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Predicting Adequate Yearly Progress: Leaving Explanation Behind

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[Predicting Adequate Yearly Progress: Leaving Explanation Behind](#)

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Abstract

The purpose of this research was to determine if the variables included in the Mississippi Report Card utilized for the calculation of AYP can be used to predict whether or not Mississippi LEAs will attain adequate yearly progress in reading and math using the logistic regression technique.

This study demonstrated that using the variables utilized for the calculation of AYP, a predictive model can be successfully utilized to classify Mississippi LEAs that will and will not attain AYP in reading and math with an accuracy greater than that which can be attributed to chance.

Introduction

The No Child Left Behind Act (NCLB) of 2001 was a complex federal initiative with the goal of nationwide public school reform (United States Department of Education, 2001). Essentially, the chief goal of this legislation was the eradication of the achievement gap that exists among students from differing racial and socioeconomic groups. NCLB sought to achieve this objective through the modification of standards pertaining to teacher quality and accountability, the establishment of literacy and school safety programs, provisions for flexible use of federal funds, increased parental choice of school, and compensation of schools based upon federal performance standards. Specifically related to accountability measures, NCLB required that each state devise specific performance standards for all students and demonstrate adequate yearly progress (AYP) for all students and subgroups of the student population.

For purposes of this study, AYP will be defined according to the definition utilized by Elmore and Rothman (1999): AYP is to be defined in a manner that (1) results in continuous and substantial yearly improvement of each school and local education agency sufficient to achieve the goal of all children. . . meeting the state's proficient and advanced levels of achievement; [and] (2) is sufficiently rigorous to achieve that goal within an appropriate timeframe. (p.8)

This study will address the following four area of research included in the review of the literature: (a) the history of adequate yearly progress, (b) the impact of adequate yearly progress on state policies and procedures related to education, and the (c) the measurement of adequate yearly progress. Each of these lines of research is discussed below.

History of Adequate Yearly Progress

Manna (2002) indicated that historically in the United States, “the federal presence in education has been justified when it served national goals or when the nation’s basic principles or physical safety were

perceived at risk” (p. 10). A prime example of increased federal power in the area of education was presented as the Elementary and Secondary Education Act (ESEA), a component of President Lyndon B. Johnson’s War on Poverty Initiative. However, 40 years after President Johnson enacted the Elementary

and Secondary Education Act of 1965, the basic premise of addressing the academic needs of underprivileged students that this federal legislation was founded upon remains at the forefront of educational concerns. Robelen (2005) stated that although ESEA has undergone numerous reauthorizations, none has increased the federal government’s role as radically as the most recent modification the No Child Left Behind Act. The first alteration to ESEA occurred in 1968, when Congress

created specialized programs and new titles for existing initiatives, establishing Title I. Title I was created to provide financial assistance to schools with elevated proportions of underprivileged children. Then, in

1970, Congress mandated stringent regulations for the manner in which funding allocated through this act was spent by states, districts, and schools. Subsequently, President Jimmy Carter reauthorized ESEA in 1978, providing more flexibility in Title I spending. The next modifications occurred in 1981 when President Ronald Reagan proposed the consolidation of several programs into Chapter I (formally Title I),

eliminating excessive paperwork for local education agencies (LEAs). However the 1988 reauthorization of the ESEA, which was enacted during the Reagan administration, marked the year that vital provisions

concerning state, LEA, and school accountability as well as the annual assessment of effectiveness were focused upon. In 1994, President Clinton enacted Improving America’s Schools Act (IASA) along with Goals 2000, which mandated that states devise state achievement standards and align annual assessments with these standards. Additionally, this particular reauthorization required that LEAs distinguish schools making and not making AYP and develop improvement plans.

Goertz (2001) stated that one of the foremost goals of IASA was the establishment of a single, comprehensive accountability system by which all public schools in the United States would be evaluated. However, as of the 2001-2002 school year, merely 22 states had established all encompassing accountability systems applicable to all public schools. The most recent reauthorization of ESEA occurred in 2002, when President George W. Bush enacted Public Law 107-110, also known as

the No Child Left Behind Act (NCLB). However, NCLB is unique in that it impacted all public schools in the United States (not just those receiving Title I funding), and holds all schools, local education agencies (LEAs), and states accountable for improving the achievement of disadvantaged students and responsible for providing substantiation that all students are making AYP. The language of the No

Child Left Behind Act (2001) asserted that the purpose of Title I is to ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging State academic assessments...[and this purpose can be achieved by]... holding schools, local educational agencies, and States accountable for improving the academic achievement of all students, and identifying and turning around low-performing schools that have failed to provide a high-quality education to their students, while providing alternatives to students in such schools to enable the

students to receive a high-quality education (Title I, Section 1001, Statement of Purpose). NCLB includes notable modifications to federally funded programs and accountability requirements (Trahan, 2002). Trahan indicated that this legislation included provisions for the largest increases in federally appropriated educational funding in history. Specifically, the amount of funding public school districts and states received was dependent upon the number of children and families living in poverty. Through increased funding as well as specific policies and programs designed to address the needs of at-risk children, NCLB seeks to offer support to states to promote the elimination of the achievement gap, especially in reading.

According to Wanning, Herdman, and Smith (2002), NCLB increases the federal government's authority in the area of educational accountability. The rationale for this expansion of control stemmed from the failure of public schools in the United States to eradicate the achievement gap that exists between groups of students from differing racial and socioeconomic subgroups. Wanning et al. (2002) also asserted that historically, the needs of low-achieving students have been improperly addressed, as educators have focused upon procedural accommodations during testing, rather than the achievement of the students.

