easily available, or as useful as the high school grade-point average. The following statement by Jex supports this idea.

> No single item of information available for freshman students affords as adequate index of ability to do college work. Although the high school grade-point average is the best single indicator of probable college success, this index of general scholarship should be supported by appropriate achievement test scores.[16]

Summary

The studies previously reported may seem to be slanted solely toward admission requirements and the correlations obtained in respect to academic success. It should be remembered that......

> To the extent that the professional schools are successful in the development of sound programs of instruction and education, to that extent will prediction of success in training constitute adequate prediction of success in professional life.[17]

In reviewing the studies that are concerned with prediction of success in college or school, it is apparent that many researchers have reported criteria which may have value when employed as predictors of academic success. The criteria most emphasized are:

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[15]Ibid., 184.

[16]Jex, loc. cit., 33.

[17]Stuit et al., loc. cit., 5.

1. High school rank or grade-point average

2. Scholastic Aptitude Test score results

3. Other objective achievement test scores.

Whether these standards or others will succeed in closing the distance that still remains between prediction and the end result, will depend upon further research.

CHAPTER III

PRESENTATION AND ANALYSIS OF THE DATA

On the following pages the students' scores on the predictive measures are compared with whether they graduate or do not graduate from the physical therapy major course, and whether they enter or do not enter the physical therapy profession.

It should be remembered that the Biserial correlation gives coefficients that are generally good approximations to the Pearson product-moment coefficient of correlation; therefore the usual interpretations that are made of one can be made of the other.[18]

TABLE I

CORRELATION BETWEEN THE SCHOLASTIC APTITUDE TEST
MATHEMATICAL AND VERBAL SCORES WITH
GRADUATION VS. NON-GRADUATION AND
ENTRANCE VS. NON-ENTRANCE INTO THE PROFESSION

| | Mathematical | | Verbal | |
	N	r	N	r
Graduation versus Non-Graduation	26	-.21	26	-.29
Entrance versus Non-Entrance into the profession	26	-.33	26	-.26

[18] J. P. Guilford, Fundamental Statistics in Psychology and Education (New York, McGraw-Hill Book Co., Inc., 1956), 303.

The coefficients of correlation shown in Table I are not significant and cannot be used for prediction. These correlations are still the highest found in this study, thereby substantiating other prediction studies where the scored from the Scholastic Aptitude Test are better predictors of academic success than the Cooperative English Test or the Ohio State University Psychological Examination; in this study the coefficients of correlation being negative indicates failure rather than success.[19]

TABLE II

CORRELATION OF OHIO STATE UNIVERSITY PSYCHOLOGICAL EXAMINATION WITH GRADUATION VERSUS NON-GRADUATION AND ENTRANCE VERSUS NON-ENTRANCE INTO THE PROFESSION

	N	r
Graduation versus Non-Graduation	43	-.01
Entrance versus Non-Entrance into the Profession	43	-.08

The correlations found in Table II show evidence of indifferent negative relationships that do not prove

Alfred Bouchard, "A Study of the Relationship of Certain Test and Other Evaluative Criteria to Academic Success in a College of Business Administration" (unpublished Master's thesis, Boston University School of Education, 1957), 37-38.

significant to prediction. A review of the literature indicates that the coefficient of correlation for prediction studies is usually found between .30 and .60.[20]

TABLE III

CORRELATION OF COOPERATIVE ENGLISH TEST WITH
GRADUATION VERSUS NON-GRADUATION AND ENTRANCE
VERSUS NON-ENTRANCE INTO THE PROFESSION

	N	r
Graduation versus Non-Graduation	43	-.04
Entrance versus Non-Entrance into the Profession	43	-.01

The correlations obtained from the Cooperative English Test are too small to indicate any significant relationship and should not be regarded as reliable or valid. It is interesting to note that the smallest coefficients of correlation are found among the results of the Cooperative English Test and the Ohio State Psychological Examination. This may be due to the fact that the scores were obtained from the same sample of students and these students were predominantly from a Non-College Preparatory background.

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[20]Stuit et al., loc. cit., 10.

TABLE IV

CORRELATION OF HIGH SCHOOL RANK AT GRADUATION WITH
GRADUATION VERSUS NON-GRADUATION AND ENTRANCE
VERSUS NON-ENTRANCE INTO THE PROFESSION

	N	r
Graduation versus Non-Graduation	137	.006
Entrance versus Non-Entrance into the Profession	137	.005

The results of Table Iv are not significant and cannot be used for prediction.

It should be noted by the reader that the author of this study realized the limitations of using percentiles in the computation of biserial correlations. Percentiles are not well suited to computations of means, correlations and other statistical methods, as they do not give a correct picture of the amount of difference between one score and another. However, it was felt necessary to use percentiles in this case as there appeared no other way to convert the rank at graduation achieved by the 137 students, and this criteria was the only one held in common by the majority of students in this study.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary

It was the purpose of this study to present the predictive quality of high school rank and test scores required for admission into the physical therapy program of Boston University Sargent College. These variables were correlated with graduation or non-graduation from the physical therapy major program and entrance or non-entrance into the physical therapy profession. The one hundred thirty-seven subjects were members of the classes of 1955, 1956, 1957, and 1958 and included students who dropped out of college during the four years because of marriage, financial problems, academic failure or other causes.

The actual scores received by the students on the mathematical and verbal sections of the College Entrance Examination Board Scholastic Aptitude Test, Ohio State University Psychological Test, Cooperative English Test were tabulated and used as predictive data with graduation versus non-graduation and entrance or non-entrance into the profession as criteria.

