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July 6, 2004

Carla Kreppein, Administrative Associate
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Washington, D.C. 20036-1183

Dear Dr. Kreppein:

RE: Manuscript for Publication in the ERIC and its Subsidies
Please, enclosed find two copies of my manuscript, **"Economically Disadvantaged Student Failure: The Role of Non-minority Teachers of Elementary School Students"** for your review and publication in the next issue of ERIC.

I understand that ERIC operates on a 'blind review' principles; and that all articles submitted to the journal are subject to editorial reviews. In light of your quality publications and with the understanding that ERIC publishes articles and research works of significant interest and importance to the education community at-large, we hope this article meets your publication criteria. Please, feel free to communicate with us if we could be of further assistance to you and the readers of ERIC.
Thank you for your consideration and we look forward to hearing from you at your earliest convenience.

Sincerely,

_____
T. Nelson Ikegulu,
CPMSA Project Evaluator

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Demographic Factors and Reading Performance

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July 6, 2004

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The Impacts of Demographic Factors in Predicting Student Performance on a State Reading Test

ABSTRACT

Background: The overall goal of the No Child Left Behind Act (NCLB) of 2001 is to close, by the end of the 2013-2014 academic year, "the achievement gap between high- and low- performing students, especially the achievement gap between minority and non-minority students and, between disadvantaged children and their more advantaged peers" (NCLB, 2001, Sec. 1001[3]). Under the federal NCLB mandates, adequate yearly progress (AYP) targets must be set for the entire period from 2002 to 2014 in order to ensure that all students and all schools eventually meet the content and performance standards adopted in their respective states. It was within this context that the Texas Education Agency (TEA) launched its Texas Assessment of Knowledge and Skills (TAKS) in spring 2003.to improve its accountability system.

The accountability provisions in NCLB clearly refer to two demographic variables underlying the current inequity in public education: economic disadvantage and race/ethnicity. It is obvious that the essence of accountability, according to the NCLB, is accountability for subgroups, particularly subgroups that have historically been disadvantaged by their low income and minority statuses. It is therefore important to investigate the extent to which student performance on the 2002-2003 TAKS was determined by economic disadvantage and minority status, so that the Beaumont ISD Superintendent of Schools, School Board members, and the cabinet may have a clear baseline picture by which it can judge how well Beaumont Independent Schoo Distrivt schools and students will be leveling the playing field from 2002 up to 2014 to ensure educational equity.

Purpose: The objective of the present study was to examine the impact of three demographic variables: poverty, ethnicity, and gender on the risk of a student failing to meet the TAKS reading proficiency standards in 2003.

Research Design: Purposeful with four grade levels (3^{rd}, 5^{th}, 8^{th}, and 10^{th}) and three research questions

Study Sample and Setting: Students were drawn from all of the 29 elementary and secondary schools Beaumont ISD. There are 24 (16 elementary, two high, and six middle schools) school-wide Title 1 campuses in BISD. The total sample consisted of 75 teachers (11 male and 64 females) with average cumulative length of service as 12.89 years (minimum was two and maximum was 37 years); and 35%, 15%, and 50% of these teachers were African, Hispanic, and Caucasian Americans respectively. There were a total of 6,112 students in this study: 1,648 third graders, 1,560 fifth graders, 1,502 eight graders, and 1,402 tenth graders.

Intervention and Control/Comparison Condition: None

Data Collection and Analysis: Data for this present investigation were collected from the district's database and state's achieves at the campus level namely the Texas state Academic Excellence Indicator System (AEIS) database of the State of TEA for the 2001-2003 school years. Within the TEA database are information about individual students and teachers and campuses. The dependent variable in this study is the binary variable of pass/fail (pass = 1, fail = 0). The event of failure (0) is modeled in logistic regression.

Findings: The three-predictor model can correctly classify 65.0%, 64.8%, 64.5%, and 64.8% of the students into the "***pass***" or "***fail***" group at grades 3, 5, 8 and 10 respectively. That is, without any consideration to academic capability, roughly 65% of the students' TAKS reading results could be correctly placed.

Conclusions: As expected, girls have a significantly lower failure rate than boys in reading across the grade levels, with statistically significant odds ratios of 0.73, 0.61, 0.54 and 0.49 for grades 3, 5, 8 and 10 respectively. The present study is limited by the absence of many other demographic variables that might conceivably have contributed to the failure rates on the 2002-2003 TAKS reading tests. It also faced the methodological challenge of how to include numerous smaller subgroups into the analyses. The predicted probabilities of failure used in classifying the students into the predicted pass and fail groups may be optimistically biased because the predicted results and the actual results are from the same data. Validations using 2004-2005 and 2005-2006 TAKS data are under consideration.