Specifically, NCLB (2001) required states to establish a set of standards, objectives, and targeted achievement levels for each disaggregated subgroup of the public school population. These subgroups include: students from low socioeconomic groups, disabled students, limited English proficiency students, students from racial/ethnic groups, and gender groups. In addition, states are required to administer at least one assessment in reading/language arts and math during the following grade spans (3-5, 6-9, and 10-12). At least one science assessment must be included during one of these grade spans, beginning no later than the 2007-2008 school year. This initiative also encouraged states to move from norm-referenced tests to criterion referenced tests, which are directly aligned with the benchmarks and standards common to each state.

Though AYP is a term defined by federal legislation, each state is responsible for devising the precise criteria (pertaining to academic standards and levels of rigor) associated with this key accountability element (Education Trust, 2003). AYP has been a critical factor in the determination of the success of individual schools and LEAs in the United States since the Elementary and Secondary Education Act of 1965, but has gained renewed significance since the enactment of the No Child Left Behind Act. Therefore, it is essential that educational leaders have a thorough and extensive knowledge of this multi-faceted element of accountability. However, since the inception of NCLB in 2001 the concept of AYP has been plagued by countless misconceptions in the educational

community. Furthermore, erroneous beliefs of educational and governmental officials pertaining to this federal legislation and associated policies could potentially be detrimental to the success of schools or

LEAs. Thus, the Education Trust addressed and clarified several of the most prominent misunderstandings related to AYP. First, schools and districts that fail to make AYP are not financially sanctioned. In reality, states are appropriated federal funding expressly for schools identified as “needing improvement.” Second, the success of students, schools, and LEAs is determined by individual states, not the federal government.

Since states are responsible for establishing academic standards and proficiency percentages, they are also accountable for determining the manner in which achievement is assessed. Third, the label “needing improvement” is not synonymous with “failing.” Schools (or LEAs) failing to make AYP for two consecutive years are labeled as “needing improvement”, but this classification implies the need for assistance in certain areas, not the failure of the entire system. Fourth, schools that succeed in narrowing the achievement gap that exists among students from differing socioeconomic and racial groups are identified as successful. NCLB does not place more stringent standards on public schools, but rather redefine the designation of a “successful school” (Education Trust, 2003).

Christopher Edley, Jr. (2002), J.D., former Co-Director of The Civil Rights Project at Harvard University and Professor at Harvard Law School and current dean at the Boalt Hall School of Law at the University of California, Berkley, stated that the No Child Left Behind Act provides innovative focus on “the academic achievement of the major racial and ethnic groups, socioeconomically-disadvantaged students, English language learners, and children with disabilities” (p. 3). Edley also noted that NCLB utilizes the success of these subgroups to determine “whether or not schools are judged to be successful” (p. 3). Edley has served as economic advisor under presidents Carter and Clinton, respectively and maintains an academic focus on civil rights, with an emphasis on public policy (University of California, Berkley, 2005). This determining factor of success is Adequate Yearly Progress.

Impact of Adequate Yearly Progress on Policy and Education

The AYP component of No Child Left Behind (2001) has significantly impacted the educational community. Though this element is not a recent innovation, its extension to all public schools in the

United States has sparked district and state-wide reform. According to Canales, Frey, Walker, Walker, Weiss, and West (2002), this legislation “places new pressure on states and districts to improve student

achievement and close academic gaps among students of different racial, ethnic, and economic backgrounds” (p. 8). As indicated by the United States Department of Education (2002), the sole function of the calculation of AYP is the emphasis of school-specific areas in need of

improvement for the enhancement of student achievement.

To determine the impact of the implementation requirements (including AYP) associated with the No Child Left Behind Act on each state, Rentner, Chudowsky, Fagan, Gayler, Hamilton, and Kober (2003) conducted telephone interviews with approximately three state educational officials from 48 states (and

the District of Columbia). Typically, the state Title I director, individuals responsible for the administration and establishment of state assessment procedures, and officers from the office of teacher certification were interviewed for approximately two hours during the sessions. Additionally, case studies involving the State of North Carolina, and individual school districts in California, Missouri, and Ohio were conducted to gain specific data related to implementation issues.

These findings indicated that states are generally supportive of the reauthorization of the Elementary and Secondary Education Act (ESEA), also known as NCLB, because of the general goals of increasing the

achievement of students from all subgroups and improving teacher quality. However, Rentner et al. (2003) found that most states have implemented the policies with which they have the most experience first, and have experienced difficulty establishing procedures for the elements of the initiative with which they are less familiar, or that the federal government presented vaguely.

Additionally, Rentner et al. (2003) revealed that states generally rated federal guidance as “good to fair” (p.10) regarding the areas of assessment and teacher quality, but ranked their direction pertaining to practices based upon scientific research notably lower. Likewise, the officials from each participating state rated the federal government’s promptness in the dissemination of regulations and specific guidance minimally.

Central to NCLB is assessment, which provides substantiation of student achievement and identifies schools in need of improvement. Rentner et al. (2003) indicated that states have pinpointed that the most difficult element of NCLB is rooted in the determination of AYP due mostly in part to the government’s postponement of the release of standards and guidelines pertaining to AYP. Additionally, because states are responsible for setting targets for achievement, little motivation exists for states to set high standards.

