

**THE MAT AS A PREDICTIVE MEASURE OF
GRADUATE SCHOOL SUCCESS FOR STUDENTS
IN PSYCHOLOGY VS. STUDENTS IN
COUNSELING AND GUIDANCE**



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THE MAT AS A PREDICTIVE MEASURE OF GRADUATE SCHOOL SUCCESS
FOR STUDENTS IN PSYCHOLOGY VS. STUDENTS
IN COUNSELING AND GUIDANCE

An Abstract
Presented to
the Graduate Council of
Austin Peay State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Sharon Cohen Cooper

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Abstract

Recently, very few articles have been reported in the literature on the Miller Analogies Test (MAT) or on the Graduate Record Examination (GRE). The majority of studies previous to 1970 have shown these two measures to be inefficient predictors of graduate school success. Although the literature refutes the predictive ability of the MAT, it still continues to be used for admission purposes. The present study was undertaken to bring the area of prediction back into focus. Specifically investigated were the differences in predictive ability of the MAT between two Master of Arts (M.A.) degree-types, namely Counseling and Guidance, and Psychology.

The subjects consisted of forty Counseling and Guidance majors and twenty-five Psychology graduate majors at Austin Peay State University. Only those who completed their M.A. degrees between June, 1965 and August, 1974 were included in the study. The following data about each student were compiled: year graduated, MAT raw score, undergraduate grade point average (UGPA), sex, age, school from which undergraduate degree was attained and year of graduation, undergraduate major, graduate grade point average (GGPA), Junior-Senior undergraduate grade point average (JSUGPA), graduate major, and final quarter status. Pearson product moment correlations were computed

and indicated that only UGPA and JSUGPA predicted GGPA significantly. MAT was inefficient in predicting GGPA. An inspection of the other variables revealed there was no difference between (1) sex, (2) age, (3) undergraduate school attended, and (4) mean MAT score for the two degree-types.

As there was no significant difference between the correlations of (1) UGPA and (2) JSUGPA in predicting GGPA for the Psychology group, the graduate school need not use extra time and manpower to calculate this measure, but can rely upon UGPA. However, for the Counseling and Guidance group, JSUGPA was the only significant predictor of GGPA; thus, for this group, JSUGPA should be calculated. Basically, MAT was a poor predictor of GGPA for those people who completed the programs in Counseling and Guidance and in Psychology at this University.

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To the Graduate Council:

I am submitting herewith a Thesis written by Sharon Cohen Cooper entitled "The MAT as a Predictive Measure of Graduate School Success for Students in Psychology vs. Students in Counseling and Guidance." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in general psychology.

Stephen F. Davis
Major Professor

We have read this thesis and recommend its acceptance:

Elizabeth H. Hoke
Second Committee Member

Barland E. Blair
Third Committee Member

Accepted for the Council:

Wayne E. Stampfer
Dean of the Graduate School

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Chapter I

INTRODUCTION

Many studies (e.g., Borg, 1963; Durnall, 1954; Stricker and Huber, 1967) have been done on the prediction of success in graduate school. For the most part, these studies have been conducted to determine the validity of the Graduate Record Examination (GRE) and/or the Miller Analogies Test (MAT) as predictors of success. Even though many of the results (e.g., Newman, 1968; Smith, 1957; Schwartz and Clark, 1959) have indicated that the GRE and the MAT contribute very little toward predicting success in graduate school, the schools continue to use these measures. For example, a random sampling of graduate schools indicated that in the state of Tennessee, eight of the ten graduate schools sampled required either the MAT or the GRE scores from students for admission purposes. In California, of the graduate schools sampled, two out of four schools required either GRE or MAT scores. In Washington, D.C., three of four schools sampled required either the GRE or the MAT for admission purposes. Thus, the continued use of these scores does not seem to be confined to any one section of the country. (Graduate schools may have changed their procedures since the latest catalog listings.) Why do the schools continue to use these scores? Because graduate programs must somehow

select among many applicants to fill the few openings they may have in their programs. However, if the predictor is a poor one, there is at best, little, and at worst, no, justification for its use.