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The Impacts of Demographic Factors in Predicting Student Performance on a State Reading Test

Overview and Introduction

The overall goal of the No Child Left Behind Act (NCLB) of 2001 is to close, by the end of the 2013-2014 academic year, "the achievement gap between high- and low-performing students, especially the achievement gap between minority and non-minority students and, between disadvantaged children and their more advantaged peers" (NCLB, 2001, Sec. 1001[3]). Under the federal NCLB mandates, adequate yearly progress (AYP) targets must be set for the entire period from 2002 to 2014 in order to ensure that all students and all schools eventually meet the content and performance standards adopted in their respective states. It was within this context that the Texas Education Agency (TEA) launched its Texas Assessment of Knowledge and Skills (TAKS) in spring 2003.to improve its accountability system.

The accountability provisions in NCLB clearly refer to two demographic variables underlying the current inequity in public education: economic disadvantage and race/ethnicity. It is obvious that the essence of accountability, according to the NCLB, is accountability for subgroups, particularly subgroups that have historically been disadvantaged by their low income and minority statuses. It is therefore important to investigate the extent to which student performance on the 2002-2003 TAKS was determined by economic disadvantage and minority status, so that the Beaumont ISD Superintendent of Schools, School Board members, and the cabinet may have a clear baseline picture by which it can judge how well BISD schools and students will be leveling the playing field from 2002 up to 2014 to ensure educational equity.

Texas State Accountability Systm, Curriculum, and Assessment

Texas has been at the forefront of state-mandated testing and accountability in the nation. The state's accountability system, which was first initiated in 1990-91, was the model for the federal accountability system established in the *No Child Left Behind (NCLB) Act* of 2001. An *accountability system* is a way of making sure that the districts and their schools are teaching the state-required curriculum and that students are learning.

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Origins of the Texas state accountability system, the *Academic Excellence Indicator System (AEIS),* dated back to 1984. At that time, the Legislature decided to emphasize student achievement as the basis for accountability rather than school district compliance with rules, regulations, and educational practices. The state's first statewide assessment dates back even farther, to 1980. The TAKS and its successors are all criterion-referenced tests. In a *criterion-referenced test,* the test-taker's *performance* (score) is interpreted by comparing it with a pre-specified body of knowledge and skills - - the *curriculum - - the Texas Essential Knowledge and Skills (TEKS).* Texas has a tradition of developing its own tests to make sure that students are meeting state curriculum requirements. Over the years, these mandated standardized tests have become progressively more rigorous, involving more problem solving and higher level thinking skills (TEA, 2002).

Other states (e.g., Oregon, Hawaii, Ohio, Iowa, Kentucky, Arkansas, Louisiana, etc.) may use a national *norm-referenced test,* such as the *Iowa Test of Basic Skills* (ITBS). These norm-referenced tests measure the performance of test takers against a target group; for instance, third graders at a particular school, district, or state against third graders in the national norm.

Some school districts in Texas, such as the Beaumont Independent School District (BISD), still use a norm-referenced test along with the state-mandated assessment or the Texas Assessment of Knowledge and Skills (TAKS), to compare how their district fares against others. The state also tracks the performance of selected groups of Texas students on norm-referenced tests such as *the National Assessment of Educational Progress (NAEP)* and the *Scholastic Aptitude Test (SAT).* Using both criterion- and norm-referenced tests offers the advantages of both systems.

The state-mandated curriculum in Texas is the *Texas Essential Knowledge and Skills (TEKS*). They are the curricula standards that currently guide classroom instruction in Texas. Questions on the TAKS are based on the TEKS. Therefore, students who do not master the TEKS do not perform well on the TAKS.

The state used a very egalitarian process for developing the TEKS. In 1997, the TEA invited every district in the state to help with the development of the TEKS and the

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subsequent assessment, the TAKS. The process was designed to ensure balanced viewpoints from members who represented the diversity of the state's population.

The TEKS were adopted by the State Board of Education (SBOE) in 1998-1999. The TEKS are lengthy and a much more comprehensive replacement for the Essential Elements, which were implemented in 1984. Some educators believe that the TEKS should be revised to provide clearer descriptions of what should be taught and to reduce the number of topics taught at each grade level.

Testing or *assessment* is an age-old way of determining how teachers are teaching and how well students are learning. The outcry over testing has grown louder as test scores have been paired with accountability rating systems that have become increasingly complex and punitive.

