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LONG-TERM PREDICTIVE VALIDITY OF THE ACT AT THE
UNIVERSITY OF WISCONSIN-LA CROSSE

A THESIS

Presented to
the Graduate Faculty
University of Wisconsin-La Crosse

In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Education:
College Student Personnel

by

Joan E. Olstad

December, 1980

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ACKNOWLEDGEMENTS

The writer expresses her thanks to the following people, whose assistance proved invaluable in the completion of this study: Messrs. Tom Gay, Dick Kerska, and Joel Worra, University of Wisconsin-La Crosse Computer Center, for their help with the statistical operations; Drs. Robert Treu and Andris Ziemelis, committee members, for their criticisms and suggestions; Dr. Clifford Zirkel, committee chairman, for his unfailing patience, guidance, and encouragement; and to my parents and friends, whose love and support made the setbacks less discouraging and the finished project a shared accomplishment.

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ABSTRACT

The study attempted to determine the validity of students' ACT scores, other selected ACT variables, high school rank in class, and overall high school grade point average (GPA) as predictors of freshman and senior GPA at the University of Wisconsin-La Crosse. Subjects for this investigation consisted of 531 UW-L students, who were matriculating seniors between fall 1974 and summer 1979. Data for the study included students' ACT subtest and composite standard scores, high school rank in class, certainty of choice of college major, certainty of first occupational choice, estimated highest level of educational attainment, estimated freshman GPA, and overall high school average as independent variables, freshman and senior GPA as dependent variables. Only students with complete sets of data were included in the study.

Pearson product-moment correlations, multiple correlations, and regression equations were prepared for freshmen and seniors in portraying the validity of the ACT in predicting GPA. All predictor variables except certainty of choice of college major, certainty of first occupational choice, and estimated highest level of educational attainment correlated positively with both freshman and senior GPA at the .01 level of significance. Estimated highest level of educational attainment was positively associated with

freshman GPA at the .05 level of significance. Results of stepwise multiple regression analyses showed significant overall multiple correlations between the predictor variables and college GPA. High school grade point average was the best single predictor of success for both freshmen and seniors ($R=.634$), accounting for 40.3% of GPA variance.

To cross-validate the findings, the regression weights developed on the freshman and senior samples were applied to the predictor data of 25% of each sample. The correlations between actual and expected freshman and senior GPAs were .786 and .674, respectively. Explanations for the findings are discussed, and the implications of this study are presented.

CHAPTER I
INTRODUCTION

The validity of college entrance examinations for predicting freshman grade point average (GPA) has been extensively documented (Aleamoni & Oboler, 1978; Chissom & Lanier, 1975; Price & Kim, 1976). However, the usefulness of such examinations is not contingent primarily on their ability to predict freshman GPA. Rather, student development specialists want to know how well a student would perform during his entire college career, not just during his first year. A student who has initial academic difficulty but eventually works his way up to an acceptable level of academic performance has a legitimate place on campus (Mauger & Kolmodin, 1975). If entrance examinations merely differentiate those who would get off to a slow start academically from those who would show immediate success, they should be used as placement rather than admissions criteria.

The purposes of this study were threefold: 1) to identify the specific factors which are associated with success in college, 2) to test the significance of those factors in predicting college performance and 3) to determine if the American College Test (ACT) scores and other selected ACT variables adequately predict a student's cumulative performance over his total academic career.

Academic performance data, self-estimates of academic performance, and ACT scores were obtained on 531 students from the University of Wisconsin-La Crosse. Correlations between ACT scores and GPA, multiple correlational coefficients (ACT subtest and composite standard scores, high school rank in class, certainty of choice of college major, certainty of first occupational choice, estimated highest level of educational attainment, estimated freshman GPA, and overall high school average as independent variables, college GPA as dependent variable), and regression equations were prepared for 213 males and 318 females in portraying the GPA predictive validity of the ACT.

Hypotheses

It was hypothesized that a significant positive correlation would exist between 1) ACT subtest and composite standard scores and college GPA, 2) high school rank in class and college GPA, 3) certainty of choice of college major and college GPA, 4) certainty of first occupational choice and college GPA, 5) estimated highest level of educational attainment and college GPA, 6) estimated freshman GPA and college GPA and 7) overall high school average and college GPA. It was also hypothesized that although the predictive value of the ACT would be higher for University of Wisconsin-La Crosse (UW-L) freshmen than for UW-L seniors, ACT scores would still have sufficient validity to be of use in predicting academic performance during the course of a student's college career.

Delimitations

Several limiting factors should be recognized.

1. Regression analyses were undertaken only for students who had complete sets of data (college GPA, high school GPA, ACT subtest and composite scores).
2. External validity of this study is unknown. Variables which provide the best prediction equation for a given group may not necessarily provide the best prediction equation for a different group. It is likely that some of the specific patterns of correlations between ACT scores, other predictors, and the criterion would change if the study were replicated in a different setting.
3. It is very likely that grades are determined by factors other than those measured by high school grade point average and ACT. The effect of internal factors related to academic performance (ability, motivation, persistence, etc.) would have to be demonstrated before results obtained on a sample of UW-L freshmen and seniors could be generalized to all college students.
4. The effects of other uncontrolled variables on achieved GPA, such as differences in grading standards among teachers or departments, were not determined.