The literature concerning the use of the GRE as a predictor of graduate school success has shown that in most cases, it is a poor one. For example, Newman (1968) found in a small northwestern university that the aptitude portion of the GRE correlated only .18 with graduate grade point average (GGPA). He also found that the advanced psychology portion of the GRE correlated .09 with GGPA of psychology students. Madaus and Walsh (1965) found that in a fairly large New England University, GRE correlated .19 with GGPA. They also stated that individual departments need to be investigated separately because the criterion measure, GGPA, should not be contaminated by different, between-department grading practices. Borg (1963) found in a graduate school of education at Utah State University that the GRE-Verbal correlated .36 and the GRE-Quantitative correlated .37 with GGPA. Tully (1962) reported a correlation of .17 between GRE and GGPA at a large southern university. Roscoe and Houston (1969) at a large midwestern university found correlations between GGPA and GRE-Verbal and GRE-Quantitative of .32 and .21, respectively. A study by Capps and Decosta (1957) at South Carolina State College indicated that the advanced education test of the GRE correlated .49 with graduate school success. Obviously, the above

mentioned studies question the advisability of using the GRE as a predictor of graduate school success. Part of the reason for this lack of predictability would appear to be the restricted spread of talent (see, Madaus and Walsh, 1965; Williams, Harlow, and Gab, 1970). Since the grades in many graduate courses are limited almost entirely to A or B, the discrimination value of the GGPA is reduced due to the criterion measure being restricted (see Borg, 1963; Robertson and Hall, 1964). It is also interesting to note that the restriction possibly occurred even before grades were assigned because only those students who showed promise in the first place were selected for the program.

Stricker and Huber (1967), in conducting a study at a small northeastern university, found undergraduate GPA (UGPA) in psychology courses to be a better predictor of success than GRE because the GRE is an aptitude test whereas UGPA in psychology courses is more like a job sample of how the student performs, i.e., an achievement test. Undergraduate psychology courses closely resemble graduate psychology courses and the same skills are needed for each. This makes some intuitive sense because some faculty members teach both undergraduate courses and graduate courses. Also, some graduate psychology courses are open to undergraduate students and some undergraduate psychology courses are open to graduate students; hence, the same skills are required. Thus, whatever intellectual and motivational variables

contribute to high performance in graduate courses probably do the same in undergraduate courses. Therefore, it would appear to be more fruitful to consider these variables, as compared with the less-efficient GRE.

On the whole, the MAT has also proven to be an inefficient predictor of success in graduate school. Predictive studies listed in the 1960 Manual for the MAT report correlations from 0 to .76, mostly falling in the range of .30 to .60 (Tully, 1962). These correlations are about the same as for many measures of aptitude and achievement suggesting, perhaps, that a whole new approach is needed in the area of prediction. The 1962 MAT manual reports ninety-five validation studies with a median correlation of .38 between MAT and grades in graduate school for those studies which used grades as a criterion measure (Marascuilo and Gill, 1967). Some of the problems inherent in these studies are small sample size and again the fact that graduate students are a highly selected group. Marascuilo and Gill (1967), investigating at a large western university, state that neither the MAT nor the UGPA are good predictors. The authors further contend that the difference between success and nonsuccess in graduate school is dedication and commitment on the part of the student. One must wonder about the assessment procedures for such factors as "dedication" and "commitment." Marascuilo and Gill (1967) indicate that the only objective measure of dedication and commitment they recorded was the number of

credits taken during the first semester of graduate school. Obviously, the reliability of such a criterion would necessitate further study.