Rentner et al. (2003) stated that one of the provisions related to accountability included in NCLB requires school districts to provide supplemental tutorial services and choice of alternate public schools to eligible students attending schools identified as needing improvement. However, Renter et al. (2003) revealed that extremely small numbers of parents had utilized these options, which the authors attribute to parents’ lack of information or the states’ delay to implement this policy until the federal government provided them with specific guidelines.

Another central tenet of NCLB involves the improvement of teacher quality through the establishment of stringent professional standards and the alteration of the necessary qualifications for paraprofessionals employed at Title I schools (Rentner et al. 2003). Individual states however, are responsible for establishing certification requirements, including the assessments for determining knowledge and skills of teachers and paraprofessionals.

Finally, the research of Rentner et al. (2003) signified that although numerous programs associated with this federal legislation require schools to implement practices based on scientific research, the guidelines from the federal government involving scientific research has

been relatively vague. Many states professed minimal experience with this topic, and looked to the

government for assistance. Renter et al. also noted that several states voiced concern over the rigorous nature of NCLB's definition of scientific research and fear that valuable programs will be eliminated because they do not conform exactly to the criteria set forth.

Joftus and Maddox-Dolan (2003) indicated that though the focus of NCLB lies chiefly within grades three through eight; American high schools are expected to comply with several stringent requirements. In an era where educational budgets are shrinking, many high school

administrators and district leaders question how governmental expectations will be met without appropriate funding. Though the chief effects of NCLB have been felt at the elementary and middle school levels, this legislation has affected public secondary schools as well.

Specifically, NCLB (2001) requires all high schools to employ "highly-qualified" instructors; exclude alternate graduation methods (certificates, GED) in the calculation of the graduation rate; administer annual assessments of reading, math, and science (by 2007-2008) once during grades ten through twelve; and progressively improve graduation rates and the achievement of all student subgroups. However, Joftus and Maddox-Dolan (2003) asserted that the positive aspects of this federal

initiative are overshadowed by the federal government's failure to provide high schools with appropriate funding to fulfill these requirements. Joftus and Maddox-Dolan also maintained that, "Accountability without resources is no better than resources without accountability" (p.17).

NCLB (2001) requires many elements that affect rural and small schools vastly differently than their larger, urban counterparts. Barton (2003) reported several concerns related to the implementation of this federal initiative identified during interviews with educational leaders

from Montana, Washington, Idaho, Oregon, and Alaska. First, the small populations of these schools make them extremely vulnerable to outliers in student assessment data (Barton, 2003). Also,

rural and small districts with minimal revenue are concerned with the implementation costs of NCLB. These districts tend to be exceptionally vulnerable to fluctuations in enrollment, which could ultimately affect achievement measures. Finally, educational professionals employed in remote, rural districts reported difficulty with recruiting and retaining qualified personnel and with conducting professional development activities. However, Barton noted that the Rural Education Initiative, which specifically addresses the concerns of these districts. The Rural Education Achievement Program (REAP), established through the Rural Education Initiative, provides flexible options for the use of federal funds, in an attempt to assist rural and small schools in the implementation of NCLB requirements.

Sanders (2003) indicated that the NCLB legislation may have inadvertent affects on schools whose populations are comprised primarily of students from low socioeconomic levels. Research revealed that many educators are responding to the pressure induced by the accountability measures included in NCLB by focusing their instructional attentions on those students who are closest to attaining proficiency. In turn, this narrowed focus results in the neglect of students performing at the high and low ends of the achievement spectrum. Sanders further cautioned that though this practice may contribute to immediate increases in proficiency levels, future measurements of AYP may be negatively affected. The author explained that low-performing students will fall further and further behind and the achievement of high-performing students will diminish and regress toward the proficient/nonproficient

cutoff point. Additionally, Sanders (2003) revealed that high-performing students from “at-risk” populations may be affected most negatively as their instructors focus their attention on their lower-performing counterparts.

Although LEAs and state departments of education are generally supportive of NCLB, the pressure of addressing the stringent accountability requirements has impacted these agencies greatly (Renter et al., 2003). Specifically, the AYP component included in this legislation has affected the manner in which all public LEAs in the United States approach education and assessment (Joftus & Maddox-Dolan, 2003). However, it is unclear whether the longitudinal implications of AYP will

affect all LEAs uniformly (Barton, 2003; Sanders 2003).

Measurement of Adequate Yearly Progress

AYP, a chief component of the accountability system accompanying the No Child Left Behind Act, has affected the manner in which teachers and administrators in public schools and LEAs across the United States approach instructional activities as well as assessment practices. In response to the federal demands associated with AYP, the educational community has implemented numerous changes and improvements in an effort to address the achievement gap that exists among students of differing ethnic and socioeconomic groups (Canales, Frey, Walker, Weiss, & West, 2002).

Lissitz and Huynh (2003) asserted that “Of all the provisions of the federal No Child Left Behind (NCLB) legislation, the definition and determination of AYP is perhaps the most challenging” (§ 1). Marion, White, Carlson, Erpehbach, Rabinowitz, and Sheinker (2002) offered the following reasons for the impact of AYP. First, at the time of enactment of NCLB, many states were in the process of establishing more localized versions of AYP, as mandated in IASA of 1994. Therefore, with the

implementation of NCLB, any local or state-specific definitions of AYP were considered null and void. Second, the intricate nature and magnitude of the elements associated with AYP along with the complexity of the calculations were extremely daunting to state educational officials. Third, given the significance of attaining and maintaining AYP, states and LEAs were burdened with the intimidating accountability entailed by AYP. In order to determine whether or not schools and LEAs are meeting

targeted achievement levels, NCLB requires states to provide evidence that districts as well as individual schools are making AYP (Education Trust, 2003). The No Child Left Behind Act (2001) indicates that AYP is a set of state-specific guidelines that are used diagnostically to determine the specific areas in which students of various subgroups or schools need concentrated assistance. Richard and Olson (2004) indicated that since the inception of NCLB, individual schools have been the focus of accountability measures. However, 2004 marked the first year that entire districts could be labeled as “needing improvement.”