Definition of Terms

For the purpose of this study, the principal terms were defined as follows.

ACT (American College Testing Program)--The ACT Assessment Program is a comprehensive program for use by students

planning to enter postsecondary education. The program contains four tests in four subject areas: English (ACTENG), mathematics (ACTMATH), social studies (ACTSS) and natural sciences (ACTNAT). They are designed to assess students' general educational development and ability to complete college work. The test items require that students demonstrate both problem-solving and reasoning ability.

ACT Student Profile Section--The ACT Student Profile Section collects personal information, admissions/enrollment data, and information about extracurricular achievements and interests, high school course work, academic plans, and individual educational needs.

ACTCOMP--ACTCOMP indicates ACT composite score, the average of the standard scores on the four individual ACT tests.

ACTHSGPA--ACTHSGPA refers to self-reported overall high school grade point average.

Criterion--Criterion is synonymous with "dependent variable".

In this investigation, college GPA is the criterion.

ESTGPA--ESTGPA denotes self-estimate of college grade point average, i.e. the college grade point average (A=4.0) the student expects to earn.

FGPA--FGPA indicates freshman grade point average.

Freshmen--Freshmen are those students who have completed at least one, but no more than 29 credits.

GPA (Grade point average)--Grade point average is the total number of grade points earned (A-highest grade, 4 grade

points per credit; B-above average, 3 grade points per credit; C-average, 2 grade points per credit; D-below average, 1 grade point per credit) divided by the number of credit hours attempted.

HIGHRANK--HIGHRANK indicates self-reported high school rank (top, second, third, or fourth quarter).

HLEVELED (Degree objective)--HLEVELED refers to the student's estimated highest level of educational attainment.

HSGPA--HSGPA refers to the average of the student's four most recent self-reported high school grades prior to the senior year.

OCCUP--OCCUP indicates certainty of first occupational choice (see PRGSTDY).

Predictor--Predictor is synonymous with "independent variable". In this investigation, ACT subtest and composite standard scores, high school rank in class, certainty of choice of college major, certainty of first occupational choice, estimated highest level of educational attainment, estimated freshman GPA, and overall high school grade point average are the predictors.

PRGSTDY--PRGSTDY refers to certainty of choice of college major. From an extensive list of educational majors and vocational choices, the student selected a major and first and second vocational choices. For both, the student indicated degree of certainty as "very sure", "fairly sure", or "not sure".

SAT (Scholastic Aptitude Test)--The SAT is a multiple-choice test made up of separately timed verbal (SAT-V) and

mathematical (SAT-M) sections. Verbal questions measure reading comprehension and vocabulary. Mathematical questions measure ability to solve problems involving arithmetic, reasoning, algebra, and geometry. These abilities have been shown to be related to successful academic performance in college. The SAT does not measure other kinds of abilities which may be associated with success in college, such as special talents or motivation.

Seniors--Seniors are those students who have completed 90 credits or more. One hundred twenty-eight (128) credits are needed for graduation.

SGPA--SGPA indicates senior grade point average.

UWLCRE--UWLCRE indicates total number of credits earned at the University of Wisconsin-La Crosse.

CHAPTER II

REVIEW OF THE LITERATURE

Much research has been done on the prediction of college success. Such prediction is desirable for decision-making about student selection, placement, retention, and counseling. The criterion most often predicted is the grade point average for the first semester, quarter, or year of college work. However, an alternate criterion is total grade point average earned prior to graduation. This criterion becomes more important when institutions seek to serve students over their entire academic careers.

Prediction of Freshman GPA

Chissom and Lanier (1975) attempted to determine the validity of students' Scholastic Aptitude Test (SAT) scores and high school grade point average as predictors of overall college grade point average. Subjects for the study included 669 freshman students at Georgia Southern College during fall quarter, 1973. Data for the study included students' high school GPA and college GPA. Results showed that a significant multiple correlation existed between the predictor variables and college GPA ($R=.57$). The largest contribution to the relationship was made by high school GPA ($r=.46$) followed by the SAT-M and SAT-V variables.

Fincher (1974), in a similar study, evaluated the incremental effectiveness of the SAT, that is, the degree to which

its use resulted in more accurate predictions than those based on high school grade point average alone. He found an increase of approximately 46% in predictive efficiency for males and 43% for females when using the SAT in addition to high school grade point average to predict college GPA in 19 colleges in the University System of Georgia. The verbal and mathematics scores of the SAT correlated significantly with freshman course grades within the University System. The high school average correlated more substantially for all levels of institutions.

Among the studies concerned with grade predictions in specific subject areas, Akins (1974) concluded that "a relationship appears to exist" between students' mathematical aptitude as measured by SAT-M and the grades they earn in beginning modern language courses ($r=.373$). In another investigation, Pedersen (1975) observed that performance on the Verbal and Mathematics sections of the SAT exhibited low predictive validity in relation to grades in freshman chemistry. For a sample of 325 students enrolled at the University of North Carolina, Chapel Hill, he reported correlations of .32 and .42 between SAT-V and SAT-M scores and earned grades in freshman chemistry.