Schmitt (1967) brings this problem into bold relief. He indicates that if an MAT raw score is 43 and a fifty per cent probability of error is tolerable, a true percentile rank somewhere between 40 and 60 can be specified. To reduce the error probability to one chance in ten, a range from the thirtieth to the seventieth percentile rank would have to be cited as that which probably includes the true rank of the applicant. In other words, if these scores were used judiciously, graduate schools would be obligated to admit many more students on the basis of MAT scores. So, how can an admissions office put so much importance on one score? And yet, many of them do! Hence, an interesting paradox develops. On the one hand, the schools do not have room to accept all of the qualified applicants, yet they use a score that has an extremely weak correlation with graduate school success to turn potential scholars away. This would appear to be a gross misuse of testing data.

At this point, one might wonder what exactly does the MAT measure? It is primarily measuring vocabulary skills and knowledge rather than reasoning skills (Wallen and Campbell, 1967). For many graduate students, the vocabulary level is so difficult as to preclude reasoning. One may speculate that these skills (vocabulary and knowledge) may be more important in such areas as history,

some English studies (e.g., reading), and some of the sciences where a large fund of knowledge is necessary (e.g., biology). It may be more valid to use the MAT for such areas than to use it as a general admission requirement. Elsewhere, a more directly related predictor may be called for (Ayers, 1971). So the use of these test results as standards for admission may cause a school to overlook some promising students.

In predicting success in a graduate school of education in a small northwestern college, Durnall (1954) found a correlation between MAT and GGPA of .21. Payne and Tuttle (1966) found a correlation of .26 between MAT and grades at a large northeastern university. Smith's study (1957) at a large midwestern university reported a correlation of .20 between MAT and GGPA. He also found a correlation between UGPA and GGPA of .31, thus supporting the fact that UGPA is a slightly better predictor than the MAT of GGPA. This may be substantiated by Felker (1973) who found a correlation between MAT and UGPA of .06, thus indicating almost no relationship between MAT and UGPA. Smith (1957) stated that the use of graduate grades as a criterion is unreliable, and that is what diminishes the usefulness of the MAT as a predictive measure. Hyman (1957), using thirty-eight (38) subjects at a large northeastern university, reported a correlation of .16 with graduate grades in a department of psychology. Schwartz and Clark (1959), at Rutgers University with a

sample of fifty-six (56) subjects, found a correlation of .26 with GGPA. For this particular group of students, there was a large gap in time between completion of undergraduate school and entrance into graduate school; therefore, UGPA was also not a good predictor ($r = .24$).

Payne, Wells, and Clarke (1971) found that UGPA was the best predictor of success for students who earned Masters degrees at a College of Education. For ninety (90) graduate students in Education at Duquesne University, Hebert (1967) found that the average in undergraduate education courses was the best single predictor ($r = .57$). However, he again reiterated that GGPA may not be a good criterion of success due to differences in grading practices. But Etaugh, Etaugh, and Hurd (1972) state that GGPA is reliable as long as the student has taken a sufficient number of courses. They prove this statistically in their study. On the other hand, at a large western university, Mehrabien (1969) reported that UGPA during the last two years exhibited a stronger relation to the overall graduate school performance than did the four year UGPA. In another graduate psychology program, Platz, McClintock, and Katz (1959) using one hundred twenty-four (124) subjects at a large midwestern university found MAT to correlate .21 with GGPA. UGPA correlated .42 with GGPA. The best predictor of GGPA was UGPA in science courses. These two factors correlated .49. They suggest that what is actually needed is a combination of predictors. A somewhat higher

correlation (.50) was reported by Watters and Paterson (1953) for fifty-one (51) Ph.D. candidates in Psychology at a midwestern university. Even this is only moderate since it contributes only twenty-five per cent toward estimating success, and thus leaves seventy-five per cent of the prediction of success unaccounted for.

Lane, Penn, and Fischer (1966), Spielberger (1959), and Coladarci (1960) all find that one can improve one's score on the MAT by taking it a second time. Lane, Penn, and Fischer (1966) and Spielberger (1959) attribute this to practice effects. Coladarci (1960) speculates that this may be due to experiences between testings. Doppelt (1971) found an average gain of seven points between testings. Consequently, he recommends retesting with a different form. In any case, this should also restrict the interpretation of the scores. A small improvement in raw score corresponds to large increments in percentile ranks. Hence, interpret with caution.