The TAKS is the state-mandated, standardized test currently used in Texas. The state sets the parameters for the tests, and the public schools are required to administer the tests. The Legislature required that TAKS be more challenging than its predecessors and be aligned with the state mandated curriculum, the *TEKS.* The TAKS needed to be a tougher test because so many students were topping out on the TAAS. TAKS tests are given in grades 3-9 in reading; grades 4 and 7 in writing; grades 10 and 11 in English language arts (reading and writing); grades 3-11 in mathematics; grades 8, 10, and 11 in social studies; and grades 5, 8, 10, and 11 in science.

The Texas Assessment of Knowledge and Skills (TAKS) Reading Test

Texas assessment system was designed years before the NCLB was authorized in 2001. As a response to the public's demand for accountability and the 1994 Improving America's Schools Act (IASA), the TEA decided to reform its statewide testing program into a three-tiered standards-guided assessment system (TEA, 1999, 2003). Assessment is to be conducted at the classroom, school and state levels in accordance with the revised TEA Offices of Accountability, Research, and Evaluation and, Ofdfice of Curriculum and Instruction. Since 2002-2003, the state-level assessment has become the primary instrument by which the TEA intends to demonstrate compliance with the NCLB.

For the purpose of this study, the TAKS refers only to the state-level assessment. In spring, 2003, the new TAKS reading and math tests were administered to grades 3, 5, 8 and 10. The present study reports analyses based on the 2003 reading tests.

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The TAKS reading tests are based upon four "strands" of standards:

1) Fluency and Phonemic Awareness ➔ Range - "Read a range of literary and informative texts for a variety of purposes including those students set for themselves."
2) Phonics ➔ Processes - "Develop and use strategies within the reading processes to construct meaning."
3) Vocabulary ➔ Conventions and Skills - "Develop and apply an understanding of the conventions of language and texts to construct meaning."
4) Comprehension ➔ Response and Rhetoric - "Using individual reflection and group interaction, comprehend and respond to texts from a range of stances: personal, critical and creative." (TEA Office of Curriculum Instruction and Student Support /Instructional Services Branch, 2003)

Each reading test consists of two types of items: selected response (multiple-choice) items and constructed response (short or extended answer) items that require writing (TEA, 2003). All test items are matched with the second, third, and fourth strands. Scaled total scores are classified into four performance levels: exceeding, meeting, approaching, and well below proficiency. The scaled total of 2100 is set as the cutoff proficiency score. Any student scoring below 2100 is considered to have failed to meet the expected proficiency level. Those with at least a scale score of 2400 earned the 'Commended Performance' academic standard.

Research Questions

The objective of the present study is to examine the impact of three demographic variables: poverty, ethnicity, and gender on the risk of a student failing to meet the TAKS reading proficiency standards in 2003, with the hope that follow-up research in subsequent years will point to an appreciable and steady decline in the negative impact of poverty and minority status on academic achievement, as compared with the 2002-2003 baseline. Gender was included in the analyses because past research has consistently shown a gender difference in favor of girls in both language arts and math (e.g., Brandon & Jordan, 1994; Brandon, Newton & Hammond, 1987; Reiss, 2005). No reliable information is currently available from the TEA database about other important demographic variables, such as length of residence in an English-speaking country, home language use, parent's educational attainment, family income relative to household size, etc. Therefore those variables were ignored in this research.

The present study addressed three specific research questions:

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1. To what extent is TAKS reading performance influenced by gender, poverty or ethnicity separately? This set of three univariate analyses provides an initial understanding of the impact of each of the demographic variables on the odds of a student failing to reach TAKS reading proficiency

2. Is there a general pattern of the effects due to the three demographic variables across the grade levels? Tahs is, with the three predictors incorporated into one single predictive model for each grade level, would a generalizable predictive model, with or without interaction effects, emerge?

3. And finally, how accurate are the predictive models with respect to different racial/ethnic subgroups? Attention was directed beyond an overall percent of correct classification to two other aspects of predictive accuracy: probability of false identification of failure and probability of false identification of pass (i.e., the True-Negatives and the False-Positives). Such knowledge will help to adjust the understanding of the overall predictive model with respect to various racial/ethnic subgroups.

RESEARCH DESIGN, METHODOLOGY, AND ANALYTICAL PROCEDURES

Beaumont Independent School District spans about 153.34 square miles in Jefferson County of Southeast Texas near the Gulf Coast. Beaumont has a population of 117,593 with ethnic composition of 41.2% African Americans, 3.7% Asian Americans, 4.6% Hispanics, and 54.9% Whites. BISD is fully accredited by the Texas Education Agency and education is provided for students in the PreK-12 grades. Educational opportunities are also provided through adult and community education Projects. Students attend classes in the district's 33 campuses: one (1) Head Start/Pre K, 19 elementary schools, seven middle schools, three high schools, and three education centers.

