2007

Relationship between graduate admission measures and student success

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DOI: <https://doi.org/10.31979/etd.wqy6-bww3>

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RELATIONSHIP BETWEEN GRADUATE ADMISSION MEASURES
AND STUDENT SUCCESS

A Thesis

Presented to

The Faculty of the Department of Psychology
San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

by

Jui S. Maru

May 2007

UMI Number: 1445248

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ABSTRACT

RELATIONSHIP BETWEEN GRADUATE ADMISSION MEASURES AND STUDENT SUCCESS

by Jui Sohil Maru

The purpose of this study was to assess the relationship between graduate admission measures and student success. The predictor variables used in this study were the Introduction to Psychology course grade at the undergraduate level, Graduate Record Examination (GRE) verbal score, and GRE quantitative score. The criterion variable, student success, was defined using three variables—time taken to graduate from the program, time taken to find the first industrial and organizational psychology related job after graduation, and salary range in the first industrial and organizational psychology job after graduation. The sample consisted of former students from the industrial and organizational psychology program at San Jose State University. Due to a small sample size, detailed analyses for all variables could not be conducted. The results of the study should be interpreted with caution. Implications and need for future research have been discussed.

ACKNOWLEDGEMENT

First, I wish to express my gratitude to Dr. Nancy Da Silva, my thesis advisor, who has been a great support and strength to me throughout the Master's program and especially the thesis process. She guided me throughout the thesis process and challenged me to rise to the occasion. Her commitment to helping me was a great source of motivation for me. Her mentorship has had a great impact on my personal and professional development. I sincerely thank Dr. Da Silva for all her time and effort.

Secondly, I would like to convey my deep gratitude to my second and third readers, Dr. Sharvari Dixit and Ms. Carolyn Troyan, who, despite their busy schedules, agreed to be my readers. I thank both my readers for reviewing my drafts and for their input.

I also appreciate the Alumni of the I/O program at San Jose State University, from whom the data were gathered. I am grateful also to the psychology department for allowing me to use the archival data. I sincerely thank Dr. Howard Tokunaga for taking time and helping me with the thesis.

Finally, I owe my loving thanks to my husband, Sohil Maru, for his never ceasing support and encouragement to pursue my academic and professional goals.

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INTRODUCTION

It is common belief that graduate education plays a key role in refining the proficiency and accomplishment of individuals (Weinstein & Srinivas, 1974). It may be difficult at the graduate admission stage to accurately identify those individuals who will make a mark later in life (Williams & Harrell, 1964). A comparative/relative importance of graduate selection measures is needed. Graduate selection measures include undergraduate academic performance, recommendation letters, graduate record examination scores, résumé, and statement of purpose (Williams & Harrell, 1964). Since the pool of applicants for graduate admissions increases every year, the validity of the selection measures becomes extremely critical so that faculties can choose the best students (Williams & Harrell, 1964). A validation of the selection measures will help educational institutions select students who demonstrate the potential to succeed (Halpern, 2000).

The purpose of this study is to assess whether the existing selection measures used for graduate school admission are good indicators of student success. For the purpose of this predictive validity study, student success has been defined using three parameters: time taken to attain the master's degree, time taken to find the first job after graduating from the program, and salary range on the first job after graduation.

This thesis discusses the concept and types of validity, followed by definitions of each criterion and predictor variable. The thesis covers the literature on this area and the proposed study. The importance and implications of this research topic are also

highlighted.

Validity

“Validity refers to the degree to which a test or a tool measures what it is supposed to measure” (Anastasi, 1999, p. 113). Validity is a complex, multifaceted notion (Cascio & Agunis, 2004). Based on the validity of the tool, the researcher can judge the appropriateness of an instrument or measure for a particular purpose (Anastasi, 1999). A tool is valid for its purpose when scores show a meaningful and significant statistical relationship between the constructs of interest (Hunter, 1996). “All procedures for determining test validity are concerned with the relationships between performance on the test and other independently observable facts about the behavior characteristics under consideration” (Anastasi, 1999, p.113). Thus, for the purpose of this study, the researcher identifies which of the selection measures best predict student success.

Types of Validity

There are three primary strategies for evaluating validity—content related, criterion related, and construct related (Anastasi, 1999). This study assesses criterion related validity (Casico & Aguis, 2005). There are two types of criteria related validity studies—predictive and concurrent. The difference between the two pertains to time lag (Casico & Aguis, 2005). In the case of concurrent validity, data on both predictor and criterion variables are collected at the same time. In the case of predictive validity, data on both predictor and criterion variables are not collected at the time. The data on the predictor variables is collected prior to collecting data on the criterion variables. For example, if a faculty were to study the relationship between GMAT score and

supervisory rating after three years of work experience, then data on GMAT score would be available as archival data, while the supervisory rating after three years of work experience would be available at a later date. This indicates that there is a time lag between the occurrences of both the variables (Casico & Aguis, 2005). Since in this case data on the criterion measures and predictor measures were not collected at the same time, this study is a predictive validity study.