Owens and Roaden (1966) report that the predictors are different in different departments because different skills are required. The program requirements should be studied first before deciding on a predictor. Perhaps it would be more justifiable for each institution (and departments within it) to develop its own predictive measure. Although this presents a problem of people taking many tests in different locations, it might be more fair and valid. An applicant does not usually apply to many graduate

schools; thus, it should not present too much of a problem. Such an idea is purported by Goldfried and D'Zurilla (1969) as a behavioral-analytic model for assessing competence. They advocate that one need analyze specific behaviors necessary for competence and use this as a means of predicting success. This possibility will be expanded subsequently.

Although the above statistics look condemning, some of the correlations were significant (Watters and Paterson, 1953; Platz, McClintock, and Katz, 1959; Hyman, 1957). However, when one looks at the magnitude of the relationships, one finds that the relationships are weak and in reality do not yield much information.

Interestingly enough, since 1970, very few articles have been reported in the literature on the MAT or on the GRE, particularly dealing with prediction. Thus, the purpose of the present study was to bring the topic of investigation back into focus. Although the literature refutes the predictive ability of the MAT, it is still being used for admission purposes. People are probably still being denied admission to graduate school based on a single test score that has low predictive ability. Perhaps the schools still using it need to be reminded of its lack of validity.

Another purpose of the present study was to investigate any differential predictive ability of the MAT between students who earned M.A. degrees in Counseling and Guidance and those who earned M.A. degrees in Psychology at Austin

peay State University. Graduate grade point average was used as the criterion of success. It was felt by the writer that the best single predictor of graduate school success would be Junior-Senior UGPA (JSUGPA). Junior-Senior UGPA was defined as that semester after which forty-five (45) credits had been earned until graduation and that quarter after which ninety (90) credits had been earned until completion of the program.

Chapter II

METHOD

Subjects

A list of all students enrolled in the Graduate School at Austin Peay State University during the period from June, 1965 through August, 1974 was obtained from the Office of the Dean of the Graduate School. The same data were not available for all subjects. Some subjects had taken the GRE and not the MAT and consequently were dropped from the study. Those who did not complete their degrees were also excluded. Finally, some undergraduate transcripts that contained transfer credits were dropped due to the inability to find an adequate demarcation between Freshman-Sophomore, and Junior-Senior years. Thus, the subjects used in the study consisted of forty (40) graduate students, seven (7) males and thirty-three (33) females, who received their Masters degrees in Counseling and Guidance, and twenty-five (25) graduate students, fourteen (14) males and eleven (11) females, who received their Masters degrees in Psychology. In all, there were twenty-one (21) males and forty-four (44) females. They ranged in age from twenty-two (22) to fifty (50). Thirty (30) had received their undergraduate degrees from Austin Peay State University. Twelve (12) more graduated from

other Tennessee Universities. Twenty-three (23) did not attend Tennessee Universities as undergraduates. The total number of subjects was sixty-five (65).

Apparatus

The materials used were all found in the students' cumulative record folders and in a special file kept on MAT raw scores.

Procedure

From the final list of subjects, the following data about each student were compiled: year graduated, MAT raw score, UGPA, sex, age, school from which undergraduate degree was attained and year of graduation, undergraduate major, GGPA, JSUGPA, graduate major, and final quarter status (graduated or unfinished). In computing UGPA, JSUGPA, and GGPA, an A was weighted four (4) points, a B was weighted three (3) points, a C was weighted two (2) points, and a D was weighted one (1) point. F's were given weights of zero. Criteria of success in graduate work was GGPA. Product moment correlations between the various predictors and GGPA were computed.