On the other hand, Gussett (1974) reported substantial correlations of .63 and .62 between SAT composite and mathematics scores and earned grades in freshman mathematics. He determined the validity of the SAT scores in the prediction of grades earned by a randomly chosen sample of 142 women in freshman mathematics at Longwood College, a

state supported girls' school in Farmville, Virginia. Many researchers have found the college achievement levels of women to be more predictable than those of men (Lunneborg, Olch, & De Wolf, 1974; Mc Donald & Gawkoski, 1979; Neely, 1977).

Paul (1978) determined that the best ACT predictors of performance in freshman chemistry were the math score ($r=.628$) and the composite score ($r=.663$). More recently, Andrews and Andrews (1979) found the SAT mathematics score to have a "much more direct relationship" with final grade in freshman chemistry than did high school grade point average.

In conclusion, most correlational studies have revealed a substantial relationship between academic predictor variables and college achievement in the freshman year as measured by GPA. However, the criterion of interest is rarely first year performance; one usually wishes to make inferences concerning the broader topic of "overall success in college". A more appropriate criterion variable might be the total grade point average earned prior to graduation. The question which must be answered is whether or not variables which best predict first year success also predict success over four years and, if so, do they do so equally well.

Consistency of College Entrance Test Scores as Predictors of College Performance

Berdie and Prestwood (1975) investigated the efficacy of high school percentile rank, a percentile score on the Minnesota Scholastic Aptitude Test (MSAT) and a score on the Minnesota Mathematics test (MINN MATH) as they related to the prediction of first year and final cumulative grade

point averages of 100 male students at the University of Minnesota who entered the Institute of Technology in the fall of 1966. All three predictor variables correlated significantly with both first year and final GPA.

Halpin, Halpin, and Hauf (1976) investigated the incremental effectiveness of the ACT along with the effectiveness of the ACT alone and of high school grade point average alone in predicting differential success in a three-year nurses' training program. Both high school GPA and ACT scores alone and combined were significantly related to first-, second-, and third-year nursing school GPA. The correlations were .36, .37, and .45, respectively.

Rowan (1978) investigated the predictive validity of the ACT toward grade point average at successive intervals during four years of college. Participants were 1,135 full-time entering freshmen from one fall class at Murray State University, and 1,154 freshmen from the next fall class. ACT validly predicted GPA at yearly intervals over the four-year span for the two classes studied. The multiple correlational coefficients ranged from a high of .59 for the first semester to a low of .48 for the eighth semester. Although validity coefficients dropped over time, all correlational coefficients and multiple correlational coefficients were significant beyond the .01 level of significance.

In a similar investigation, Mauger and Kolmodin (1975) studied the ability of the SAT verbal and mathematics scores to predict achievement over the entire period of college attended. In a sample of 318 students at a small,

denominational liberal arts college, the correlations of terminal GPAs and SAT-V and SAT-M scores were .52 and .43, respectively.

Larson and Scontrino (1976) examined the validity of high school GPA and of the Verbal and Mathematical portions of the SAT as predictors of college performance over an eight-year period. It was found that both multiple regression predictions involving use of all three of these variables in combination and predictions based upon high school GPA as a single predictor had consistently high correlations with four-year college grade point average.

Lunneborg (1977) in a study of 1,633 students at the University of Washington obtained a correlation of .51 between high school grade point average and four-year college GPA. Price and Kim (1976), in a study of 93 junior and senior business students at Fort Hays Kansas State College, determined that both high school grades and ACT scores are significant predictors of college performance. However, they concluded that ACT scores are more significant and important in predicting a person's ability to perform in college than are high school grades.

Numerous studies have been conducted to compare the ability of the ACT Program tests and the Scholastic Aptitude Test (SAT) to predict GPA (Adams, Higley, & Campbell, 1976; Gordon, 1974; Maxey & Lenning, 1974). In most of these studies investigators have concluded that both tests are equally capable of predicting college grades, although Aleamoni and Oboler found, in a 1978 study at the University

of Illinois at Urbana-Champaign, that SAT was the more valid predictor at that highly selective midwestern university ($r=.290$). When stepwise multiple regression analysis was employed, the best set of predictors was high school rank and SAT-Total score ($R=.449$).

Validity of College Grade Predictions Over Time

In recent years there has been heated debate over the effectiveness of aptitude tests as predictors of academic success in college. A 13-year study by Dalton (1976) at Indiana University revealed a trend toward lower predictive validity when college grade point average was predicted from high school average and SAT scores. However, in a more recent study, Sawyer and Maxey (1979) examined on a national scale the stability over a four-year period of the accuracy of grade predictions based on ACT Assessment test scores and high school grades. Their study was based on a sample from a data base of approximately 1,300,000 student records submitted by 605 institutions through their participation in ACT's predictive research services. The institutions participated in the research services during the academic year 1976-77 and in one or more of the academic years 1972-73, 1973-74, 1974-75, and 1975-76. Therefore, the grades earned by the 1976-77 freshmen at these institutions were available for comparison with grades predicted from equations developed in one or more of the four preceding base years.

For each 1976-77 student record, the actual grade average was compared with the grade averages predicted from the equations developed from the four base years. The

results of the analyses indicated that for students as a whole, irrespective of their colleges, the accuracy of the prediction equations was stable over the four-year period studied. Moreover, the same was generally true of the accuracy of the prediction equations for individual colleges.