Predictor Variable

“A variable that is hypothesized to explain inconsistency or variability in the outcome variable is called a predictor variable” (Jackson, 2003, p. 17). It is also called the independent variable, which is manipulated by the researcher. By attempting to isolate all other factors/constructs/variables, one can determine the influence of the independent variable on the dependent variable. For example, if one were to assess the relationship between coworker support and an individual’s productivity at work, then coworker support would be the independent variable and an individual’s productivity at work would be the dependent variable.

Criterion Variable

“The variable in a study that is expected to change as a result of alteration of the predictor variable is called a criterion or dependent variable” (Jackson, 2003, p. 17). The experimenter does not manipulate the dependent variable. It is the variable that is measured. For example, if one were to study the manner in which an employee handles feedback in the presence of coworkers or supervisors or family members, then the manner in which an employee handles feedback would be the dependent variable and

coworkers and family members would be the independent variable.

Challenges in Educational Psychology and Validation Studies

One of the challenges for educational psychology has been the prediction of academic performance based on individual differences (Rothstein, Paunonen, Rush, & Gillian, 1994). Applicants differ from one another along multiple facets in many ways, such as family background, prior academic achievement, attitude towards education, interest in the subject, and motivation behind choosing the subject. Individual differences distinguish one person from another and may be responsible for a person's future success (Halpern, 2000). Due to these differences among people, each applicant has to be appropriately chosen from a pool of applicants and admitted into the graduate program (Halpern, 2000). In order to understand and evaluate the differences between these students, and to determine which students will be admitted into the program, faculties use certain selection measures. The application material turned in by each student/applicant is essentially the set of selection measures used to choose students.

One of the other challenges is the complexity involved in predicting success. This may be because it is difficult to define success operationally. Success can have many faces, making it difficult to single out the most appropriate few. Moreover, some people may view graduate GPA as a measure of success, while others may view it as years taken to complete the degree. In other words, definitions of "student success" differ from person to person and situation to situation.

Need for Validating Graduate Selection Measures

Despite the importance of this area of study, there is paucity of research

addressing this issue. Most research in this area was conducted in the Fifties and Sixties (Weinstein & Srinivas, 1974; Williams & Harrell; Willingham, 1974). Therefore, given the importance of the subject and the outdated nature of research in this area, this study attempts to examine the relationship between student success and graduate admissions measures used for selecting students for a Master's program. To the researcher's knowledge, there has not been any such research in the field of psychology and, more specifically, industrial/organizational psychology. This study is the first of its kind that examines the relationship between graduate admissions measures in the field of industrial/organizational psychology and student success.

Students who graduate with a Master's degree in industrial/organizational psychology usually work in companies in the human resource department or pursue a doctorate degree. The predictor variables in this study include the selection standards used by the industrial/organizational faculty, which comprise (1) undergraduate grade in the introductory psychology course, (2) Graduate Record Examination (GRE) verbal score, and (3) Graduate Record Examination (GRE) quantitative score. Each of these will be discussed in detail later.¹

For the purpose of this study, the researcher operationally defined student success using the following: time taken for attainment of the Master's degree; time taken to find the first job after graduating from the program; and salary range on the first job after graduation. Several researchers (Weinstein and Srinivas, 1974; Williams & Harrell, 1964) used salary range as a means of measuring success. Attainment of the Master's

¹The I/O faculty uses additional selection measures, such as statement of purpose, résumé, and letters of recommendation. However, these measures were not used in this study.

degree was used by Willingham (1974) as a measure of success. The above listed three measures are the criterion variables used in this study. Each variable will be discussed in detail later.

Previous Research - Validation Studies in the Academic Setting

There is not a great deal of research that assesses the relationship of graduate selection measures and student success. Only a few studies have attempted to understand the relationship between selection measures and student success (Weinstein & Srinivas, 1974; Williams & Harrell, 1964; Willingham, 1974). As one would expect, the selection measures used by most studies are the same, and mirror the commonalities in real world college admission processes. The operational definition of the criterion variable, i.e., student success, varies from study to study. Nevertheless, there are some common measures used, for example, salary range and attainment of degree. It is surprising that no work has been done in this area in recent years, particularly because there remain a number of unanswered questions. One common question that arises is: What is the most important selection measure?