Chapter III

RESULTS

The results of the various correlation coefficients calculated from the data of the present study are presented in Table I. As can be seen from this table, there is no significant relationship between MAT and UGPA for either the total sample or for each degree-type considered separately.

Also, it can be seen that a significant relationship between MAT and GGPA was not obtained. The latter result corroborates the results previously reported by Hyman (1957), Durnall (1954), and Payne and Tuttle (1966). For the total sample, both UGPA and JSUGPA were found to correlate positively and significantly ($p < .01$) with GGPA. For the Psychology group, both UGPA and JSUGPA were significantly ($p < .01$) correlated with GGPA. However, in both cases, the correlations were not significantly different from each other. In other words, both factors predicted equally well. However, in the Counseling and Guidance group, the only significant ($p < .01$) correlation was between JSUGPA and GGPA.

A closer inspection of the respective groups on additional dimensions indicated that there was no

difference between: (1) males and females, $t(63) = .812$, $p > .05$; (2) subjects 29 and younger vs. those older than 29, $t(63) = .229$, $p > .05$; (3) whether the student attended school in Tennessee or elsewhere as an undergraduate, $t(63) = 1.516$, $p > .05$; (4) whether the student attended Austin Peay State University or another school as an undergraduate, $t(63) = .508$, $p > .05$; and (5) the mean MAT scores for the two degree-types, $t(63) = 1.09$, $p > .05$.

Chapter IV

DISCUSSION

As can be seen from Table I, MAT has virtually no relationship to UGPA, thus substantiating the previously-reported results of Felker (1973). As these two measures are unrelated, it would be expected that they will contribute separately in some fashion to the prediction of GGPA (i.e., Graduate Success). Also, as already mentioned, MAT contributes almost nothing to the prediction of GGPA for selection of graduate students for either the Counseling and Guidance or the Psychology programs.

As already noted, it would appear that either JSUGPA or UGPA would be the best single predictor of graduate success. This finding upholds the original hypothesis (i.e., that JSUGPA would be the best single predictor) and also the results reported by Mehrabien (1969). It will be recalled that JSUGPA was the single best predictor for Counseling and Guidance students, and further that there was no significant difference between JSUGPA and UGPA in predictive ability for Psychology students. One possible reason for the nonsignificant correlation between UGPA and GGPA for the Counseling and Guidance students may be the fact that about two-thirds of them were undergraduate education majors. Often, education majors begin in a

Liberal Arts program and do not get into their specialty area until the last two years of college. Thus, they probably perform better (i.e., higher grade point average) in courses (those of the last two years) that become more important to them and to their careers. Therefore, it would appear beneficial to calculate JSUGPA for this group, as it was the only variable to have a significant correlation with GGPA. However, at this university, for those who completed the Psychology program, JSUGPA does not differ in predictive ability from UGPA. Hence, it would appear to be fruitless to use extra time and manpower to calculate JSUGPA.

As to the other variables investigated, neither sex nor age differences had a relation to MAT scores. Undergraduate school attended was also not related to GGPA. It was thought that those who had attended Austin Peay State University as undergraduates would have higher GGPA's than those from other universities since they would have the advantage of knowing the professors and knowing their expectations. Also, they would have had practice in test taking from the professors. However, this was not upheld; students from other universities had equally high GGPA's.

Some of the problems inherent in the present study concern the criterion (GGPA). As previously mentioned, grades in graduate school are mainly restricted to A's and B's, thus lowering the correlation by reducing the