The authors concluded from this study that although colleges experience some change in their students' academic abilities, their curricula, or grading practices over a period of time, college grade point average can in most cases be accurately predicted from equations as old as four years.

Summary

The relative importance of high school grade point average and of college entrance test scores in predicting success in college has been a question raised by many educational researchers in recent years. College administrators have accepted the aptitude test scores of high school students as one of the two most important indicators of academic success in undergraduate education for the past two decades (Price & Kim, 1976). Both SAT and ACT measures have been widely used as a basis for selecting candidates for college admissions, and both have been shown to be correlated significantly with grade point average in college.

CHAPTER III

METHOD

Subjects

The subjects for this investigation consisted of 213 male and 318 female University of Wisconsin-La Crosse students, who were matriculating seniors between fall 1974 and summer 1979. Only students with complete sets of data (senior GPA, freshman GPA, high school GPA, ACT subtest and composite scores) were included in the study. Records of students who had transferred as freshmen from other colleges or universities were not considered.

Design

Two multiple regression models were employed with grade point average as the dependent variable. The first model was designed to determine the degree of the association between freshman GPA and each of the 11 independent variables: ACT subtest and composite scores, high school rank in class, certainty of choice of college major, certainty of first occupational choice, estimated highest level of educational attainment, estimated freshman GPA, and overall high school average. The second model was designed to relate senior GPA to these same 11 variables.

Instrumentation

Data on 11 independent variables were obtained from the ACT Assessment Instrument, which consists of four

academic tests written during a timed test session, and a Student Profile Section and Interest Inventory which students complete at the time they register for the Assessment. ACT subtest and composite scores were extracted from Student Profile Reports, which ACT sends to institutions and agencies designated by each student. Questions #14, #15, #16, #17, #81, and #82 of the Student Profile Section (see Appendix A) were used to assess students' certainty of choice of college major, certainty of first occupational choice, estimated highest level of educational attainment, estimated freshman GPA, and overall high school average. Grade transcripts from fall 1974 to summer 1979 provided the criterion data.

The ACT is one of the most frequently used and highly regarded measures of academic potential (Halpin, Halpin, & Hauf, 1976). Much data demonstrating that ACT scores covary significantly with academic criteria such as college grade point average are available.

Procedure

Means and standard deviations for all measures were computed. A Pearson product-moment correlation (r) was computed between each pair of variables. In addition, multiple correlations (R) and stepwise multiple regressions using GPA as the dependent variable were calculated.

To cross-validate the findings, the regression weights developed on the freshman and senior samples were applied to the predictor data of 25% of each sample. The predicted GPAs were then correlated with the actually obtained averages

to give an indication of the accuracy of the prediction equations.

All statistical operations were performed on a Hewlett-Packard 3000 at the University of Wisconsin-La Crosse Computer Center, using Version 8.0 of the Statistical Package for the Social Sciences (SPSS), subprogram REGRESSION (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). The SPSS multiple regression subprogram combines standard multiple regression and stepwise procedures in a manner which provides considerable control over the inclusion of independent variables in the regression equation.

CHAPTER IV

RESULTS AND DISCUSSION

Means and standard deviations for all measures are presented separately for UW-L freshmen and seniors (Tables 1 and 2). Pearson product-moment correlations between predictor variables and freshman and senior GPA are presented in Tables 3 and 4. These data indicate that all predictor variables except certainty of choice of college major, certainty of first occupational choice, and estimated highest level of educational attainment correlated positively with both freshman and senior GPA at the .01 level of significance. Estimated highest level of educational attainment was positively associated with freshman GPA at the .05 level of significance. The variable with the highest correlation with both freshman and senior GPA was high school GPA ($r=.634$), followed by ACT composite score ($r=.600$) and high school rank ($r=.575$) for freshmen, and high school rank ($r=.569$) and ACTHSGPA ($r=.547$) for seniors.

Composite ACT-GPA correlation coefficients decreased from .600 to .505 between the freshman and senior years, supporting the hypothesis that the predictive value of the ACT would be higher for UW-L freshmen than for UW-L seniors. Subtest r 's were somewhat lower, ranging from a high of .514 for mathematics (ACTMATH) in the freshman year to a low of .361 for natural sciences (ACTNAT) at the senior level.

Over the four-year period, better predictability of the subtests tended to be in the order of ACTMATH, ACTSS (social studies), ACTENG (English), and ACTNAT. All correlation coefficients were significant beyond the .01 level.

Relationships between variables that were not included in the original hypotheses are of interest. Statistically significant relationships were found between estimated college GPA and high school GPA (.643), high school rank (.512), and ACT composite score (.488), indicating that students' self-estimate of future academic performance is based, at least in part, on their past academic performance (Henson, 1976). Certainty of choice of college major and certainty of first occupational choice were also positively associated for both freshmen and seniors ($r=.743$ for freshmen; $r=.748$ for seniors).

