A Comprehensive Analysis Of The Efficacy Of Non-Cognitive Measures: Predicting Academic Success In A Historically Black University In South Texas

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ABSTRACT

Universities have long used standardized American College Tests (ACT), Scholastic Aptitude Tests (SAT), and high school Grade Point Averages (HS GPA) for academic admission requirements. The current study of 127 minority college students in a Historically Black University in South Texas assesses an alternative measure, the Non-Cognitive Questionnaire developed by William Sedlacek. It is also important to test the validity of these standards for graduation success. As part of the process for residence hall placement at the Historically Black University, each participant completed a Non-Cognitive Questionnaire (NCQ) (Schauer, 2007). Preliminary indications provide neither a clear cut distinction nor a strong probability of success based on ACT or SAT scores among minority college students. High school GPA appears to be the best predictor of college graduation success among academic admission requirements in a Historically Black University. The NCQ appears to be a weak predictive tool in the success rates of minority students in the current study. Further study is required in the child developmental years of educational training.

Keywords: ACT; SAT; Academic success; Graduation rates; Non-Cognitive indicators

INTRODUCTION

The aim of all institutions of higher education is to recruit, retain and graduate students who meet certain requirements set by those institutions. Recruitment and admissions personnel constantly face the issue of selecting and admitting those students who will persevere to graduation. The selection tools of choice for many years have been the SAT and ACT. Fleming (2002) cites research which indicates that the correlation between SAT and college GPA is consistent among most students. She suggests that the only other measure which predicts college success is high school GPA. However, she also concludes that SAT scores seem to correlate with social economic status.

William Sedlacek has devoted over 30 years to the study of the Non-Cognitive (NC) indicators of academic success. His book B*eyond the Big Tests* (2004) posits the idea that the SAT and ACT are inadequate for predicting which students should be admitted to our colleges and universities. These standardized tests bring information which is useful for some students; but they are not as accurate at predicting academic success for women, minorities, "or anyone who has not had a White, middleclass, Eurocentric, heterosexual, male experience" (Sedlacek, 2004, 6) in the American educational system. While poorly predicting the academic successes of African American females, Stretch (2005) states that the big tests are even "less useful in predicting performance for African American Males" (Sample & Seymour, 1971; Arbona & Novy, 1990).

Sedlacek and Brooks (1976) offered eight Non-Cognitive variables that they say enhance predictions of success and failure for minorities and nontraditional students. They predict that the degree to which students adjust to these areas and the degree to which the institutions foster this adjustment will determine academic success. These Non-Cognitive variables are useful as standards for admission; as evaluation instruments for anticipating successful GPA, persistence, and graduation; and as advising intervention tools. The eight variables are: positive self-concept, realistic self-appraisal, successful handling of the system (formerly, "racism"), preference for long-range over short term goals, availability of a strong support person, successful leadership experience, demonstrated community involvement, and knowledge acquired in a field (Appendix A; available from author Osho).

Sedlacek's (2004) research has produced a survey form which attempts to measure these Non-Cognitive variables; i.e., the Non-Cognitive Questionnaire (NCQ). The questionnaire consists of biographic information, as well as student reaction, on a Likert-type scale, to each of several questions. Additionally, the students are asked to list their past accomplishments and future goals (Appendix B; available from author Osho). Not everyone agrees that Sedlacek's NCQ is the "crystal ball" for predicting student success. Thomas, Kuncel, & Crede (2007) give a strong argument for not using the results of the NCQ as an admission tool. Among other things, they cite problems with the three open-ended NCQ items and how the raters differed in their interpretation of these scores.

In order to reverse a trend (solve a problem), the researcher must: 1) identify the problem, 2) suggest solutions or resolutions for the problem, and 3) offer hope for the future. From all indications, African American students are lagging behind in college education. Of those who do come to college, a troubling percentage does not persevere to graduation. Many factors make the prediction of college success difficult for minority, female, non-traditional, and first generation students. Among the issues which confound predictions of success are the type of college attended, whether Historically Black College or University (HBCU) or predominantly White institution and the amount of student involvement in campus activities, services to students, and living situations while attending college (Stretch, 2005, 2-3). One possible solution would be to look at factors other than high school GPAs and standardized test scores when considering college applications. Another would be to make interventions standard procedure. The use of non-cognitive factors in predicting academic success has been suggested by William Sedlacek and others. Sedlacek's NCQ has been used, tested, validated, examined, argued, and used again by many institutions of higher education. The authors propose to investigate the predictive accuracy of Sedlacek's scales in the actual academic successes of participants.