Education Trust (2003) defined Adequate Yearly Progress (AYP) as a five step procedure. First, states must establish sets of academic standards in literacy and math for each grade that are indicative of what students at each level should be able to master. Canales et al. (2002) specified that each state has created these statewide academic standards, except for Iowa, which has standards specific to each school district. Additionally, states must determine scores of proficiency for each

grade level which will serve to delineate students performing on grade level from those who are not (Education Trust, 2003).

Second, each state must establish baseline targets for the measurement of AYP using data from the 2001-2002 school year. Since the goal of NCLB is for all students to perform at proficient levels by the year 2014, states must demonstrate consistent progress toward this goal. Specifically, the initial target levels must be the larger of either of the following two percentages: the percent proficient in the lowest performing subgroup or the percent proficient of the school at the 20th percentile of

total student enrollment. Also, as indicated by Education Trust (2003), these targets apply to all students; targets are the same for each subgroup.

Third, states must establish longitudinal targets to demonstrate student improvement in the areas of mathematics and reading. After the baseline measurements for each state have been established, each state must determine incremental progress until the year 2014 and align the targets accordingly. Additionally, the targets “must be the same for all schools serving the same grades and for all subgroups of students within schools” (Education Trust, 2003, p. 3).

Fourth, states must administer yearly assessments in language arts and math to students in grades three through eight and at least once during grades 10 through 12. Under NCLB, schools can attain AYP through “Regular” or “Safe Harbor” criteria. According to Education Trust (2003), “Regular” AYP is attained if all students and student subgroups in the school (or district) “meet or exceed the statewide goal in math and language arts” (p. 4), a minimum of 95% of the school’s total enrollment

are tested, and at least one other academic indicator is met. These additional academic indicators include: proficiency on other local or state measurement instruments, reduction of retention rates, mandated attendance percentages, or increased proportion of students participating in advanced and college-preparatory classes. Additionally, secondary schools must also include information pertaining to the graduation rate of the school. Furthermore, Education Trust specified that NCLB provides alternative standards for schools and districts that are unable to meet the usual AYP requirements, which are referred to as “Safe Harbor” AYP. Specifically, if a school (or district) fails to meet the statewide proficiency targets for all students or subgroups of students, it can still make AYP if “it reduces the percent of students below proficient by 10% from the previous year (and makes progress on the other

academic indicator)” (p. 5). Additionally, although NCLB necessitates an annual determination of AYP status, schools are not required to utilize the data from single years in the calculation of AYP targets. Still another provision related to alternate AYP attainment included in NCLB states that schools are only accountable for the performances of students who have been enrolled at least one full academic year. In addition, schools are only required to report the scores of student subgroups that are large enough to be “statistically valid and reliable” (p.5).

Fifth, NCLB establishes corrective measures for schools (and districts) that fail to make either “Regular” or “Safe Harbor” AYP for two (and up to seven) successive years. These corrective measures include: parental option to transfer students to a higher performing school within the same district (with priority given to low socioeconomic students), identification of issues for improvement,

provision of supplemental tutoring services, and the possibility of staff replacement, total school restructuring, and extension of the school day (Education Trust, 2003).

Hall, Wiener, and Carey (2003) indicated that the concept of Adequate Yearly Progress requires schools to address the needs of all students and disseminate accurate reports of the progress of several

student subgroups. Additionally, the authors assert that “. . . it is the AYP process that forms the heart of the accountability system” (p. 2) of NCLB. Though only Title I schools were previously required to show

evidence of Adequate Yearly Progress, the application of AYP to all public schools has completely altered the manner in which schools, districts, and states view success.

Hall et al. (2003) asserted that the conditions for attaining AYP have been instrumental in identifying schools that are failing to narrow the achievement gap that exists among ethnic and socioeconomic groups. First, AYP information is influential in identifying schools that have

previously been deemed “successful” according to state standards, but have substantial achievement gaps. Many states formerly based their achievement measures on school wide averages, which did not take ethnic subgroups into account. However, attainment of AYP is based upon the improvement of these groups of students; according to target measures of progress established by the state.

Essentially, AYP has assisted states in the targeting of schools which must improve the manner in which they address the needs of traditionally disadvantaged students.

Additionally, Hall et al. (2003) maintained that the information gained from the establishment of more rigorous accountability standards has encouraged positive changes in many schools. However, this policy also acknowledges schools that successfully address the needs of all student subgroups, including those with learning disabilities and limited English proficiency; both of which have been basically ignored by state accountability systems.

Finally, Hall et al. (2003) related several aspects influencing the attainment of AYP. These included: (a) the size of the achievement gap, (b) the distribution of low-performing students, (c) participation rates, (d) the minimum “N” size of subgroups identified for reporting practices, (e) the number of grades tested, and (f) the utilization of tests of statistical significance and confidence intervals.