Separate multiple regressions were computed for freshmen and seniors using the SPSS subprogram for multiple regression (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Predictors were selected for criteria in a stepwise manner to maximize the predictability of the multiple regression equation. As indicated by the data in Tables 5 and 6, the overall multiple correlation coefficients were .725 and .689 for freshmen and seniors, respectively. Therefore, about 52.5% of the variation in freshman GPA and 47.5% of the variation in senior GPA were explained by the predictor variables.

The best set of predictors for both freshman and senior GPA was high school GPA and ACT composite score

($R=.711$ for freshmen; $R=.667$ for seniors). The addition of the other predictor variables appeared to contribute only slightly to the prediction of freshman GPA, although the addition of sex to the senior predictor equation increased the multiple R by 1.1%. The positive correlation between sex and GPA supports research findings that college achievement levels of women are more predictable than those of men (Lunneborg, Olch, & De Wolf, 1974; Mc Donald & Gawkoski, 1979; Neely, 1977). Predictor selection was stopped if the increment to the multiple correlation was insignificant.

Beta weights (B) for each predictor are presented in Tables 5 and 6. Cross-validation of the findings yielded significant correlations of .786 and .674 between actual and predicted GPAs when the regression weights developed on the freshman and senior samples were applied to the predictor data of 25% of each sample (see Appendix B).

Student development specialists may use these data to place students in honors programs or in specific majors, or to screen out (or possibly provide remedial instruction for) students who lack the academic skills to succeed in college. However, predictions of scholastic success or failure based on a combination of measures of aptitude can be made only when consideration is also given to many other factors that may operate to vary students' learning achievement (ability, motivation, persistence, and so on). For this reason, the importance of careful counseling cannot be overstressed. The measures of aptitude in this study can be very helpful in such counseling and in the diagnosis of learning

difficulties, but must be supplemented by wise and careful attention to possible intervening personal, social, and emotional factors.

Table 1

Means and Standard Deviations of Predictor
and Criterion Variables for Freshmen

Variable	Mean	Standard Dev.	Cases
FGPA	2.86	.57	395
UWLCRE	127.77	14.61	395
HIGHRANK	71.75	23.88	395
SEX	1.60	.49	395
ACTENG	19.81	4.47	395
ACTMATH	21.64	6.52	395
ACTSS	21.24	6.14	395
ACTNAT	24.15	5.40	395
ACTCOMP	21.82	4.57	395
PRGSTDY	.19	.39	395
OCCUP	.23	.42	395
HLEVELED	3.43	.82	395
ESTGPA	5.31 ^a	.89	395
HSGPA	5.65 ^a	1.11	395
ACTHSGPA	3.08	.69	395

^aSelf-estimate of college grade point average and students' self-report of high school grade point average were converted to numerical grades based on a seven-point scale (see Appendix A).

Table 2

Means and Standard Deviations of Predictor
and Criterion Variables for Seniors

Variable	Mean	Standard Dev.	Cases
SGPA	3.03	.44	399
UWLCRE	127.52	14.80	399
HIGHRANK	71.70	23.91	399
SEX	1.60	.48	399
ACTENG	19.80	4.46	399
ACTMATH	21.62	6.50	399
ACTSS	21.22	6.13	399
ACTNAT	24.06	5.48	399
ACTCOMP	21.79	4.58	399
PRGSTDY	.19	.39	399
OCCUP	.23	.42	399
HLEVELED	3.43	.82	399
ESTGPA	5.31 ^a	.89	399
HSGPA	5.65 ^a	1.11	399
ACTHSGPA	3.07	.69	399

^aSelf-estimate of college grade point average and students' self-report of high school grade point average were converted to numerical grades based on a seven-point scale (see Appendix A).

Table 3

Coefficients of Correlation Between Predictor Variables and Achieved Freshman GPA

Variable	FGPA	UWLCRE	HIGHRANK	SEX	ACTENG	ACTMATH	ACTSS	ACTNAT
FGPA								
UWLCRE	-.070**							
HIGHRANK	.575**	-.020						
SEX	.136**	-.147**	.308**					
ACTENG	.472**	-.021	.447**	.164**				
ACTMATH	.514**	.061	.429**	-.075	.494**			
ACTSS	.483**	.032	.360**	-.145**	.562**	.476**		
ACTNAT	.468**	.084	.411**	-.084	.513**	.554**	.616**	
ACTCOMP	.600**	.050	.504**	-.060	.761**	.805**	.823**	.827**
PRGSTDY	-.046	.041	-.070	-.023	-.033	-.089	-.002	-.068
OCCUP	.006	.018	-.000	-.037	.039	.015	.055	.014
HLEVELED	.113*	.055	.050	-.197**	.071	.143**	.115*	.189**
ESTGPA	.469**	-.067	.512**	.113*	.399**	.438**	.340**	.407**
HSGPA	.634**	-.070	.766**	.248**	.431**	.482**	.339**	.398**
ACTHSGPA	.554**	-.037	.687**	.253**	.376**	.380**	.347**	.368**

*p < .05.

**p < .01.

Table 3 (cont.)