The 33 campuses and education centers in BISD educate about 19,361[2] students of whom 64.4% is African Americans, 3.1% is Asian Americans, 14.1% is Hispanic Americans, 0.2% is Native Americans, and 18.7% is Whites. About 74.1% students in BISD are considered economically disadvantaged of which the African (75.3%) and Hispanic (77.5%) Americans constitute the largest subgroups. There are 10,583 (50.4%) males and 10,316 (49.6%) females.

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Rationale for the Four Selected Grade Levels

Texas has been phasing in an academic program that requires students to pass the TAKS to be promoted from grade 3 (began in 2002-2003); grade 5 (2004-2005); and grade 8 (2007-2008). The program, known as the *Student Success Initiative (SSI*), is designed to ensure that all students get the support they need to succeed in reading and math. Students in grades 3, 5, and 8 have three chances to pass the required TAKS. (Grade 3 students must pass only the reading TAKS test). Those students who do not pass are given additional instruction after each testing opportunity. Parents are notified if their child does not pass the TAKS test that is required for promotion.

After a student has failed the second test, a *Grade Placement Committee (GPC)* creates an instructional plan, based on the individual needs of the student. The GPC includes the principal, teacher, and parent or guardian. Students who fail after three trial attempts are to be retained. However, parents are allowed to appeal the decision to the GPC. The committee may decide to promote those students who are likely to perform at that grade level if they are given supplemental instruction. Whether a district retains or promotes a student, the district must develop an individual educational plan (IEP) for the student for the following school year. All BISD students have the IEP for all academic years to foster their graduation.

To graduate from high school, students are currently required to pass all four content areas assessed by the TAKS in grade 11 (Exit TAKS): mathematics, English language arts (ELA), science, and social studies. Students can retake these *exit-level tests* five times during their junior and senior year. Those who still have not passed by the end of their senior year can continue to take the tests for an unlimited number of times. The tenth graders have the greatest propensity for attrition, academic failure, and institutional malintegration.

These grade levels were chosen because TAKS test results are readily available and the tests are administered more than once at these grade levels to give students ample opportunity for promotion and eventual graduation with their cohort. Hence, it suffices to say that the sample design for the present investigation was purposeful.

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Population and Sample Characteristics

The population (with 29 elementary and secondary schools), from which the sample was drawn can be characterized as homogeneous with gender and ethnic distributions as: (1) Gender - - 18% male and 82% female teachers and (2) Ethnicity - - 3.5% Asian, 34% African, 18% Hispanic, 44% Caucasian, and 0.5% Native Americans.

Students were drawn from all of the 29 elementary and secondary schools Beaumont ISD. There are 24 (16 elementary, two high, and six middle schools) school-wide Title 1 campuses in BISD. The total sample consisted of 75 teachers (11 male and 64 females) with average cumulative length of service as 12.89 years (minimum was two and maximum was 37 years); and 35%, 15%, and 50% of these teachers were African, Hispanic, and Caucasian Americans respectively. There were a total of 6,112 students in this study: 1,648 third graders, 1,560 fifth graders, 1,502 eight graders, and 1,402 tenth graders.

The grade-level specific sample sizes for the logistic regression analyses are: 3rd grade, 1,242 (75.36%); 5th grade, 1,202 (77.05%); 8th grade, 1,138 (72.95%); amd 10th grade, 1,006 (66.98%). Academically related information and other predictor variables, such as if the student in question “Met state Standard” and received state “Commended Performance” and the student’s race and gender were also included in the database..

Data Collection and Analytical Procedures

Data for this present investigation were collected from the district’s database and state’s achieves at the campus level namely the Texas state Academic Excellence Indicator System (AEIS) database of the State of TEA for the 2001-2003 school years. Within the TEA database are information about individual students and teachers and campuses.

The TAKS reading achievement test scale scores (RSCORE) data as well as other demographic information were gathered for third, fifth, eight, and tenth graders enrolled in 29 (19 elementary, seven middle, and three high schools) elementary and secondary schools’ TAKS reading assessment using the Texas state’s standardized test - - TAKS reading - - for grades 3, 5, 8, and 10 students enrolled during the spring 2003 test administration.