Predictive validation studies have been conducted over the last few decades. Willingham's (1974) study suggested certain measures for selecting graduate students and specified a need for future research. The predictor variables used in his study were GRE-verbal, GRE-quantitative, GRE-analytical, GRE-composite (average of all three sections), undergraduate GPA, recommendation letters, and GRE-GPA composite. Willingham (1974) defined success using the following criterion variables: graduate GPA, overall faculty rating, departmental examination, attainment of Ph.D., and time

taken to complete Ph.D. The results of Willingham's (1974) study demonstrate that undergraduate GPA is a good indicator of graduate GPA and overall faculty ratings. However, undergraduate GPA is not a good predictor of whether or not a student will attain a Ph.D. He found that the GRE composite score (average of all three sections) was a better predictor of success (attainment of Ph.D.) than undergraduate GPA. Also, amongst the GRE's, GRE quantitative was found to be a better predictor of success than GRE verbal.

In another study, Williams and Harrell (1964) used a sample comprised of MBA graduates from Stanford University who resided in the San Francisco Bay Area. Predictor variables available to the researchers at the time of a student's graduation—namely, overall undergraduate and graduate GPA, GPA of required courses in the MBA program, GPA of elective courses in the MBA program, scores on selected scales of Strong Vocational Interest Blank, faculty ratings, and extracurricular activities (athletic/non-athletic and activities related to leadership roles Vs non-leadership roles)—were utilized. Salary was the only criterion variable used in this study. A significant relationship was found between three predictor variables: GPA of elective courses, faculty ratings, and leadership in college with salary (criterion variable). However, the most valid predictor of salary was determined to be leadership in college. This implies that students who were elected as leaders on campus (presidency or vice presidency in clubs or student organizations) may be successful in earning higher salaries.

Weinstein and Srinivas (1974) conducted a study to aid faculty members in developing a model that would help in selecting students for an MBA program. The

predictor variables used in this study were Administration Test For Graduate Study In Business, candidate excellence by school indices (verbal, quantitative and total), undergraduate GPA, undergraduate GPA by subject area, undergraduate college major, weighted graduate study,² rating of involvement in social organizations, rating of letters of recommendation, rating of involvement in sports activities, age, marital status, and final MBA GPA. The criterion variables used in this study were current annual compensation and organizational level attained. The researchers divided participants based on the kinds of jobs they had, for example, individuals in line functions versus those in staff functions. The researchers found that individuals with work experience held jobs in the staff function rather than in line function, and also received higher salaries (Weinstein & Srinivas, 1974). Graduate grades significantly correlated with compensation for both line and staff managers. Involvement in social activities was found to be a predictor of success for staff managers, while involvement in sports activities was a predictor of success for line managers.

In sum, the most commonly used predictor variables are undergraduate GPA, GRE scores, and letters of recommendation. Success in previous research was defined with regard to annual compensation/salary range, time taken to complete course, position held in the organization, and attainment of degree. Overall faculty rating has been used as a predictor and criterion variable.

Proposed Study

As pointed out earlier, the main issue with validation studies in the academic

² The researchers have not defined “weighted undergraduate study.”

setting is that the research and conclusions are far too outdated. Most of the studies conducted in the early years used business school students as their samples, making it difficult to generalize results to the field of behavioral/social sciences. There is a dearth of research on this topic in the field of psychology in general, and especially in industrial and organizational psychology.

This study attempts to aid faculties in better determining which measures predict student success. The results may help faculties assign “importance” to some of the selection measures used. For example, if the GRE verbal score is a better indicator of success than undergraduate GPA, then faculty members may wish to give more weight, rather than equal importance, to the verbal dimension of the GRE than to the undergraduate GPA. Most importantly, this research is the first of its kind in the domain of industrial/organizational psychology. To conclude, this study attempts to evaluate the relationship between graduate selection measures used in an industrial/organizational psychology program and student success.

Criteria Variables

Salary Range

The salary which a man or woman earns during his or her career with an organization is often a measure of his or her value and/or contribution and involvement in that organization (Brenner & Lockwood, 1965). Salary is a collective measure that usually indicates past as well as present accomplishments (Brenner & Lockwood, 1965). Salary is commonly used as an objective determinant of triumph. Research has shown that it is a person’s behavior and/or personal characteristics that are rewarded steadily

(Brenner & Lockwood, 1965). This indicates that people who initially obtain large financial rewards in their careers tend to receive larger monetary rewards even later in their careers. Furthermore, annual compensation has “face validity” as a criterion of managerial success (Weinstein & Srinivas, 1974). Salary ranges differ from one industry to another and from organization to organization as well (Barid, 1999). Thus, salary data should be interpreted with care for accuracy of the results (Barid, 1999).