However, concerns about the current methods of AYP evaluation have been expressed. Lee and Coladarci (2002) asserted that the current manner in which student achievement is assessed as a result of the No Child Left Behind Act encourages incorrect inferences as to the quality of instruction or “success” of a particular school. Lee and Coladarci also declared that the most common method of measuring academic growth involves the comparison of successive groups (scores of 6th graders in

2002 to the scores of 6th graders in 2003). Two apparent weaknesses associated with this approach involve “initial group weaknesses and mobility” (p. 3). Though AYP formulas included in NCLB (2001) do not account for preliminary group differences, provisions are in place to regulate for student mobility. Additionally, Lee and Coladarci (2002) stated that AYP status is influenced by the phenomena known as

regression to the mean, in which higher-performing schools tend to experience less academic growth

than lower-performing schools. Frankel and Wallen (2003) indicated that the regression threat involves “the possibility that the results are due to a tendency for groups, selected on the basis of extreme scores, to regress toward a more average score on subsequent measurements, regardless of the experimental treatment” (p.186). Lee and Coladarci (2002) recommended that factors controlling for regression to the mean be added to the current AYP formula.

Lissitz and Huynh (2003) also expressed concern over certain measurement techniques associated with the calculation of AYP. Because test scores are the primary indicator of school success and progress, the authors assert that it is imperative that the various assessment instruments utilized over the years are equitable. Lissitz and Huynh suggested scaling (applying nonlinear or linear transformations to) the scores from the assessment instruments to obtain standard scores. This process simplifies the communication and interpretation processes for parents and the general public and allows for equitable comparisons of scores on multiple instruments.

Additionally, the research of Kane, Staiger, and Geppert (2001) focused on three major areas of concern involving AYP. These concerns are based on the inconsistencies that exist between state accountability systems and AYP requirements of NCLB. First, Kane et al. contended that the guidelines for AYP calculation fail to account for “the natural volatility in test scores, by requiring increases in a school’s test performance each year” (p. 1). Theoretically, schools could be penalized for fluctuations in performance attributable to the composition and size of the sample of students tested per year per grade. Second, Kane et al. reviewed the test scores of every school in Texas and North Carolina

(which were selected for the notable increase in student performance during the years from 1994 to 1999) and discovered that practically every school in each state would have failed to make adequate yearly progress at least once during the five year span under consideration. Though schools are not penalized for failing to make AYP for one year, the authors assert that 96% of the schools in both states would have faced corrective action and 75% would be forced to undergo restructuring during the five year time period. Kane et al. asserted that because the majority of the schools would be required to submit plans for school improvement, it is likely that individual states would not have the monetary resources to evaluate or fund these plans appropriately. Essentially, the accuracy of the AYP formula and feasibility of the implementation of the corrective actions is in question. Finally, Kane et al. maintained that since AYP is based upon the improved performance of racial/ethnic and socioeconomic subgroups schools whose enrollment is comprised of more than one racial/ethnic subgroup are at an immediate

disadvantage due to natural statistical instability in the subgroup samples.

To overcome these potentially detrimental inconsistencies in state and federal accountability requirements, the authors recommended that each school’s performance be assessed using a “value-added”, which measures students’ performance longitudinally. The benefit of a value24

added system is that schools whose enrollment consists primarily of underperforming students are placed “on a level playing field” (Kane et al., 2001, p. 10) with schools whose student body performs at a higher level. Additionally, Kane et al. advocated the use of performance data from multiple years in order to obtain a more accurate view of student progress. This practice would lessen the effect of

natural variations in student performance from year to year. Finally, Kane et al. opposed the complacent acceptance of the achievement gaps that exist in the performance of students of differing racial and ethnic groups and promoted setting high standards of achievement for all students.

Snow-Renner and Torrence (2002) affirmed that states have three options pertaining to the manner in which data associated with AYP are measured and reported in accordance with NCLB. States can evaluate the performances of students in the same grade over time (cohort comparisons), the same general cohort of students longitudinally or individually over time. The authors recommended the latter of these options (individual longitudinal student comparisons) to obtain the most precise information pertaining to the actual progress of students and therefore the success of the school.

According to Snow-Renner and Torrence (2002), individual longitudinal student data can provide educators and legislators with information pertinent to: student growth by subgroup, program effectiveness by age, correlations between early and subsequent achievement, as well as subgroup patterns in mobility, retention, and completion. As of the 2002, 17 states had established statewide

longitudinal student databases (Arkansas, Connecticut, Delaware, Florida, Louisiana, Maryland, Massachusetts, Minnesota, Tennessee, Texas, Georgia, Hawaii, Michigan, Mississippi, Oregon, South Dakota, and Vermont). Additionally, Snow-Renner and Torrence suggested that the following aspects are necessary for the establishment and maintenance of effective longitudinal student data bases. First, states should obtain individual student data biannually (in the fall and in the spring) in order to provide more accurate data in reference to dropout rates, enrollment in English as a Second Language Programs, and general information related to student demographics as required by NCLB. Second, states should utilize a method of tracking student mobility within the state, in order to control for sampling mortality.

Third, individual data from the spring assessments from all students in grades in which assessments are administered should be available to policymakers so that the process by which any student data is excluded from AYP calculation of AYP is transparent. Fourth, states should also obtain information relevant to “high school course completion and participation and success on SAT, ACT, and Advanced Placement Exams” (p. 8). Fifth, the progress of students enrolling in post-secondary academic courses should be tracked and evaluated in reference to earlier achievement. Finally, states should utilize multiple assessment measures to provide triangulation and substantiation of performance measures.