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Table 1
Frequency Distribution of the Data

Grade Level	Ethnicity	Free Lunch? (Top Row=No Bottom Row=Yes)	% of Sample	Sample Size (per grade)	Total Usable Score (per grade)
3	Asian	222	0.18	1,242	1,648
		53	0.04		
	Hispanic	176	0.14		
		156	0.13		
	Black	145	0.12		
		252	0.20		
	Caucasian	160	0.13		
		77	0.06		
5	Asian	216	0.18	1,202	1,560
		49	0.04		
	Hispanic	172	0.14		
		149	0.12		
	Black	147	0.12		
		238	0.20		
	Caucasian	163	0.14		
		68	0.06		
8	Asian	234	0.21	1,138	1,502
		36	0.03		
	Hispanic	188	0.17		
		126	0.11		
	Black	167	0.15		
		184	0.16		
	Caucasian	151	0.13		
		52	0.05		
10	Asian	248	0.25	1,006	1,402
		29	0.03		
	Hispanic	202	0.20		
		87	0.09		
	Black	148	0.15		
		107	0.11		
	Caucasian	152	0.15		
		33	0.03		

These data sets were subjected to exploratory and inferential data analyses to respond to the proposed research questions. First, summary statistical measures were computed to describe the sample characteristics; whereafter, the entire sample was analyzed using correlation and logistic regression. The extracted logistic regression model was then subjected to post-hoc analyses to determine the underlying factors contributing to student academic achievement.

The dependent variable in this study is the binary variable of pass/fail (pass = 1, fail = 0). The event of failure (0) is modeled in logistic regression. More specifically, it is the log odds of failure, i.e., $\ln(p/(1-p))$, that is regressed on to the predictors. The letter p

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refers to a student's probability (risk) of failure. The ratio between the probability of failure, p, and the probability of pass, (1-p), is known as odds. The three independent variables are operationally defined below:

- gender (male = 0, female = 1)
- low-income status (ineligible for free or reduced price lunch = 0; eligible for free or reduced price lunch = 1 or '***Economically Disadvantaged***')
- race/ethnicity (Asian, Hispanic, Black or White, dummy coded with the White group designated as the reference group)

For any statistically significant logistic regression coefficients, their profile likelihood odds ratios and the 95% confidence limits are reported (SAS Institute, 1995).

RESULTS AND DISCUSSION

Research Question One

As expected, girls have a significantly lower failure rate than boys in reading across the grade levels, with statistically significant odds ratios of 0.73, 0.61, 0.54 and 0.49 for grades 3, 5, 8 and 10 respectively. In other words, the odds of failure for girls are 27%, 39%, 46% and 51% lower than boys at the four grade levels respectively. This single predictor model has an adjusted R-square of 0.74, 0.75, 0.75, and 0.75 for Grades 3, 5, 8 and 10 respectively (Nagelkerke, 1991). It is not clear what exactly accounts for the persistent gender difference because gender can be interpreted as a composite of numerous biological, psychological and socio-cultural factors. However, this finding does have profound pedagogical implications if the BISD is to be serious about ensuring that all students, boys as well as girls, attain the expected reading proficiency at each grade. In the four grades examined, students whose parents are classified as at least moderate-income to high-income outperformed their low-income counterparts. That is, students eligible for free or reduced price lunch (i.e., '***economically disadvantaged'***) are found to have significantly higher failure rates than their ineligible peers, which is not at all surprising. The heavy and statistically significant odds ratios, 2.74, 2.62, 2.33, 2.09 for grades 3, 5, 8 and 10 respectively, are all against low-income students. Eligibility for free or reduced price lunch means more than double the odds of falling below the TAKS

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reading standards. Those odds ratios suggest that poverty has a much stronger effect on academic success than gender. The univariate logistic model has an adjusted R-square of 0.75 for all the four grades. The failure rates by gender, low-income status, and ethnicity are reported in Table 2

Table 2
Rates of Failure by Factors and Grade Level

Factors	Grade 3	Grade 5	Grade 8	Grade 10
Study Sample	50.26	50.95	50.04	50.49
Gender				
Male	54.32	57.02	59.11	58.17
Female	46.28	44.70	41.45	41.83
Income/Economically Disadvantaged Status				
Receiving free lunch	64.22	64.62	61.83	54.74
Not receiving free lunch	39.61	41.12	43.70	45.26
Ethnicity				
Asian	30.98	33.96	33.14	32.89
Hispanic	60.68	57.61	58.24	60.69
Black	64.27	66.03	64.98	67.84
Caucasian	34.73	36.13	34.08	36.99

Among the four racial/ethnic groups, Asian and White have quite similar failure rates, which are clearly lower than those of the Hispanic and Black groups. Compared to Whites, Hispanic and Black students at all grade levels experience significantly higher odds of failure, whereas no statistical difference is found between Asian and White students at any of the grade levels except grade three. The odds ratios for the Hispanic vs. White contrast are 2.90, 2.40, 2.63, 2.70 for the four grades respectively; the odds ratios for the Black vs. White contrast are even greater, 3.38, 3.44, 3.60 and 3.59 for the four grades respectively. Blacks face nearly 3.5 times the odds of failing compared to Whites. The only statistically significant difference found between Asians and Whites is an odds ratio of 0.84 at the third grade; indicating that Asian students actually outperform their White peers. This only point to the fact that race/ethnicity is possibly the greatest influence among the three predictors – a possibility that is further confirmed by the

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findings resulting from the next research question. The adjusted R-square due to race/ethnicity remains 0.75 at all the four grade levels.