Time Taken to Attain a Degree

The most crucial test of success is whether or not a student graduates from a program (Weinstein & Srinivas, 1974). It is probably the most unassailable, decisive factor of student success. Furthermore, those who do obtain a degree probably have characteristics of sincerity, achievement motivation, and determination (Hirschberg & Itkin, 1978), which not only help in college success, but also are also essential to climb the corporate ladder. While this criterion may not be able to differentiate between scholars and professionally successful people, it displays academic persistence (Weinstein & Srinivas, 1974), which is required for student success.

Time Taken to Get the First I/O Related Job After Graduation

The amount of time taken to secure a job after gradation is a good determinant of how many skills a student may have leveraged from the academic program. However, sometimes students may take longer to find a job due to a bad economy.

Predictor Variables

Undergraduate Introduction to Psychology Course Grade

In the previous literature Introduction to Psychology course grade at the

undergraduate level was not used as a predictor variable, as a result of which there is no information on whether or not this variable is a good indicator of success. Nonetheless, there has been some research that assessed the relationship between overall undergraduate grades and success. A student's undergraduate grade has obvious relevance as a predictor because it represents a similar sort of behavior that one is intending to forecast (Willingham, 1964). This includes consistency, hard work, and dedication, which are important skills for success. However, there is a good amount of disparity with respect to the relationship between grades and success (Roth, BeVier, Switzer, & Schippmann, 1996). Some (e.g., Baird, 1987) believe that grades are useful predictors since they reflect intelligence and motivation, both of which are required for success. Nelson (1975) stated that grades do not reflect some crucial skills important for success, such as interpersonal and social skills.

It is common knowledge that past behavior is largely the finest predictor of future performance (Willingham, 1964). Moreover, the undergraduate Introduction to Psychology grade is easily available for those who major in psychology. Since there has not been much research assessing the relationship between psychology grades and student success, little is known about the relationship.

Pertinent to the variable undergraduate Introduction to Psychology course grade, the following hypotheses have been posited:

Hypothesis 1: Undergraduate Introduction to Psychology course grade will be positively related to time taken to graduate.

Hypothesis 2: Undergraduate Introduction to Psychology course grade will be

positively related to time taken to get the first job.

Graduate Record Examination Scores

The use of standardized tests is an important element in graduate admissions (Halpern, 2000). Each year numerous psychology majors devote a substantial amount of time preparing for the Graduate Record Examination (GRE) (Chernyshenko & Ones, 1999). Standardized tests are used for two reasons—to measure past learning and to measure future performance (Halpern, 2000). This conforms to the societal norm that people should be granted places in higher education on the foundation of developed aptitude (Halpern, 2000).

The GRE test measures the level of ability and intelligence that has been developed up to the time the test is taken (Halpern, 2000). Using this as a source of prior learning, faculty members forecast possible achievement in prospective learning tasks (Halpern, 2000). One can theorize that general intelligence and ability are related to success in any aspect of life (Rothstein *et al.*, 1994). Due to the psychometric development of the GRE, it has become possible to assess a range of human abilities such as logical reasoning ability, analytical reasoning skills, and verbal comprehension (Willingham, 1964).

Few studies have shown GRE verbal scores (GRE-V) to be significantly related to grades, while others have found that the other two sections of GRE test, i.e., Quantitative and Analytical, are predictive of college GPA (House, Johnson, & Tolone, 1987). Williams and Harrell (1964) found that GRE scores were not related to college GPA but were associated with whether or not students graduated. These inconsistent results have

led us to doubt the validity of the tool as a selection measure (House, Johnson, & Tolone, 1987). It is essential to note that the use of the GRE as a selection tool varies from one program to another (House, Johnson, & Tolone, 1987). Chernyshenko and Ones (1987) found that students with high GRE scores have a better chance of succeeding in psychology graduate programs.

For the purpose of this study, a students GRE verbal and quantitative section scores will be used. Pertinent to the GRE, the following hypotheses have been posited:

Hypothesis 3: GRE verbal and quantitative scores will be positively related to salary range.

Hypothesis 4: GRE verbal and quantitative scores will be positively related to the time taken to complete the degree.

Hypothesis 5: GRE verbal and quantitative scores will be positively related to the time taken to attain the first job.

Even though several graduate school faculties extensively use the above-mentioned selection measures, little is known about their validity. It will be interesting to assess the relationship of these selection measures with student success. The outcome of this study will benefit faculty members and allow them to enhance their selection procedure.