Though Snow-Renner and Torrence asserted that monetary and confidentiality issues should be carefully considered and addressed, the authors suggested that the establishment of a statewide longitudinal database provides the most thorough and accurate data related to individual student achievement and AYP.

Since NCLB places the preponderance of the responsibility of AYP determination on the states, it is critical that the accountability systems for these entities are valid and reliable. Specifically, the No Child Left Behind Act (2001) indicated that

- The accountability systems and assessments used by states should be “valid and reliable and ...consistent with relevant, nationally recognized professional and technical standards”
- State-specific definitions of AYP should be “statistically valid and

reliable”

- Interpretation of the students’ results from each disaggregated subgroup should not be undertaken if “the number of students in a category is insufficient to yield statistically reliable information...” [Section 1111(b) (1) (ii)].

According to Marion et al. (2002), the phrase “valid and reliable” or “reliable and valid” is contained in NCLB 59 times. It is apparent that great importance is placed on the integrity of these measures. Though numerous definitions of these two terms commonly associated with the

viability of research exist, these terms will be defined according to Frankel and Wallen’s (2003) explanations. First, reliability is identified as “the degree to which scores obtained with an instrument are consistent measures of whatever the instrument measures” (p. 119). However, validity can be described as “the degree to which correct inferences can be made based on results from an instrument; [it] depends not only on the instrument itself, but also on the instrumentation process and the characteristics of the group studied” (p. G-9).

However, states have evidenced concern over the formation of different valid and reliable accountability systems based on NCLB. Marion et al. (2002) indicated that this shift from a compensatory model to a conjunctive model of standards assessment has necessitated states to change their focus and emphasis of their accountability systems. The accountability measures outlined in IASA required states to base their accountability systems on compensatory models, which “allow higher

scores on some measures to offset lower scores on other measures” (p. 15). Additionally, though the performance of all subgroups was publicly reported, AYP attainment was based on the performance of all students.

Conversely, No Child Left Behind (2001) mandates that state accountability systems are built around conjunctive models, an approach in which “scores on all measures used must be above the criterion point (cut score) for the student to have met the overall standard” (p.15). Essentially, each student subgroup must evidence specified proficiency targets or levels. Marion et al. (2002) also maintained that conjunctive models usually evidence the lowest passing rates of the two approaches.

Marion et al. (2002) offered several suggestions for the establishment of valid and reliable accountability state systems. To begin, the authors specified three phases associated with the definition of

a state accountability system: (a) pre-intervention (identification), (b) intervention, and (c) post-intervention (evaluation). Essentially, information gained in the first phase leads to action in the second phase, the effects of which are measured in the third phase. Additionally, the authors proposed that there are six key components of state educational accountability systems. First, Marion et al. recommended that purposes and goals be established. This step entails the identification of the overall

goals of the system, theoretical bases for the goals, and the population that is affected by the goals, interventions and evaluations. Second, states must select indicators representative of state-specific academic standards and appropriate assessment instruments, and collect several

types of data. Third, each state must establish accurate and impartial procedures for data collection, scoring and analyses. Fourth, states must interpret the data and make decisions in terms of interventions, rewards, and sanctions based on subgroup performance. Fifth, these decisions must be applied consistently and in a timely manner. Finally, each state should participate in evaluative practices to determine the effects of the implementation.

Purpose of the Study

The purpose of this research is to determine if the variables included in the Mississippi Report Card utilized for the calculation of AYP can be used to predict with accuracy greater than that which can be attributed to chance, whether or not Mississippi LEAs will attain adequate yearly progress in reading and math using the logistic regression technique.

Justification of the Study

This study is related to previous research in that it seeks to add to the existing general knowledge base associated with adequate yearly progress (Hall et al., 2003). However, research related to this topic has generally been conducted for the purpose of investigating the implications, implementation issues, and measurement techniques using Multiple Linear Regression (Mississippi Department of Education, 2004).

Additionally, because this initiative was implemented fairly recently, the research pertaining to the element of AYP is far from complete. No empirical studies have been conducted to determine whether reading and/or math AYP could be predicted for LEAs using metric variables

related to the characteristics of school districts used in the calculation of AYP to predict a dichotomous variable (not attaining AYP, attaining AYP) using the logistic regression technique. The results of this research could benefit Mississippi LEAs by providing a proactive measure for the prediction of AYP in reading and math. School districts could utilize this preliminary information as a basis for the establishment of remedial academic programs, intensive professional development workshops, or

the adoption of appropriate comprehensive school reform models.

Limitations

The sample for the study is limited to school districts in the state of Mississippi, and does not include school districts from any other region in the United States. Therefore, the results of this study should not be generalized to other states. Because the administration of an instrument to human subjects

does not occur during the course of the research, several threats to internal validity are avoided. However, the possibility of some degree of threat to the study's internal validity is introduced through the characteristics of the subjects (Mississippi School Districts). According to the United States Department of Education (2004), "The states with the largest percentage of minority students are California, Hawaii, Louisiana, Mississippi, New Mexico, and Texas" (p.7). Thus, the results of the study

would not be generalizable to states with differing proportions of students.

Research Design

Intact datasets associated with AYP status of each LEA in Mississippi (in the form of the Mississippi Statewide Accountability System: 2004 Results) were obtained from the Mississippi Department of Education Office of Statistics and Research. Additionally, variables pertaining to each school district in the state included in the Mississippi Report Card 2003-2004 and necessary for the calculation of AYP were utilized for this study (Mississippi Department of Education, 2005). The data were analyzed using the Logistic Regression technique using the following predictor variables: (a) % of students from each gender and racial subgroup scoring at or above the “proficient” level for grades 2-8 in reading and math, (b) Attendance as a % Enrollment, and (d) Graduation rate. A second logistic regression analysis was conducted using the additional predictor variable (percentage of teachers with one year educator licenses) to ascertain whether or not the inclusion of this variable notably adds to the explanatory power of the model.