Conclusions

1. The findings of this study reveal no single factor in the Admissions requirements that shows a degree of predictability which appears statistically significant.

2. Analysis of the data compiled for this study indicates that the pre-entrance tests yield no significant coefficients of correlation as predictive criteria.

Inferences

1. The overall results of this study would seem to point out that the students with the lower scored tend to graduate from the physical therapy major program and enter into the physical therapy profession more frequently that these with higher scores.

2. The correlation between the mathematical section of the Scholastic Aptitude Test appears to be related to non-entrance into the physical therapy profession.

Recommendations

Some consideration should be given to determining the factors that eliminated the students with the higher entrance scores from matriculation. The possible causes that might be investigated are:

1. Incentive
2. Selection of college and major field of study
3. Challenge of academic work
4. Personal-Social attitude
5. Extra-curricular activites
6. Financial problems

In view of the results of this study perhaps some effort should be made to evaluate the tests required for admission into other physical therapy schools and colleges.

Because of the size of the sample chosen for this study and the limited number of test scores, an extension of this study in the future might prove valuable.

A detailed followup survey of the professional work record of those graduates who have entered the physical therapy field might uncover some attributes that are not at present a part of the admission requirements.

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STUDENT	HIGH SCHOOL RANK	OHIO STATE UNIV.	COOP. ENGLISH	SCHOLASTIC APTITUDE VERBAL	MATH	GRADUATION	WORK
1	19					yes	yes
2	20					yes	yes
3	76					yes	yes
4	46	98	62			no	no
5	91					yes	yes
6	71					yes	yes
7	53					yes	no
8		103	56			yes	yes
9	76	104	60			no	no
10	79	62	47			yes	yes
11	60					yes	yes
12	34		56			yes	yes
13	1	75	56			no	no
14	11	41	50			no	no
15	1					no	no
16	50	39	51			no	no
17	71					yes	yes
18	88					yes	yes
19	92					np	no
20	59	93	57			yes	yes
21	69					yes	yes
22	19					yes	yes
23	97					no	no
24	56	75	52			yes	yes
25	30	75	55			no	no
26	82					no	no
27	8	39	47			no	no
28	92					yes	yes
29	11	38	45			yes	yes
30	6	35	49			yes	yes
31	27	65	53			yes	no
3 2	48					yes	yes
33	81					yes	yes
34	76					yes	yes

36	19	40	45			yes	no
37	43	47	47			yes	yes
38	55					no	no
39	72					yes	yes
40	60	64	63			yes	yes
41	82					yes	yes
42	87					yes	yes
43	83					yes	yes
44	22					no	no
45	27					yes	yes
46	93					no	no
47	22					no	no
48	11					yes	yes
49	84			422	421	yes	yes
50	29					yes	yes
51	33					yes	yes
53	62					yes	yes
54	51					yes	yes
55	92					yes	yes
56	62					yes	no
57	87					yes	yes
58	48	55				yes	yes
59	58					yes	yes
60	98			600	522	no	no
61	57					yes	yes
62	91					yes	no
63	58					no	no
64	83					no	no
65	61			433	421	yes	yes
66	98					no	no
67	11	50	49			no	no
68	70			357	369	no	no
69	92					no	no
70	36	81	52			yes	yes
71	92					no	no
72	71					yes	yes
73	96					yes	yes
74	34					yes	yes
75	34	85	65			yes	no
						yes	yes

76	86					yes	yes
77	31					yes	yes
78	38			416	538	no	no
79	73			423	461	yes	yes
80	52					yes	yes
81	67					yes	yes
82	70					yes	yes
83	51	69	48			yes	yes
84	94					yes	yes
85	94			434	403	yes	yes
86	87					yes	yes
87	42			334	339	yes	yes
88	56	62	51			yes	yes
89	71					yes	yes
90	95					yes	yes
92	66			473	335	yes	yes
93	92					yes	yes
94	95					yes	yes
95	55	59	56			yes	yes
96	36	116	80			no	no
97	71					no	no
98	67			461	405	no	no
99	96			536	474	no	no
100	12					no	no
101	74					yes	yes
102	92			474	525	yes	yes
103	73					yes	yes
104	27	87	59			yes	yes
105	62					yes	yes
106	94	90	51			yes	yes
107	79					yes	yes
108	93			538	545	yes	yes
109	99	81	63			yes	yes
110	100			626	687	yes	yes
111	43					yes	yes
112		111	65			yes	yes
113	78					yes	yes
114	55	79	50			yes	yes
						yes	yes

115	53			392	511	yes	yes
116	73	61	57			yes	yes
117	27	67	55			yes	yes
118	74			304	457	yes	yes
119		84	55			yes	yes
120	88					yes	yes
121	60	64	54			yes	yes
122	72	90	65			yes	yes
123	79					yes	no
124	55			405	365	yes	no
125	85			490	497	yes	yes
126		67	54			yes	yes
127	23	77	55			yes	yes
128	100			620	600	yes	no
129	83			336	437	yes	no
130	75			466	415	yes	yes
131	96			688	612	no	no
133	74	59	47			no	no
134	9	66	48			no	no
135	56			416	561	no	no
13 6	17			416	357	no	no
137	92			495	521	no	no
138	83					no	no
139	54	87	61			no	no
140	83	74	48			no	no
141	69					no	no
142	38	54	53			no	no
143	19					no	no
144	90			427	341	yes	yes