Implications - Relationship Between Success in Graduate School and the Workplace

Characteristics or traits of sincerity, achievement motivation, and focus, which help students succeed in school, are also necessary for success in the professional world (Hirschberg & Itkin, 1978). Individuals attend school or pursue higher education to

achieve more in life. If graduate schools are successful in developing effective selection procedures, then they are more likely to produce high quality students who, in turn, will be successful employees. Identifying and choosing individuals who show the potential to manage effectively is crucial to the welfare of business (Williams & Harrell, 1974). This is also of great interest to employers, for whom selection blunders may have negative consequences. Thus, if predictor variables of student success are recognized, then selection procedures at the graduate level can be enhanced, resulting in better individual accomplishment (Williams & Harrell, 1974). The measures used to select students to graduate school must be evaluated as predictors of success (Halpern, 2000). Productivity in organizations can be maintained if people with high ability for their jobs are selected (Hunter & Hunter, 1984). A validation of selection measures will help both colleges and organizations save time and effort.

METHOD

Participants

The sample consisted of 53 individuals who graduated from San Jose State University with a Master's degree in Industrial and Organizational Psychology. A survey was sent out to several students, but only eight students responded by completing the survey. The researcher obtained data from 53 students for one of the criterion variables, i.e., time taken to attain the degree. For the remaining two criteria variables (salary range and time taken to find a job), the researcher was able to gather data from only eight students. The predictor variable data were available for 53 individuals.

The sample included students who graduated from the program up to the year 2006. The sample consisted of people working in a wide range of organizations in the Bay Area.

The sample included individuals from all races, ethnicities, and genders. Sixty-three percent of the sample consisted of females; thirty-seven percent were males. Less than fifty percent of the research sample had prior work experience in the I/O field before they started the program. Fifty-five percent of the participants had never been employed at a job that required one-on-one interaction with people, such as customer marketing or teaching assistant. Fifty-three percent of the sample had leadership roles in their previous jobs, which included acting as secretary of a club or captain of a sports team. The remaining forty-seven percent of the sample had never been in any significant role that required leadership skills before the start of the program.

Procedure

Archival data were obtained for all predictor variables from the psychology department at San Jose State University (undergraduate Introduction to Psychology course grade and GRE verbal and quantitative scores). Data for one of the criterion variables (time taken to complete degree) was also available in the psychology department. For the remaining criteria variables (salary range and time taken to find a job) participants were asked to fill out a survey. Their contact information was obtained from the psychology department database. The survey included a cover letter, which informed participants of the purpose of the study and stated that participation was voluntary but would be appreciated. The cover letter also ensured participants that the data collected would be confidential. Although it was not possible to maintain anonymity in this study, the researcher assured participants that the gathered data would not be misused and would remain confidential. Former students were contacted via email and phone, and the survey and consent form were posted on the I/O alumni Yahoo group. The researcher also sent the survey and the consent form in a personalized email to each participant.

Measures

Undergraduate Introduction to Psychology Course. The grade for undergraduate Introduction to Psychology course was used. Using the SJSU grading policy, A+, A have been coded as 4.0, A- has been coded as 3.7, B+ has been coded as 3.3, B has been coded as 3.0, B- has been coded as 2.7, C+ has been coded as 2.3, C has been coded as 2.0, and C- has been coded as 1.7. Using the College of Business (Department of

Organization and Management) grading policy, A+ has been coded as 98.5 (97-100), A has been coded as 95 (94-96), A- has been coded as 91.5 (90-93), B+ has been coded as 88 (87-89), B has been coded as 85 (84-86), B- has been coded as 81.5 (80-83), and C+ has been coded as 78 (77-79).

Graduate Record Examination. The GRE General Test measures verbal reasoning, quantitative reasoning, critical thinking, and analytical ability that have been acquired over a period of time. The GRE test was revised in 2003, but until then it consisted of three sections—verbal reasoning, quantitative reasoning, and analytical ability. The maximum achievable score in each section was 800 points, amounting to a total of 2400 points. However, from 2003 onwards, the analytical ability section was substituted by an analytical writing section. The GRE test now totals 1600 points, with 800 each for the verbal and quantitative sections. For the purpose of this study, scores on only the verbal reasoning and quantitative reasoning sections have been used.

Time taken to graduate. Number of years taken to graduate was obtained from the psychology department records. Two different grading policies were used, namely, the SJSU grading system and College of Business grading system.

Time taken to get a job after graduating from the program. Time taken to get a job was measured with one item on the survey: After graduating from the program, how long did it take you to find your first I/O-related job? The response range was (a) I was in an I/O-related job at the time I graduated from the program, (b) Within 3 months of graduation, (c) 3-6 months after graduation, (d) 6-12 months after graduation, (e) More than 12 months after graduation, (f) I have not yet had an I/O-related job.