Characteristics of Mississippi School Districts

According to the Mississippi Department of Education (2003), there are 152 public local education agencies in the State of Mississippi. Three of these districts are considered agricultural secondary institutions, 68 districts are based on county divisions, and 81 are considered separate

43 school districts (within counties but disconnected from the county school districts). Additionally, there are 440 elementary schools (K-8), 130 secondary schools (7-12), 306 K-12 combined schools, 62 alternative schools, 88 vocational schools, and 21 special needs schools, for a total of 1,047 public schools in the state of Mississippi.

The Mississippi Department of Education (2003) further indicates that as of 2003, the total student enrollment for the state was 491,622. Additionally, a total of 32,925 teachers are employed by the state of Mississippi, earning estimated average salaries of \$35,135. Approximately 53% of teachers employed by Mississippi LEAs have a Bachelor’s degree, 40.83% have Master’s degrees, 3.78% have Specialist degrees, and 0.79% have Doctoral degrees. Additionally, less than 1% (0.84%) of Mississippi educators are considered substitute teachers or have not earned a teaching certificate.

Mississippi public schools also receive the bulk of their annual funding from the state (54.3%), a substantial portion from local appropriations (30.2%), and the remaining 15.5% is provided by the

federal government. The average daily expenditure (per pupil) in average daily attendance is \$6,402 (below the Southeast ADA of \$7,258 and the National ADA of \$8,383) (Mississippi Department of Education, 2003).

Finally, the Mississippi Department of Education (2003) indicates that in 2003, 25,588 students completed high school with 23,703 receiving diplomas, 1,381 earning certificates, 432 completing GED

requirements, and 72 securing occupational diplomas.

Procedures

The datasets were analyzed using SPSS 13.0. The research question addressed was: Can variables

included in the Mississippi Report Card (2003-2004) required for the calculation of Adequate Yearly Progress be used to successfully predict Adequate Yearly Progress using the Logistic Regression technique with an accuracy greater than that which can be attributed to chance? To address this research question, the researcher selected variables for inclusion in the initial logistic regression analyses based on guidelines for the calculation of AYP included in the No Child Left Behind Act (2001) and Mississippi Statewide Accountability System, a publication of the Mississippi Department of Education (2004). The results of this analysis indicated whether or not it is possible to predict, with accuracy greater than that which can be attributed to chance, if Mississippi LEAs will meet AYP reading and math guidelines using the previously-mentioned predictor variables. For purposes of the first component of the data analysis, two separate logistic regression analyses were conducted in order to predict each LEA's attainment of AYP in reading and AYP in math. The independent (predictor) variables that were utilized in the first analysis are as follows: percent students from each gender and racial subgroup scoring at or above the "proficient" level for grades 2-8 in reading and math, attendance as a percent of enrollment, graduation rate. Each of the independent variables is classified as a metric variable, meaning that the data associated with each is recorded in continuous, numeric form. The dependent variables in the first pair of analyses are: AYP attainment-reading and AYP attainment-math.

RESULTS

Descriptive Statistics of Dependent Variables

The dependent variables of interest in this study were the statewide LEA measurements of AYP attainment in reading and AYP math. Of the 149 Mississippi LEAs, 59.1% did not attain AYP in reading.

Additionally, 48.3% of Mississippi LEAs did not attain AYP in math. These statistics reveal the critical need for a predictive diagnostic model for AYP in reading and math so that proactive measures such as

remedial academic programs, intensive professional development workshops, or the adoption of appropriate comprehensive school reform models can be implemented to increase the likelihood that LEAs will meet federal standards.

Descriptive Statistics of Independent Variables

The reporting process outlined in the accountability requirements associated with NCLB requires that the public release of school wide and district wide proficiency percentages is limited to only those ethnic

subgroups with samples that are (a) large enough for accurate statistical comparison to other subgroups and (b) large enough so that the proficiency levels of individual students cannot be identified. In

Mississippi, the only subgroup proficiency percentages that were reported in the majority of LEAs were those of African-American (Black) and Caucasian (White) students. Thus, these were the subgroups included for statistical analysis. Additionally, there were minimal occurrences when the proficiency

percentages of students from these two subgroups could not be reported due to the low number enrolled or homogeneity of the student population. To address this issue, unreported scores were replaced with the series mean, one technique suggested by Hair, Anderson, Tatham, and Black (1998).

The following variables were used to predict AYP in reading and math for the 149 Mississippi LEAs by using the logistic regression technique: (a) attendance as a percentage of enrollment, (b)

graduation rate, (c) percentage of teachers with one-year educator licenses, and the percentages of Black and White students scoring at or above the proficient level on the Mississippi Curriculum Test in grades 2-8. An inspection of the minimum and maximum scores for each variable substantiates the extreme variability of academic success, proportion of teachers with one-year educator licenses, and the percentage of students completing state mandated requirements for secondary education that

exist within Mississippi LEAs. For example, the graduation rate for Mississippi LEAs ranges from 53.4% to 100% and the percentage of teachers with one-year educator licenses ranges from 0% to 29%.