Research Question Two

Given three demographic predictors, the full logistic regression model can have seven effects: three main effects, three two-way interaction effects, and one three-way interaction effect. When the full model was applied to the four grade levels, the three-way interaction effect was non-significant in all cases. This finding justified a subsequent search for more parsimonious predictive models. It may be in order here to add that this finding corroborates the conclusion of no need to consider a possible three-way interaction between gender, poverty, and ethnicity, reached in several large scale studies (N > 1,000) that examined academic performance in mathematics, reading, and science (Bali & Alvarez, 2003; Derington-Moore, 2003; Gertz, 1999; O'Conner & Miranda, 2002; Patton, 2003; Saturnelli & Repa, 1995).

Further examination of the two-interactions revealed no consistent or interpretable patterns. Hence, a decision was made to adopt a main-effects-only model for all the grade levels. The pattern of effects, in terms of direction, magnitude, and accuracy in prediction, is similar enough to suggest that there may exist one single underlying model across the grade levels. The results are reported in Table 3.

The three-predictor model can correctly classify 65.0%, 64.8%, 64.5%, and 64.8% of the students into the "***pass***" or "***fail***" group at grades 3, 5, 8 and 10 respectively. That is, without any consideration to academic capability, roughly 65% of the students' TAKS reading results could be correctly placed. This is a clear evidence that demographic variables beyond the control of the Beaumont ISD instructional system are potent determinants of academic achievement in BISD schools. This demographics-based predictive model works in three ways: disadvantaging boys, poor students, and Hispanic and Black students. Conversely, it favors girls, high-income students, and students of White or Asian ancestry.

A significant gender effect in favor of females is consistent across the grades. Other factors being equal, girls' odds of failure may be 31% lower at grade three, 45% lower at grade five, 58% lower at grade eight, and 50% lower at grade ten. Gender appears to have a greater impact at the higher rather than lower grades.

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A more powerful determinant than gender is eligibility for free or reduced price lunch or the '***economically disadvantaged students***.' This eligibility translates into a 110% increase in the odds of failure at the third grade, 103% increase at the fifth grade, 58% at the eighth grade, and 75% at the tenth grade. Unlike the gender effect, its negative impact seems to weaken as the student gets older. Nonetheless, the magnitude of the odds ratio far exceeds the corresponding gender related odds ratio at each grade level.

The most potent determinant is found to be race/ethnicity. Because poverty and race/ethnicity are correlated, there has been a long standing debate as to whether or not race/ethnicity is only a proxy for poverty (e.g., Abbot & Joireman, 2001; Harkreader & Weathersby, 1998; Williams, 1972). The analyses based on the TAKS reading data indicated that race/ethnicity has a definitive unique effect, in spite of its correlation with the low-income status. Furthermore, as far as the contrasts between Whites on one hand and Hispanics and Blacks on the other are concerned, race/ethnicity seems to have a much more drastic influence than poverty. After the effect of poverty is controlled for, Hispanic students' odds of failure are 122% higher than the Whites' at grade five. And that is the lowest odds ratio attributable to race/ethnicity. The most dramatic example is that Black students' odds of failure are 361% of the Whites' at the eighth grade. Such empirical evidence strengthens the argument that race/ethnicity impacts achievement over and beyond the effect of the associated variable of poverty (e.g., Bali & Alvarez, 2004; Brooks-Gunn, Duncan, & Klebanov, 1994; Lubienski, 2001). The three-effect logistic regression model has a stable adjusted R-square of 0.75 at all the grade levels examined.

Given the three demographic variables, there are 16 possible combinations at each grade level with a wide range of probabilities of failure. The contrasts between the subgroups least and mostly likely to fail (Asian females without free lunch vs. Black males with free lunch) are 0.24 vs. 0.75, 0.24 vs. 0.78, 0.23 vs. 0.79, and 0.24 vs. 0.81 for Grades 3, 5, 8 and 10 respectively (Uyeno, Zhang & Chin-Chance, 2005). This is the picture the TEA faced in 2002 as it began the arduous task to ensure all students and schools meet the NCLB mandates by 2014.