Salary range in the first I/O psychology related job. Salary range was measured with one item: What was your first salary range after completion of Master's in I/O Psychology? The response range was (a) \$20,000 - 39,000, (b) \$40,000 - 59,000, (c) \$60,000 - 79,000, (d) \$80,000 - 100,000, (e) More than \$100,000. Participants were asked to check their response.

RESULTS

As mentioned earlier in the study, only eight responses were received from the survey. Due to a small sample size, the hypotheses related to the variables—time taken to find a job after graduation and salary range in the first job after the completion of the program—were not studied. No conclusive deduction can be made based on eight participants. Data on 53 participants is available for the criterion variable—time taken to complete the degree—and the three predictor variables.

This section offers a detailed analysis of the criterion variable, time taken to complete the degree, and its relationship with the predictor variables, and assesses the relevant hypotheses.

Relationship Between Time Taken To Graduate and the Predictor Variables

This part of the results section discusses the descriptive statistics, correlations, and regression analysis for the criterion variable, time taken to complete the degree. The sample consisted of 53 participants. The average time taken to complete the degree was three years and nine months. One student completed the program in one year (1.9%). One student completed in one and a half years (1.9%). Fourteen out of 53 participants (26%) graduated from the program in two years. Nine out of 53 participants (17 %) in the sample graduated in three years. Two out of 53 participants (3.7%) graduated in three and a half years. Seven out of 53 participants (13 %) graduated in four years. Six out of 53 participants (11 %) graduated in five years. Eight out of 53 participants (15 %) in the sample graduated in six years, and five out of 53 (9%) took seven years to graduate. The

average GRE verbal and quantitative scores were 477($SD=95.65$) and 525($SD=99.98$), respectively. Using the SJSU grading policy, the average grade in the Introduction to Psychology course was A- (the mean is 3.7). Twenty-three out of 53 participants (43%) secured a B grade in the Introduction to Psychology course at the undergraduate level. One person secured an A- grade (1.9%), and 34 out of 53 participants secured an A or A+ (55.55%). Using the grading policy of the College of Business, the average grade in the Introduction to Psychology course was 91% or A-. 24 out of 53 (38%) students secured 85% or B grade in the Introduction to Psychology course at the undergraduate level. 28 students out of 53 students (44%) secured 95% or A grade in the Introduction to Psychology course at the undergraduate level. Two out of 53 (3.2%) students secured 98.5% or A+ in the introduction to psychology course. The mean grade for the sample was the same using both the grading policies. However, the percentage of students who secured A's and B's changed. The change in the percentage could be due to the fact that the grades have been lumped together in the SJSU grading policy. It should be noted the grading policy of the College of Business is not applicable to the Department of Psychology and thus should be interpreted with caution. The grading policy of SJSU provides the grading system that applies to all course work acceptable toward the completion of a degree at SJSU.

Pearson correlations between all predictor variables and time taken to complete the degree were conducted (see Table 1). Time taken to accomplish the degree has a low positive correlation with the grade attained in the Introduction to Psychology course ($r = .03, p > .05$). Both the GRE's—verbal ($r = -.09, p > .05$) and quantitative ($r = -.09, p >$

.05)—have low negative correlations to time taken to complete the degree.

Table 1

Means, Standard Deviations, and Correlations for the Three Predictor Variables (GRE Verbal, GRE Quantitative, and Introduction to Psychology Grade at the Undergraduate Level) and One Criterion Variable (time taken to complete the degree).

Variable	<i>N</i>	<u><i>M</i></u>	SD	1	2	3	4
Time Taken to Graduate	53.00	3.88	1.77	--	--	--	--
GRE Verbal	53.00	477.04	95.65	-.09	--	--	--
GRE Quantitative	53.00	525.37	99.98	-.09	.32*	--	--
Introduction to Psy Grade	53.00	3.57	.50	.03	.03	-.12	--

* Correlation is significant at the 0.05 level (2- tailed)

GRE verbal has a positive low correlation with GRE quantitative ($r = .32, p < .05$). This implies that a student who secures a high GRE verbal score is likely to do well on GRE quantitative as well. GRE verbal has a low correlation with Introduction to Psychology course at the undergraduate level ($r = .03, p > .05$). The GRE quantitative has a negative correlation ($r = -.12, p > .05$) with the Introduction to Psychology course at the undergraduate level.

A standard multiple regression analysis was conducted to determine which of the predictor variables (Introduction to Psychology course grade at the undergraduate level, GRE-verbal and GRE-quantitative) accounted for variance in the criterion variable (time taken to complete the degree).