HYPOTHESIS

H_0: William Sedlacek's eight non-cognitive variables will correlate with and may be used to predict measures of college success (such as graduation, final college grade point average, and persistence in college) for African American freshmen upon admission at a Historically Black University.

H_1: The non-cognitive variables, when used in combination with traditional college success predictors (such as high school grade point average and standardized test scores), will improve on the predictive accuracy of the traditional measures in predicting college success.

H_2: Additive scores, which may be envisioned as a measure of non-cognitive maturity derived from the eight individual non-cognitive variables, will correlate with and may be used to predict measures of college success.

H_3: Non-cognitive variables will be better predictors for African American freshmen at a HBCU than will traditional college success measures.

H_4: High school grade point average will be a better predictor of college success for African American freshmen at a HBCU than standardized tests.

DESCRIPTION OF VARIABLES

The following is a brief explanation of the eight non-cognitive variables as Sedlacek defines them. When studying these Non-Cognitive variables, the researcher must keep in mind that these are neither solid nor discrete. Variable conceptualizations do overlap and different researchers use varying terms for these concepts. The nomenclature following the variable in bold represents Sedlacek and adjusted variables, respectively.

Positive Self-concept or Confidence (NC1SED & NC1plus)

Embracing a positive self–concept means that a person has strength of character; he or she can speak, write, and think positively about him or herself. He or she expects to graduate, expects to do well in the academic setting, and is not afraid to face new challenges. The student who enters college feeling confident that he or she can make it through school is more likely to survive and thrive on campus. Rosenberg's "adolescent self-image" (1965) and Bandura's "self-efficiency" (1997), both of which are related to success in academics and in life, are constructs which fit closely with the positive self-concept variable (Wood & Locke, 1987, and Okech & Harrington, 2002).

Realistic Self-appraisal (NC2SED & NC2plus)

A student who can accept praise and awards for academic excellence, as well as constructive criticism and the consequences that follow poor performance, is making a realistic self-appraisal. He or she sees the need for self-development and has in mind the goal to broaden him or herself individually during his or her academic career. The student practices assessing personal strengths and weaknesses, seeks help for perceived deficits, and wants to know how he or she is doing in class before grades come out in order to correct any problems. Another aspect of this realistic self-appraisal is adaptability (Shivpuri, Schmitt, Oswald, & Kim, 2006). The student who is equipped with sufficient coping mechanisms will deal successfully with change, new situations, and the multiple demands of college, especially during the critical first year. Rogers' study (1984) showed that resistance to becoming easily discouraged and expecting to have a difficult time in college were strong predictors of Black male success (Stretch).

Successfully Negotiating the System (formerly listed as "Understands and Deals with Racism"; NC3SED & NC3plus)

One of Sedlacek's original variables was labeled "dealing with racism"; but in recent years, he has revised it to "successfully handling or negotiating the system" (2004). This seems evident when we think that for women and students with disabilities, racism may or may not come into play. The successful student has experienced and coped with discrimination and is committed to being a catalyst for change in the system; he or she has learned to realistically handle situations without blaming his or her problems on someone or something else. This variable is especially important for minority students because their treatment by the system may well be caused by their ethnicity (Sedlacek, 1987).

Millione's (1980) Black consciousness measure refers to an individual's beliefs or attitudes about self and/or race. He identified four stages of Black consciousness: 1) preconscious or antagonistic, 2) confrontational or emotional, 3) internalization or incorporation, and 4) integration or tolerance. Sedlacek (2004) suggests that a successful Black student is a realist who has experienced discrimination and is dedicated to improving the system in which he or she finds him or herself. Learning to handle the circumstances and situations in a rational and tolerant manner leads to developing new abilities. Shivpuri et al. (2006) explain that the student who is continuously learning, actively seeking new information and skills, and open to new experiences will be more successful academically. This is another way of negotiating the system. Hood (1992) found "racial homogeneity" to be the fourth strongest non-cognitive predictor of black male academic success in a predominantly White institution. Racial homogeneity, as Hood uses the term, is synonymous with Sedlacek's variable of negotiating the system and dealing with racism.

Prefers Long-Range Goals to Short-Term or Immediate Needs (NC4SED & NC4plus)

Learning to set goals is a "must" for college students, but top students know how to state specific, concrete goals that are oriented in the future. Understanding the relationship between present education and future goals, being willing to defer gratification, and being ready to work hard for the grades are examples of preferring long–term over short–term goals.