Table 3
Regression Coefficients and Odds Ratio Estimates by Grade Level

Table 3a: Grade 3	Regression Coefficient	Odds Ratio	95% Profile Likelihood Confidence Limits

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			[Lower	Upper]
Intercept	-0.70			
Gender (Ref = Female)	-0.37**	0.69	0.63	0.75
Low Income Status				
(Ref = Not Receiving Free Lunch)	0.74**	2.10	1.92	2.30
Ethnic Group (Ref = Caucasian)				
Asian	-0.07	0.93	0.81	1.07
Hispanic	0.99**	2.70	2.37	3.07
Black	1.03**	2.81	2.48	3.19

* p < 0.05
** p < 0.001

Table 3b: Grade 5	Regression Coefficient	Odds Ratio	95% Profile Likelihood Confidence Limits [Lower	Upper]
Intercept	-0.51			
Gender (Ref = Female)	-0.59**	0.55	0.51	0.60
Low Income Status				
(Ref = Not Receiving Free Lunch)	0.71**	2.03	1.85	2.22
Ethnic Group (Ref = Caucasian)				
Asian	-0.03	0.97	0.85	1.11
Hispanic	0.80**	2.22	1.96	2.52
Black	1.07**	2.91	2.57	3.30

* p < 0.05
** p < 0.001

Table 3c: Grade 8	Regression Coefficient	Odds Ratio	95% Profile Likelihood Confidence Limits [Lower	Upper]
Intercept	-0.40			
Gender (Ref = Female)	-0.86**	0.42	0.39	0.47
Low Income Status				
(Ref = Not Receiving Free Lunch)	0.46**	1.58	1.43	1.75
Ethnic Group (Ref = Caucasian)				
Asian	0.02	1.03	0.88	1.19
Hispanic	1.01**	2.74		2.37
3.16				
Black	1.28**	3.61	3.13	4.17

* p < 0.05
** p < 0.001

Table 3 (Continues)
Regression Coefficients and Odds Ratio Estimates by Grade Level

Table 3d: Grade 10	Regression Coefficient	Odds Ratio	95% Profile Likelihood Confidence Limits [Lower	Upper]
Intercept	-0.30			

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Gender (Ref = Female)	-0.70**	0.50	0.45	0.55
Low Income Status (Ref = Not Receiving Free Lunch)	0.56**	1.75	1.54	1.98
Ethnic Group (Ref = Caucasian)				
Asian	-0.15	0.86	0.74	1.01
Hispanic	0.95**	2.59	2.22	3.02
Black	1.20**	3.31	2.81	3.89

* $p < 0.05$
** $p < 0.001$

In short, a general logistic model consisting of three main effects is adequately applicable to the four grade levels. The model can correctly classify about 65% of the students in each grade and maintain a fairly consistent pattern of significant effects due to gender, low-income status and ethnicity. Of the three effects, ethnicity appears to be the most powerful determinant, followed by low-income status and gender. This hitherto undocumented pattern of relative potency is consistent across the four grade levels in Texas.

Research Question 3

The last part of the study focused on those students who are misclassified by the logistic model. Table 4 reports the sensitivity and specificity of this model at each grade level. Sensitivity refers to the percentage of true failures identified by the logistic model, and specificity refers to the percentage of true successes identified by the model. Also included in the table are the probabilities of false-failure (True-Negative) and false-success (False-Positive) as identified by the logistic model.

With the cutoff of predicted probability of failure set at 0.50, the predictive model, with all ethnicities/races considered together, shows a sensitivity of 0.64 at grade three, 0.65 at grade five, 0.69 at grade eight, and 0.62 at grade ten. Specificities are 0.67, 0.65, 0.61 and 0.68 for grades three, five, eight and ten respectively. Those indices remain fairly stable across the grades, providing further evidence for the feasibility of a general underlying logistic model across the grades.

Table 4
Sensitivity and Specificity Analysis by Grade-Level within Race/Ethnicity

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	% Correct	Sensitivity (Correctly pred. fail /Total Fail)	Specificity (Correctly pred. pass /Total Pass	Predicted to Fail, Actual Pass	Predicted to Pass, Actual Fail
Asian					
Grade 3	69.02	0.00	1.00	0.00	0.31
Grade 5	68.26	0.17	0.94	0.04	0.28
Grade 8	67.81	0.12	0.95	0.03	0.29
Grade 10	68.01	0.10	0.96	0.03	0.29
Hispanic					
Grade 3	61.48	0.79	0.35	0.26	0.13
Grade 5	61.43	0.80	0.36	0.27	0.12
Grade 8	60.26	0.76	0.39	0.26	0.14
Grade 10	59.83	0.69	0.45	0.22	0.19
Black					
Grade 3	66.36	0.87	0.28	0.26	0.08
Grade 5	66.00	0.86	0.27	0.25	0.09
Grade 8	64.98	1.00	0.00	0.35	0.00
Grade 10	67.84	1.00	0.00	0.32	0.00
Caucasian					
Grade 3	63.18	0.19	0.87	0.09	0.28
Grade 5	63.76	0.19	0.89	0.07	0.29
Grade 8	66.00	0.19	0.90	0.06	0.28
Grade 10	63.60	0.12	0.94	0.04	0.33