Table 2 presents the results of the multiple regression analysis. This regression

analysis has been conducted using the SJSU grading policy. It suggests that only 1.2% of the variance in the criterion variable, time taken to complete the degree, is accounted for by all the predictor variables ($R = .12$, $R^2 = .01$). The F ratio is not significant ($F(3, 49) = .23$; $p > .05$), which suggests that the overall relationship between the three predictor variables and the criterion variable is not significant. In other words, it implies that the predictor variables do not account for significant variance in the time taken to complete the degree. This indicates that adding the three predictor variables does not have any impact on the criterion variable. Additional regression analysis was conducted using the grading policy of the school of business to see if there was a difference on account of the manner in which grades are coded. However, this relationship was also found to be not significant ($F(3, 49) = .23$; $p > .05$).

Table 2

Results of Standard MRC of GRE Verbal, GRE Quantitative and Introduction to Psychology Grade at the Undergraduate Level as Predictors of Time Taken to Complete the Degree

Predictor Variables	Beta	T	Sig.
GRE Verbal	-.08	-.50	.62
GRE Quantitative	-.06	-.41	.68
Introduction to Psy Grade	.03	.19	.84

Note. $R = .12$, $R^2 = .01$ ($p > .05$)

Neither Hypothesis 1 nor Hypothesis 4 was supported by the data. Hypothesis 1 stated that undergraduate course grade would be positively related to time taken to graduate. Hypothesis 4 stated that both the GRE verbal and the GRE quantitative scores would be positively related to time taken to graduate.

DISCUSSION

The researcher was hopeful that this study's findings would be of help to policy makers and graduate admission I/O faculty at San Jose State University. Unfortunately, the study did not lead to any significant conclusion due to an incredibly small sample size. Two of the criteria variables—time taken to get a job after graduation and salary range in the first I/O related job—could not be assessed, also because of a small sample size. Thus, the hypotheses associated with these two criteria variables could not be evaluated.

One of the criterion variables—time taken to graduate from the program—could be assessed even with a moderate sample size. The overall relationship was not significant. However, the results cannot be generalized, as a sample of 53 cannot be considered large enough. None of the findings of this study can be generalized, as this study was conducted with industrial-organizational psychology students only. Also, if this study were to be replicated, it should be conducted using a broader sample of students, including students from other universities across America.

One of the greatest difficulties experienced in conducting this study was obtaining responses from the alumni. It might be possible that alumni who knew the researcher may have been apprehensive about participating due to their familiarity with the researcher. It seemed as if those who had graduated many years ago were less connected with the Alma Mater and, therefore, may not have felt obligated to participate in the survey.

The other issue may pertain to measurement of variables. The researcher did not have the exact number of years and months taken to graduate for some of the participants, including the exact time taken to graduate could have an impact on the results. The method in which grades are coded in SJSU are a matter of concern. Firstly, the grading system combines students who receive an A+ or A grade. The intervals between the grades are not equal.

Several researchers, such as Hirschberg and Itkin (1978) and Willingham (1964), have expressed a need to search for new predictors. However, the role of nonintellectual factors associated with graduate success cannot be disregarded. Characteristics like sincerity, commitment, and conscientiousness are probably as important to success as grades and GRE scores. It may be worthwhile to assess a student on these factors before granting admission. Letters of recommendation could be rated for the important motivational variables and weighted by how well the recommender knows the student. It may be a good idea to include an objective rating scale with a few personality variables, such as commitment and industriousness, with the regular letter of recommendation. Thus, for future research it may be a good idea to include a few motivational characteristics and personality variables as predictors. Although the study did not make any significant contribution to the research for the variables due to its small sample size, it has made an attempt to establish the importance of this topic and the need for future research.

REFERENCES

- Ai-Hwa-Quek. (2005). Learning for the workplace: A case study in graduate employees' generic competencies. *Journal of Workplace Learning*, 17, 231-242.
- Arthur, W, Barrett, G. V., & Doverspike, D. (1990). Validation of an information-processing based test battery for the prediction of handling accidents among petroleum-product transport drivers. *Journal of Applied Psychology*, 75, 621-628.
- Baird, L. L. (1987). Do you think admission tests are fair? Do tests affect their decisions? *Research in Higher Education*, 26, 373-338.
- Binning, J. F., & Barrett, G. V. (1989). Validity of personnel decisions: A conceptual analysis of the inferential and evidence bases. *Journal of Applied Psychology*, 74, 478-494.
- Brenner, M. H., & Lockwood, H. C. (1965). Salary as a predictor of salary. *Journal of Applied Psychology*, 49, 295-298.
- Cascio, W. F., & Aguinis, H. A. (2005). *Applied psychology in human resource management* (6th Ed). Upper Saddle River, NJ: Prentice Hall.
- Chernyshenko, O. S., & Ones, D. (1999). How selective are psychology graduate programs? The effects of the selection ratio on GRE score validity. *Educational and Psychological Measurement*, 59, 951-961.
- Dawes, R. M. (1975). Graduate admission variables and future success. *Science*, 721-723.
- Halpern, D. F. (2000). Validity, fairness, and group differences tough questions for