Coefficients of Correlation Between Predictor Variables and Achieved Freshman GPA

Variable	ACTCOMP	PRGSTDY	OCCUP	HLEVELED	ESTGPA	HSGPA
FGPA						
UWLCRE						
HIGHRANK						
SEX						
ACTENG						
ACTMATH						
ACTSS						
ACTNAT						
ACTCOMP						
PRGSTDY	-.061					
OCCUP	.038	.743**				
HLEVELED	.163**	-.072	-.092			
ESTGPA	.488**	-.165**	-.129**	.073		
HSGPA	.511**	-.161**	-.097	.080	.643**	
ACTHSGPA	.454**	-.126*	-.065	.070	.546**	.777**

*p < .05.

**p < .01.

Table 4

Coefficients of Correlation Between Predictor Variables and Achieved Senior GPA

Variable	SGPA	UWLCRE	HIGHRANK	SEX	ACTENG	ACTMATH	ACTSS	ACTNAT
SGPA								
UWLCRE	-.015							
HIGHRANK	.569**	-.025						
SEX	.210**	-.158**	.303**					
ACTENG	.424**	-.020	.449**	.161**				
ACTMATH	.444**	.058	.433**	-.077	.495**			
ACTSS	.406**	.032	.366**	-.148**	.562**	.479**		
ACTNAT	.361**	.097	.416**	-.094	.511**	.555**	.618**	
ACTCOMP	.505**	.053	.509**	-.065	.761**	.805**	.825**	.827**
PRGSTDY	-.075	-.042	-.080	-.016	-.036	-.096	-.013	-.088
OCCUP	-.047	.017	-.009	-.031	.036	.007	.045	-.004
HLEVELED	.071	.056	.054	-.196**	.076	.143**	.115*	.192**
ESTGPA	.449**	-.064	.518**	.107*	.402**	.442**	.347**	.419**
HSGPA	.634**	-.070	.769**	.242**	.434**	.486**	.346**	.406**
ACTHSGPA	.547**	-.040	.691**	.249**	.379**	.385**	.352**	.374**

*p < .05.

**p < .01.

Table 4 (cont.)

Coefficients of Correlation Between Predictor Variables and Achieved Senior GPA

Variable	ACTCOMP	PRGSTDY	OCCUP	HLEVELED	ESTGPA	HSGPA
SGPA						
UWLCRE						
HIGHRANK						
SEX						
ACTENG						
ACTMATH						
ACTSS						
ACTNAT						
ACTCOMP						
PRGSTDY	-.074					
OCCUP	.025	.748**				
HLEVELED	.165**	-.076	-.096			
ESTGPA	.498**	-.177**	-.141**	.081		
HSGPA	.518**	-.170**	-.106*	.082	.648**	
ACTHSGPA	.460**	-.134**	-.073	.073	.551**	.779**

*p < .05.

**p < .01.

Table 5

Summary Table for Stepwise Multiple Regression
 Dependent Variable--Freshman Grade Point Average

Variable	Multiple R	R ²	Increase in R ²	B
HSGPA	.634	.403	.403	.161
ACTCOMP	.711	.505	.102	-.039
HIGHRANK	.715	.511	.005	.002
UWLCRE	.717	.515	.003	-.002
ACTHSGPA	.719	.517	.002	.060
PRGSTDY	.720	.519	.001	.060
ACTSS	.721	.520	.001	.027
ACTMATH	.722	.522	.001	.023
SEX	.723	.523	.001	.056
HLEVELED	.724	.524	.001	.024
ACTNAT	.724	.524	.000	.015
ACTENG	.725	.525	.000	.015

Table 6

Summary Table for Stepwise Multiple Regression
 Dependent Variable--Senior Grade Point Average

Variable	Multiple R	R ²	Increase in R ²	B
HSGPA	.634	.402	.402	.149
ACTCOMP	.667	.445	.042	-.020
SEX	.676	.457	.011	.102
ACTNAT	.680	.462	.005	.001
HIGHRANK	.683	.467	.004	.001
ACTSS	.685	.469	.002	.018
ACTHSGPA	.687	.470	.001	.037
ACTMATH	.687	.472	.001	.014
UWLCRE	.687	.472	.000	.000
ACTENG	.687	.473	.000	.009
HLEVELED	.688	.473	.000	.009
PRGSTDY	.688	.473	.000	.067
OCCUP	.689	.475	.001	-.056

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The study attempted to determine the validity of students' ACT scores, other selected ACT variables, high school rank in class, and overall high school grade point average as predictors of freshman and senior grade point average (GPA) at the University of Wisconsin-La Crosse. Subjects for this investigation consisted of 531 UW-L students, who were matriculating seniors between fall 1974 and summer 1979. Data for the study included students' ACT subtest and composite standard scores, high school rank in class, certainty of choice of college major, certainty of first occupational choice, estimated highest level of educational attainment, estimated freshman GPA, and overall high school average as independent variables, freshman and senior GPA as dependent variables. Only students with complete sets of data were included in the study.

Pearson product-moment correlations, multiple correlations, and regression equations were prepared for freshmen and seniors in portraying the validity of the ACT in predicting GPA. All predictor variables except certainty of choice of college major, certainty of first occupational choice, and estimated highest level of educational attainment correlated positively with both freshman and senior GPA at the

.01 level of significance. Estimated highest level of educational attainment was positively associated with freshman GPA at the .05 level of significance.