Heckman & Rubenstein (2001) begin their research paper by citing the importance of conventional wisdom that places motivation and persistence in relation to success in life. Their study on non-cognitive skills and GED recipients seems to indicate that these students may be smarter but less persistent than their high school graduate counterparts. Long-range goals were shown, on the other hand, by Hood's study (1992), to be the third strongest predictor of Black male academic success in a predominately White setting.

Perseverance attaches to the preference of long-range goals and indicates a commitment to one's goals despite obstacles. Precedence includes the motivation to finish projects and meet deadlines. Shivpuri et al. (2006) concluded that perseverance is especially related to higher GPA in the first year of college.

Availability of Strong Support Person (NC5SED & NC5plus)

A recurring theme in the retention literature is the successful student's obvious need for mentors (Schauer, Schauer, & Rabb, 2006). Some studies include the presence of a strong support person under the theme of social capital (Schauer, 2005). The minority student who has even one strong support person behind him or her is far more likely to make a quick and appropriate adjustment to college (Sedlacek, 1989).

Successful Leadership Experience (NC6SED & NC6plus)

"Success breeds success" could be the subtitle for this next variable. The student who has had successful experiences in leadership roles is more likely to excel in college. Along with leadership opportunities comes organizational ability, influencing and directing others, and mediation training. This student is comfortable taking action when called upon to do so. Hood (1992) found that leadership was the strongest NC predictor of Black male academic success in a predominantly White institutional setting. For leadership experience for Black males, Hood included participation in sports teams and clubs. Rogers' (1984) study suggests that pride in the accomplishments of leadership was the strongest non-cognitive predictor for Black males.

Demonstrated Community Involvement (NC7SED & NC7plus)

Community service, or community involvement, is necessary for navigating the college campus. Living in a residence hall, participating in class, and forming study groups are all the outgrowth of past experience in community. The student who has contributed to his/her community has shown an interest in and understanding of the community she/he just left. Understanding and accepting one's background and being willing to work toward the benefit of the community evidences a level of maturity that is necessary for one who is leaving home and striking out on his/her own. Shivpuri et.al. (2006) also list good interpersonal skills as a factor leading to academic success. Conforming to new social dynamics, having good communication skills, and satisfying peer relations are all important to any college student.

Knowledge Acquired in a Field (NC8SED & NC8plus)

Non-traditional knowledge acquired in a field is defined as unusual or culturally-based methods of obtaining information and displaying knowledge. One example in some minority cultures is the opportunity for public debate. This out-of-classroom experience could easily translate to better class participation and discussion. Persons of color are more apt to learn and develop by way of methods that are less traditional and outside the education system. The methods may be related to culture or gender, and the field itself may be non-traditional (Sedlacek, 2004, 48). Sherman, Giles, & Williams-Green (1994) point out students of all ethnic backgrounds, who have solid records of prior achievement, are likely to continue that achievement in college and that the key factor is

the extent to which skills acquired in high school can be transferred to college studies. They suggest that this is especially important for Black students.

SAMPLE

The current study contains 127 participants of whom 126 are African Americans and one Hispanic. The sample incorporates college freshmen entering a Historically Black University in South Texas in 2000. As part of the process for residence hall placement, each participant filled out a Non-Cognitive Questionnaire (NCQ) (Schauer & Schauer, 2007). Males make up 66.9% (85) of the participants and 18.8% (16) of the graduates. The sample includes 33.1% (42) females accounting for 23.8% (10) of the graduates.

The frequencies and cross-tabulations for the sample of participants and their demographics, including standardized ACT and SAT scores, high school and college GPA's, can be found in Table 1 (available from author Osho). Referring to Table 1, from the wide range of ACT and SAT scores, one may notice most of the graduates come from those who score 14 to 17 on the ACT and 700 to 890 on the SAT. It should also come to the attention of the reader that those who score higher on the SAT have a similar percent chance of graduating as those who have lower scores. Notice similar results in the ACT scores: The two lowest scores and the two highest scores mirror each other, as does the percentage of graduates having those scores. Again, more graduates stem from the middle range scores in the ACT categories. Under the category high school GPA (HS GPA), one notices 37 students who scored 2.00 to 2.50 did not graduate. As can be expected, those students obtaining a college GPA less than 2.00 do not graduate. However, obtaining 2.00 and higher does not necessarily ensure graduation. As students progress to the higher college GPA's, the percentages who graduate become higher. So, how does a Historically Black University determine the admission requirements? More minority graduates appear to come from the mid-range scores on the ACT and SAT. Students who score low on ACT and SAT are also able to graduate. Is the answer to this dilemma found in inconsistencies in education quality or could it be the difference in quality of education from high school to college? Could it be a maturation factor of being away from home?