- selection testing. *Psychology, Public, Policy and Law*, 6, 56-62.
- Hirschberg, N., & Itkin, S. (1978). Graduate student success in psychology. *American Psychologist*, 1083-1093.
- House, D. J., Johnson, J. J., & Tolone, W. L. (1987). Predictive validity of the graduate record examination for performance in selected graduate psychology courses. *Psychological Reports*, 60, 107-110.
- Hunter, J E, & Hunter, R. F. (1984). Validity and utility of alternative predictors of job performance. *Psychological Bulletin*, 96, 72-98.
- Hunter, J. E. (1986). Cognitive ability, cognitive aptitudes, job knowledge and job performance. *Journal of Vocational Behavior*, 29, 340-362.
- Jackson, S. (2003). *Research methods and statistics*. Thomson/Wadsworth.
- Johnson, J. W., Carter G., W., Davison, K. H., & Oliver, D. H. (2001). A synthetic validity approach to testing differential prediction hypotheses. *Journal of Applied Psychology*, 86, 774-780.
- Kuncel, N. R., Hezlett, S. A., & Ones, D. S. (2001). A comprehensive meta-analysis of the predictive validity of the graduate record examinations: implications for graduate student selection and performance. *Psychological Bulletin*, 127, 162-181.
- Roth, P. L., BeVier, A. C., & Schippmann, J. S. (1996). Meta-analyzing the relationship between grades and job performance. *Journal of Applied Psychology*, 81, 548-556.
- Rothstein, M. G., Paunonen, S. J., Rush, J. C., & Gillian, A. K. (1994). Personality and cognitive ability predictors of performance in graduate business school. *Journal of Educational Psychology*, 86, 516-530.

- Weinstein, A. G., & Srinivas, V. (1974). Predicting managerial success of master's of business administration (MBA) graduates. *Journal of Applied Psychology*, 59, 207-212.
- Williams, F. J., & Harrell, T. W. (1964). Predicting success in business. *Journal of Applied Psychology*, 48, 164-167.
- Willingham, W.W. (1974). Predicting success in graduate education. *Science*, 183, 273-278.

APPENDIX A: SURVEY

Please make sure to highlight or distinguish your response to the multiple choice questions. For all the other questions, please print your response.

1. Your name: _____
2. The year you started the I/O program: _____
3. The year you graduated from the I/O program: _____
4. After graduating from the program, how long did it take you to find your first I/O-related job?
 - a. I was in an I/O-related job at the time I graduated from the program
 - b. within 3 months of graduation
 - c. 3 - 6 months after graduation
 - d. 6 - 12 months after graduation
 - e. More than 12 months after graduation
 - f. I have not yet had an I/O-related job

Questions 5-8 concern your first I/O-related job after graduating from the I/O program:

5. What was the name of the organization? _____
6. Where was the organization located (city, state)? _____
7. What was your job title? _____

8. What was your starting salary?

- a. Less than \$20,000 a year
- b. \$20,000 - \$39,000 a year
- c. \$40,000 - \$59,000 a year
- d. \$60,000 - \$79,000 a year
- e. \$80,000 - \$100,000 a year
- f. More than \$100,000 a year

9. Based on your experience with the program, what feedback or comments do you have that may help improve the program?

APPENDIX B:
SAN JOSE STATE UNIVERSITY HUMAN SUBJECTS REVIEW BOARD
APPROVAL

Jui Sohil Mari

Hi Jui,

Congratulations. Your protocol #S0604199 (To assess the relationship between graduate admission criteria and student success) has been approved. You may begin collecting data. An official letter will be sent to you in the mail.

Kind Regards

Alena Filip

Institutional Review Board & Graduate Thesis Coordinator

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IRB Forms: <http://www.sjsu.edu/gradstudies/Research/irb.html>

Graduate Studies and Research: <http://www.sjsu.edu/gradstudies/>

APPENDIX C: GRADING POLICIES – SJSU & COLLEGE OF BUSINESS

SJSU Grading Policy

A+,A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C+	2.3
C	2.0
C-	1.7

Source: <http://info.sjsu.edu/web-dbgen/narr/soc-spring/rec-385.html>

College of Business (Department of Organization and Management)

A+	97-100
A	94-96
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73