Of the 11 predictor variables, high school grade point average (HSGPA) had the strongest predictive validity ($r=.634$) with reference to both freshman and senior GPA, followed by ACT composite score ($r=.600$) and high school rank ($r=.575$) for freshmen, and high school rank ($r=.569$) and ACTHSGPA ($r=.547$) for seniors. Correlations based on ACT predictors showed a tendency to decline after the freshman year, although correlation coefficients remained significant beyond the .01 level.

Results of stepwise multiple regression analyses showed significant overall multiple correlations between the predictor variables and college GPA. The largest contribution to the multiple regression models was made by high school GPA ($R=.634$), followed by ACT composite score. Both high school GPA and ACT scores, individually and collectively, were significantly related to freshman and senior GPA. Cross-validation of the obtained regression equations yielded significant correlations ($r=.786$ for freshmen; $r=.674$ for seniors) between actual and predicted freshman and senior GPAs (see Appendix B).

Conclusions

The results support the hypotheses that ACT scores, high school grades, and high school rank in class are significant predictors of college performance, and that ACT scores and other selected ACT variables adequately predict a student's cumulative performance over his total academic career. High school grades and ACT scores "stood the test

of time" in predicting long-term college success, a finding that supports their continued use as admissions, advising, or placement indices for postsecondary education.

Many college administrators have asserted that aptitude test scores are no longer the determining factor in a student's application for admission to an undergraduate program. However, virtually all colleges and universities have made it mandatory for college applicants to submit some college entrance test scores along with their high school grades as prerequisites for admission, on the presumption that their test scores are one of the two most important predictors for the success or failure of college education (Price & Kim, 1976). Since college admissions officers place a great deal of emphasis on a student's high school GPA and ACT score, continuous efforts should be made to determine the predictive validity of these scores for their own particular college population.

Recommendations

The prediction of academic achievement remains an unsolved problem in education. Such prediction is desirable for decision-making about student selection, placement, retention, and counseling. The results of this study show some promise as a potentially valuable tool for counselors and instructors in understanding some of the factors that influence academic performance. However, the quest for variables which will yield valid predictors continues.

This study has not included a wide range of nonintellective variables such as age, race, motivation, persistence, parents' education, effect of major field of study, and so

on, which may be associated with college performance. Replication of the investigation and refinement of the research design to control for additional variables seem to be desirable directions for future research.

The usefulness of a prediction system is generally seen in terms of the accuracy with which it forecasts the behavior of individuals in a new sample. The investigation needs to be replicated on other students at other institutions before any serious claim to generalizability for these results can be laid.

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APPENDIX A

ACT STUDENT PROFILE SECTION
(American College Testing Program, 1975)

14. How sure are you about your current choice of program of study?
- I am very sure.....1
I am fairly sure.....1
I am not sure.....0
15. How sure are you about your first occupational choice?
- I am very sure.....1
I am fairly sure.....1
I am not sure.....0
16. What is the highest level of education you expect to complete?
- Vocational or technical program (less than two years).....1
Two-year college degree.....2
Bachelor's degree.....3
One or two years of graduate study (MA, MBA, etc.).....4
Professional level degree (PhD, MD, LLB, JD, etc.).....5
17. I estimate my overall grade point average at the end of my first year in college will be:
- 0.5-0.9 (D- to D).....1
1.0-1.4 (D to C-).....2
1.5-1.9 (C- to C).....3
2.0-2.4 (C to B-).....4
2.5-2.9 (B- to B).....5
3.0-3.4 (B to B+).....6
3.5-4.0 (A- to A).....7

81. My class rank in high school is (was) (If you are not sure, give your best estimate.)

top quarter.....1
second quarter.....2
third quarter.....3
fourth quarter.....4

82. My overall high school average is (was)

D- to D (0.5-0.9).....1
D to C- (1.0-1.4).....2
C- to C (1.5-1.9).....3
C to B- (2.0-2.4).....4
B- to B (2.5-2.9).....5
B to B+ (3.0-3.4).....6
A- to A (3.5-4.0).....7

APPENDIX B

CROSS-VALIDATION OF OBTAINED REGRESSION EQUATIONS

Coefficients of Correlation Between Predicted and Achieved
Freshman and Senior GPAs along with Their
Means and Standard Deviations

Variable	FGPA	EXPF	SGPA	EXPS	Mean	S.D.
FGPA					2.83	.583
EXPF	.786*				2.85	.410
SGPA					3.03	.467
EXPS			.674*		2.93	.283

*p < .001.