discrimination value of GGPA (see Borg, 1963; Robertson and Hall, 1964). Also, a lower correlation may be due to the fact that only those people above a certain cut off MAT score were incorporated into the program in the first place, thus restricting the range of MAT scores. A third possible reason for the lowered correlations observed is the fact that only those students who were successful graduates were included in the present study. The writer could not make a distinction between those students who had dropped out of school from those who were just taking a few courses at a time. Also, it was felt that specifying completion of a minimum number of credit hours (such as three, for example) as a criterion, for the present study, would have been unreliable due to Etaugh, Etaugh, and Hurd's (1972) report stating that GGPA is reliable only as long as the student has taken a sufficient number of courses. The writer could not ascertain what would be "sufficient," hence, it was decided not to arbitrarily choose a number. Despite the fact that a study reported by Ainsworth and Fox (1966) used a three hour credit minimum as a criterion, the question remains as to how significant a correlation can be between scores on the MAT and only one graduate education course! Too many extraneous variables could enter into that one grade (e.g., sickness). Furthermore, how can one compare a student having a 4.00 average who was enrolled for only three hours with a student having a 3.50 average who was

enrolled for eighteen hours? Results of this nature would be tenuous, at best! Finally, as Austin Peay State University is located close to a large military base, it is extremely likely that several students were taking courses simply for interest while they were located in the area. Thus, it was deemed necessary to use in the present study only those subjects who had actually completed their degrees. The literature appears to support this decision. In a longitudinal study (Williams, Harlow, and Gab, 1970) of doctoral candidates in education that did use graduation vs. non-graduation as a criterion, it was found that GRE-Quantitative (GRE-Q) correlated .34 with graduated vs. non-graduated and -.01 with doctoral GGPA. Even though the graduated vs. non-graduated criterion shows a stronger relationship to GRE-Q than does doctoral GGPA, it is still a weak relationship. In another study, also using both graduates and non-graduates, Marascuilo and Gill (1967) found that neither the MAT scores nor the UGPA were good at distinguishing between successful and unsuccessful doctoral students in education. Therefore, including students in these studies that have not graduated did not appear to improve significantly the predictive ability of GRE-Q or of MAT.

So, what is the answer? Goldfried and D'Zurilla (1969) suggest a behavioral-analytic model (i.e., a model designed to determine the particular skills necessary for success in a particular department) for assessing competence.

Owens and Roaden (1966) say that different departments require different skills; therefore, program requirements should be studied first. This model is one way in which to study requirements for competence in specific areas. The process involves five measures. The first three are employed to analyze the criterion. The first step is situational analysis, where different methods may be employed to obtain a list of those situations deemed important for the student to display competence in to function effectively. Only those situations that have a high likelihood of occurrence are retained. In the second step, response enumeration, a sampling of possible responses is obtained. From these, a response evaluation, step three, is made by judges (i.e., professors, Deans, etc.), who evaluate the responses on their effectiveness in handling the situations. Then (step four) a measuring instrument is developed, and in step five, evaluation of the measure is executed.

It is the contention of this writer that the above behavioral-analytic model is the most reasonable way of assessing the specific behaviors required for success in graduate school programs. Certainly, it appears to be more valid than the present use of MAT scores, hence, further practical investigation of its use should be made.

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APPENDIX: Table I

Table I

Correlation Coefficients for the Factors
Involved in the Present Study

<u>Factors Involved</u>	<u>Correlation Coefficient</u>	<u>Significance Achieved</u>
A. Total Sample		
1. UGPA vs. MAT	r=.069	non-significant
2. MAT vs. GGPA	r=.164	non-significant
3. UGPA vs. GGPA	r=.417	p .01
4. JSUGPA vs. GGPA	r=.468	p .01
B. Psychology Program		
1. UGPA vs. MAT	r=.072	non-significant
2. MAT vs. GGPA	r=.113	non-significant
3. UGPA vs. GGPA	r=.565	p .01
4. JSUGPA vs. GGPA	r=.533	p .01
C. Counseling and Guidance Program		
1. UGPA vs. MAT	r=.106	non-significant
2. MAT vs. GGPA	r=.204	non-significant
3. UGPA vs. GGPA	r=.296	non-significant
4. JSUGPA vs. GGPA	r=.416	p .01

UGPA = Undergraduate Grade Point Average

JSUGPA = Junior-Senior Undergraduate Grade Point Average

GGPA = Graduate Grade Point Average

MAT = Miller Analogies Test