Three separate correlations were run on the non-cognitive data sets with respect to graduation. The first set consisted of the unchanged Sedlacek variables where missing values were coded as 2 (N=127; NC1SED to NC8SED, and NCSEDTOT). Each of these variables correlated to graduation are positive and weak with the exception NC5SED (Availability of a Strong Support Person) and NC7SED (Demonstrated Community Service), which are both negative and weak correlations. The strongest correlation at 0.129 is "Positive Self-Concept or Confidence" (NC1SED) where the weakest is -0.118 "Demonstrated Community Service" (NC7SED). The second set consisted of missing variables that were left out by list-wise correlation (N=124; NC1plus to NC8plus, and NCPLSTOT). All variables are positive and weak. However, the major difference between Sedlacek's variables is that none of the correlations are negative. In correlation with graduation, the strongest correlate is "Knowledge Acquired in a Field" (NC8plus; 0.271) and the weakest is "Availability of a Strong Support Person" (NC5Plus; 0.005). Cross-referencing both correlations with graduation one finds the Sedlacek variables are weaker overall (NC1SED, NC2SED, NC6SED, NC7SED, NC8SED, and NCSEDTOT), "Availability of a Strong Support Person" were exactly the same, as where NC2plus and NC3plus were found to be the weaker correlations. The only significant variables between the two correlations of the 2-tailed test were the total of NC1plus through NC8plus (0.183, $p=0.042$, $\alpha=0.05$) and NC8plus (0.271, $p=0.002$, $\alpha=0.10$). The third correlation among graduates from the Historically Black University includes the other college variables (Table 2; available from author Osho). Among minority students, graduation has a strong positive correlation with college hours earned, college hours attempted, college hours attended, and college GPA. Other positive correlations of graduation include high school GPA and percent of hours completed. Further analysis must be completed to verify collinearity. The SAT and ACT scores are non-significantly correlated with college graduation having a weak positive correlation and a weak negative correlation to graduation respectively. Reflecting a negative correlation suggest the SAT and ACT scores should not be considered in the admission requirements in a Historically Black University. However, further analysis is suggested. High school GPA has the strongest correlation with college hours transfer credit and college hours earned. Correlations associated between high school GPA and college hours attended, college GPA, and college hours attempted are all positive but weak.

DATA ANALYSIS

The first regression model for College GPA indicates a positive, strong variance among variables with a coefficient of determination (adjusted r^2) of 84.5%. Suggesting College GPA can be forecasted from the variables: gender, accumulated ACT, high school GPA, percent hours completed, ACT score, SAT score, and college hours attended. Utilizing a 2-tailed test with a level of significance of α=.05 and 18 degrees of freedom (N-1= 17), the t-statistics for high school GPA, ACT score, SAT score, gender, and accumulated ACT/SAT fall between the critical value of ±2.110 (Table 3; available from author Osho). However, the level significance for gender, high school GPA, accumulative ACT/SAT, SAT, and ACT are not statistically significant as they are greater than α =.05 and suggest rejecting the null. The t-statistics for percent of college hours completed and college hours attended fall to the right of t-critical ±2.110, are not significant and null must be rejected. Adding the variable percent of college hours completed reduces coefficient of determination (r^2) to 80.1%. Slight changes are found in all variables and even high school GPA now becomes non-significant with a p-value =.066 at α=.05. If the error were accepted, a unit increase in high school GPA would increase the graduation rate by .773. All other variables are rejected for the same procedures in the first regression model. A backward regression using the dependent variable (graduation) and independent variables (gender, race, SAT, ACT, high school GPA, college hour attended, college GPA, college hours attempted, college hours earned, and major) indicates the only variables that are significant include gender, college hours attempted, and college hours earned. The correlation also indicates only the college variables have strong correlation with each other (collinearity). Through six steps, the adjusted r^2 (0.891) increased 0.041 with a standard error of 0.385.

Non-Cognitive Regression

Utilizing graduation as the dependent variable, a linear regression analysis indicates weak correlations among the non-cognitive variables. A coefficient of determination (r^2 = 0.107) for 123 degrees of freedom (N-1=122) and adjusted r^2 = 0.045 for 115 degrees of freedom, the regression appears to be very weak and accounts for 4.5% of the variance in the non-cognitive variables. The t-statistics for all variables, except NC8, fall within t-critical ±1.645. The tolerance and variance inflation factors (VIF) indicate very little multicollinearity. However, the analysis also indicates each level of significance falls outside of the 95 percentile range of inclusion. Therefore, the non-cognitive variables are not predictive of participant graduation at a Historically Black University.