The misclassified students at each grade level fall into two categories, those who are predicted to pass (not fail) but actually failed ("false negatives"); and those who are predicted to fail but actually passed ("false positives"). Although much research has been conducted relating academic performance to demographic variables, particularly low-income status and race/ethnicity, probabilities of false negatives or positives have not received much attention. In Hawaii, this neglect may be partly due to the fact that no viable pass/fail standards existed in public schools for years until the NCLB of 2001. In a more broad perspective, while the effects of social, cultural, and economic factors on academic attainment are widely accepted, it is rare to find carefully thought out empirical research on inaccuracies in inferring from such factors to individual achievement within subgroups. The NCLB's unambiguous requirement of fair and clear measures of subgroup performance prompted the third research question.

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The racial/ethnic distribution of the false negatives deviates drastically from the expected proportions at each grade level (chi-square = 478, 436, 729 and 522 for grades 3, 5, 8 and 10 respectively; df = 3, $p < 0.001$ for all cases). For example, among the third graders, 37.63% of the 1,693 false negatives are Asian students (significantly higher than the population proportion of 22.21%), and 29.36% are Whites (significantly higher than the population proportion of 19.13%). Obviously Asian and White students in Beaumont's public schools would enjoy a better than deserved academic reputation, were such reputation to be based exclusively on the three demographic variables. On the other hand, Hispanic and Black students would be more likely to be disparaged than their Asian and White counterparts. About 14.06% of the negative falses are Hispanics (significantly lower than the population proportion of 31.95%, and 29.36% are Blacks (significantly lower the population proportion of 19.13). The observed probability of a false negative (predicted pass with an actual outcome of failure) being Asian or White is 0.67 as compared to 0.33 for Hispanics or Blacks. The so-called academic success of Asian and White students cannot be accurately interpreted unless more research attention has been devoted to the number of false negatives in theoretical or statistical models based exclusively on demographics. The over-representation of Asians or Whites (67%, 66%, 75% and 73% for grades three to ten respectively), or under-representation of Hispanic or Blacks, persists among the false negatives across the grades.

The other side of the story is of course that among the false positives, i.e., predicted failure with an actual outcome of pass, it is the Hispanics and Blacks who outnumber Asians or Whites. For instance, of the 1,025 false positive tenth graders, 935 (91.22%) are Hispanics and Blacks. Only 90 (8.78%) are Asians or Whites. This pattern is stable across the grades. The probability of an Asian or White to pass who is predicted to fail is only 0.10, 0.13, 0.10, and 0.09 for grades three to ten respectively.

The overall percent of correct classification based upon the demographics does not tell the whole story. What is lost is the exciting news about the valiant efforts and personal victories of many, many educationally disadvantaged Hispanic and Black students in Beaumont (Southeast Texas or Texas) public schools who manage to beat the heavy odds and meet or exceed the TAKS reading proficiency level. Approximately 90% of the 303

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false positives are Hispanic or Black at the third grade; so are 87% of the 319 at the fifth grade, 90% of the 328 at the eighth grade, and 91% of the 315.

CONCLUSION

The present study is limited by the absence of many other demographic variables that might conceivably have contributed to the failure rates on the 2002-2003 TAKS reading tests. It also faced the methodological challenge of how to include numerous smaller subgroups into the analyses. The predicted probabilities of failure used in classifying the students into the predicted pass and fail groups may be optimistically biased because the predicted results and the actual results are from the same data. Validations using 2004-2005 and 2005-2006 TAKS data are under consideration.

Nevertheless, this research has provided the BISD and its schools a preliminary overall understanding of what roles the major demographic variables of gender, low-income status, and race/ethnicity, played, individually and jointly, in determining students' reading performance in the NCLB baseline year of 2002. It has been found that one single main effects-only logistic model is viable, correctly classifying approximately 65% of the students into the "pass" or "fail" group at each of the four grade levels examined. If the NCLB is to come anywhere near its stated overall objective, logistic regression coefficients associated with the demographic variables should all have decreased to a value near 0 by 2014 (odds ratio close to 1). Barring that, the BISD and its schools may take heart in the hitherto undocumented success story that many educationally disadvantaged Black/Hispanic Beaumont, Southeast Texas, and Texas students with support from these public education systems, have proved to be capable of overcoming their odds of failure and reaching the TAKS reading proficiency level.

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