	SGPA	EXPS	FGPA	EXPF
1	3.28	3.22	3.18	3.16
2	3.14	3.22	3.68	3.37
3	2.78	2.82	2.56	2.46
4	2.54	2.56	2.25	2.48
5	2.67	2.40	2.50	1.90
6	2.69	2.53	2.35	2.32
7	2.61	2.95	2.51	2.81
8	2.53	2.28	2.07	1.80
9	3.48	3.25	3.41	3.42
10	2.40	2.81	2.11	2.73
11	2.31	2.98	2.97	2.88
12	3.55	3.00	3.25	3.06
13	2.85	2.61	2.37	2.45
14	2.64	2.67	2.27	2.64
15	3.15	3.00	2.96	2.83
16	3.56	3.00	3.43	3.14
17	3.20	3.20	2.87	2.91
18	2.35	2.84	2.25	2.72
19	3.22	3.06	3.42	2.97
20	2.80	2.45	2.07	2.06
21	3.87	3.35	3.78	3.59
22	3.77	3.21	3.82	3.40
23	3.15	3.00	3.48	3.07
24	2.81	2.88	2.63	2.60
25	2.81	3.07	3.25	3.13
26	2.49	2.47	1.92	2.22
27	2.42	2.75	1.48	2.64
28	3.15	3.25	2.67	3.18
29	3.17	3.04	2.97	3.11
30	2.59	2.53	2.25	2.47
31	3.69	3.25	3.59	3.17
32	2.72	2.90	1.70	2.74
33	2.39	2.64	2.12	2.23
34	3.38	3.17	3.28	3.05
35	2.33	2.77	2.83	2.73
36	3.62	3.14	3.58	3.25
37	2.28	2.46	2.38	2.25
38	3.65	3.28	3.31	3.45
39	2.12	2.83	2.42	2.57
40	3.25	3.34	3.13	3.30
41	3.75	3.26	3.77	3.36
42	3.80	3.24	3.90	3.30
43	3.23	3.26	3.05	3.17
44	2.67	2.84	2.45	2.56
45	3.78	3.29	3.88	3.32
46	3.74	3.37	4.00	3.49
47	3.85	3.39	3.64	3.46
48	3.39	2.92	3.03	2.80
49	3.59	3.36	3.58	3.40
50	2.57	3.22	2.40	3.37
51	3.01	2.69	2.58	2.43
52	3.82	3.33	4.00	3.54
53	2.90	2.95	2.35	2.95
54	3.15	3.00	2.95	2.48
55	2.46	2.80	2.36	2.52
56	3.17	3.15	3.12	3.06
57	2.55	2.97	1.94	2.80
58	3.47	3.37	3.44	3.40
59	2.81	2.86	2.24	2.64
60	2.59	2.84	2.74	2.77
61	3.06	2.97	2.45	2.46
62	2.63	2.58	2.28	3.57
63	3.25	2.85	2.55	2.50
64	2.37	2.87	2.81	2.40
65	3.24	3.27	3.33	2.78
66	2.54	2.75	2.75	3.38
67	3.37	2.53	2.34	3.03
68	3.16	3.18	3.21	2.12
69	3.65	3.39	3.80	2.93
70	2.49	2.58	2.38	3.45

	SGPA	EXPS	FGPA	EXPF
71	3.67	3.32	3.35	3.77
72	3.21	3.14	3.15	2.90
73	2.57	2.63	2.48	2.24
74	3.50	2.91	2.86	3.14
75	2.41	2.51	2.23	2.03
76	2.72	3.01	2.99	2.87
77	2.38	3.00	3.00	2.68
78	3.54	3.28	3.35	3.26
79	3.79	3.10	3.02	3.68
80	2.67	2.29	2.29	2.16
81	3.62	3.13	3.06	3.38
82	2.73	2.79	2.74	2.75
83	3.22	3.12	2.92	2.83
84	3.11	3.07	3.00	2.75
85	3.78	3.33	3.40	4.00
86	2.62	3.32	3.33	3.06
87	2.19	2.56	2.59	2.48
88	3.61	3.07	3.01	3.19
89	2.34	2.79	2.75	2.42
90	3.45	3.05	3.12	3.26
91	3.23	2.84	2.65	2.78
92	2.45	2.35	1.96	1.31
93	3.84	2.73	2.62	3.60
94	3.12	2.59	2.26	2.19
95	3.07	3.15	3.24	3.15
96	2.92	2.89	2.90	2.36
97	2.96	3.13	3.22	3.20
98	3.25	2.99	2.91	2.75
99	3.58	3.31	3.24	3.35
100	2.91	3.19	3.37	2.94
101	2.38	2.39	2.17	2.54
102	3.21	2.98	2.82	2.51
103	2.43	2.78	2.38	1.84
104	2.92	3.21	3.18	2.42
105	3.30	2.59	2.53	2.87
106	3.03	2.96	3.04	3.18
107	3.06	3.02	3.12	2.90
108	2.39	2.52	2.20	1.89
109	3.03	2.62	2.42	2.64
110	3.00	2.61	2.34	2.45
111	2.78	2.95	2.88	2.76
112	3.79	3.11	3.10	3.54
113	3.34	3.07	3.36	3.04
114	3.09	2.81	2.34	2.86
115	2.13	2.26	1.77	1.98
116	2.63	2.53	2.63	2.36
117	3.20	3.05	2.96	3.06
118	3.38	2.94	2.87	2.86
119	3.32	2.93	3.00	2.66
120	2.89	2.85	2.44	2.68
121	3.41	3.03	3.30	3.03
122	2.24	2.49	2.07	2.10
123	3.30	3.01	2.76	2.87
124	3.13	3.20	3.31	2.16
125	2.95	3.05	2.84	2.83
126	3.15	2.82	2.57	2.25
127	3.03	3.04	2.87	3.25
128	3.59	3.21	3.14	2.25
129	2.74	3.24	3.23	3.13
130	2.59	2.74	2.20	3.51
131	2.92	3.12	3.03	3.42
132	3.43	2.94	3.03	2.44