Logistic regression is used to (1) determine characteristics or outcomes of the predictor variables where the dependent variable is dichotomous and (2) estimate odds ratios for independent variables by way of coefficients. A block entry method of Forward Step logistic regression was used to enter variables in SPSS which took three steps to significantly improve the model. The categorical variables were recoded automatically. Since some of the variables are continuous, a linear regression will be used later in an attempt to verify suitability of the data. The initial variables entered include the dependent variable (graduation) and the independent variables (gender, race, SAT, ACT, high school GPA, major, NC1 through NC8, NC total, NC plus total, NC additive total, and NC Sed total). Missing data were excluded using a casewise identifier. Race and major were used as contrast indicators. Goodness-of-fit was determined by a 95% confidence interval meaning α=.05 for inclusion and α=.10 for exclusion. The model initially removed race as it is constant throughout the data. Variables removed during the modeling procedure include gender, SAT, ACT, HS GPA, major, NC1 through NC8, NC total, NC plus total, NC additive total, and NC Sed total. The model summary indicates very little change after the second or third iteration in each step. The final step could not find a solution to the model after 20 iterations. Table 4 (available from author Osho) shows the computed r^2, chi-square, degrees of freedom and level of significance. Table 4a (available from author Osho) indicates the variables in the logistic regression equation by step. Only HS GPA approaches a level of significance but does not reach the 95% necessary. In fact, the logistic correlation indicates a strong negative correlation of HS GPA with graduation of -0.959, a strong positive correlation of 0.779 for leadership and graduation, and a strong negative correlation of -0.672 for SAT and graduation.

DISCUSSION

The present research set out to study Sedlacek's non-cognitive questionnaire and best predictors of success for college graduation. Reflecting on the hypotheses the present study must state:

H_0: Rejected. William Sedlacek's eight non-cognitive variables do not correlate with and may not be used to predict measures of college success (such as graduation, final college grade point average, and persistence in college) for African American freshmen upon admission to a Historically Black University. The only non-cognitive variable approaching significance appears to be related to leadership.

H_1: Rejected. The non-cognitive variables, when used in combination with traditional college success predictors (such as high school grade point average and standardized test scores), do not improve on the predictive accuracy of the traditional measures in predicting college success. High school GPA may prove to be the best among the available measures for college success, as the non-cognitive plus variables predict graduation by only an adjusted r^2 at 34%.

H_2: Rejected. Additive scores, which may be envisioned as a measure of non-cognitive maturity derived from the eight individual non-cognitive variables, do not correlate with and may not be used to predict measures of college success. The NCplus and NC adjusted variables were found to be weaker predictors of college success.

H_3: Rejected. Non-cognitive variables were not found to be better predictors for African American freshmen at a HBCU than traditional college success measures.

H_4: High school grade point average will be a better predictor of college success for African American freshmen at a HBCU than standardized tests is accepted. The Sedlacek variables and college variables in the study are restrictive and subject to multicollinarity.

CONCLUSION

High school GPA appears to be a better predictor of college success than are the ACT and SAT scores, non-cognitive variables from the correctional matrix, and other standardized admission requirements. Minority students from a wide range of ACT and SAT scores are, in fact, able to graduate as seen in Table 1 (available from author Osho). The present study attempted to find a clear-cut measure for predicting college success. However, due to multicollinearity, the present study encountered difficulty in determining that clear-cut measure. In order to prevent these limitations, future studies must factor out specific variables with collinearity. Running a test with collinearity creates a false positive or a false representation of a strong r^2 between variables. An example would be grouping graduation with other college variables as college GPA, hours attended, or hours completed. In similar fashion, Sedlacek grouped "the reason for leaving college" (V9) into two non-cognitive scales (NC1 and NC2). It should also be mentioned that running the non-cognitive variable totals on each grouping with the specific groups may confound the results. Overall, future studies on admission requirements, retention, and academic success of college students must be modified over time to include environmental factors, familial financial indicators, health issues, and past academic success. Administrators must consider students on a case-by-case basis. Knowing and understanding an individual's background, as well as their academic success, will be a factor to be considered. Students with the drive to succeed may not have had the best academic scores or opportunity to succeed. Parental involvement, or the lack of it, in a child's early educational development may be the biggest predictive factor. The way questions are asked may also be a major factor in the responses given. Further study is required in the child developmental years of educational training.

AUTHOR INFORMATION

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