However, the widest range of variability is found within the variables denoting the proficiency levels for students in the two ethnic subgroups in each grade. For instance, the average percentage of Black students scoring at the “proficient” level in reading in second grade is 80.8, while the average percentage of White students scoring at the proficient level for in second grade is 91.4. Additionally, the average percentage of Black students scoring at the “proficient” level in reading in eighth grade is 42.9, while the average percentage of White students scoring at the proficient level for in eighth grade is 77.7.

Results of the Logistic Regression Analyses

The dataset utilized for purposes of this research was appropriate for use with the logistic regression technique, according to the guidelines set forth by Hair, et al. (1998). First, the dependent is a dichotomous, categorical variable, and the independent variables are metric. Additionally, the ratio of the sample exceeds the minimum suggested ratio of 5 observations to every independent variable. The ratio for this dataset is approximately 6.5 observations to each independent variable. Finally, the original sample contained a sufficient number of cases for obtaining an analysis and a holdout sample for the purpose of model validation. Prior to conducting the logistic regression analyses, the data were randomly divided into the original sample (50% of the cases) and the holdout sample (the remaining 50% of the cases) using the “Split File” subcommand available through SPSS 13.0.

The data used for this study conforms to all assumptions associated with the logistic regression technique: (a) independence of observations (b) population with dependent (dichotomous) variable scores representing both categories and (c) that the linear function of the independent variables included in the model represents the logodds (probability) of an event, represented by the dependent variable (Morse, 2005). First, independence of observations is assumed because the scores on each of the variables represent a measurement of a singular LEA. Second, scores on the dependent variables were sufficiently diverse, as represented by the frequencies reported previously (59.1% did not attain AYP in reading and 48.3% did not attain AYP in math). Finally, the logistic regression

technique is constructed so that the independent variables included in the model represent the log odds (probability) of an event (Hair, et al., 1998).

To address the research question, two separate logistic regression analyses were applied to the original sample (Hair, et al., 1998) to determine the predictive power of variables presently used to calculate AYP in reading and math. The findings of these analyses indicate that AYP in reading and math can be predicted with an accuracy greater than chance using the previously mentioned variables used to calculate AYP. Using the “Enter” logistic regression method, in which all variables are entered into the model simultaneously (Hair, et al., 1998), the variables which exhibited the most influence over whether LEAs will attain AYP in reading are: attendance per enrollment and reading scores

of students in the White ethnic subgroup in grades 3 and 5 respectively. For purposes of this study, the log odds of the regression coefficients (represented by exp B in Table 2) will be interpreted in order

to provide a practical interpretation of the regression coefficients. The variable attendance per enrollment has an odds ratio of 1.588. This indicates that with all other variables held constant (statistically controlled for), for every unit change in this variable the odds that a LEA will attain AYP increase by approximately 59%. In simple terms, when variables are held constant in logistic regression, statistical control is implemented by controlling for differences in the other variables in the model. In this case, holding all other variables constant (controlling for differences) including graduation rate and the percentages of students from both ethnic subgroups in each grade, the likelihood that a LEA will

attain AYP increases by 59%. Additionally, the variable Reading_3_White (which represents the reading scores of students in grade 3 in the white ethnic subgroup) has an odds ratio of 1.375, which indicates that with all other variables held constant, for every unit change in this variable the odds that a LEA will attain AYP increase by approximately 38%. Finally, the variable Reading_5_White (which represents the reading scores of students in grade 5 in the white ethnic subgroup) has an odds ratio of 1.134, which indicates that with all other variables held constant, for every unit change in this variable the odds that a LEA will attain AYP increase by approximately 14%. However, as evidenced by the Wald statistic, which “test(s) the hypothesis that a coefficient is different from zero (zero means that the odds ratio does not change and the probability is not affected)” (Hair et al., 1998, p. 281), the only coefficient of the variables most impacting the dependent variable that is statistically significant from zero at an alpha level of .05, therefore changing the probability of the dependent variable is Reading_3_White

(Wald $\chi^2 = 4.494$, $p=.036$).

Logistic regression coefficients (logits) “coefficients that act as the weighting factor for the

independent variables in relation to their discriminatory power” (Hair, et al., 1998, p. 242). However, these coefficients are not particularly meaningful independently, though the greater the logistic regression coefficient, the more powerful the variable. Furthermore, positive coefficients increase the probability of the dependent variable (AYPReading) and negative coefficients decrease the probability of the dependent variable. For example, the logistic coefficient of the variable Attendance as a percentage of enrollment is $\beta = .462$, and the logistic coefficient for Graduation rate is $\beta = .030$. These coefficients directly correspond to the odds ratios, and therefore are direct influences on the odds of

AYP-Reading attainment. For this reason, the odds ratio (which will be discussed subsequently) of each coefficient (Exp B) should be interpreted for practical purposes. The standard error of each coefficient (S.E.) is “the expected variation of the estimated coefficients (both constant and regression coefficients)” (Hair, et al., 1998, p.182). Essentially, this term estimates the degree to which the coefficients are representative of the population (if a sample is used). However, because this study involved all Mississippi LEAs, this statistics is not useful because the “sample” is perfectly representative of the population, because the “sample” is, in fact, the population (Hair, et al., 1998). The Wald Statistic (Wald) as well as the degrees of freedom (df) and the associated significance levels (Sig.) is a chi-square test that evaluates “that the coefficient is different from zero (zero means that the odds ratio does not change and the probability is not affected)” (Hair, et al., 1998, p. 281). As stated previously, of the variables most impacting the likelihood of attaining AYP-Reading, the coefficient associated with Reading_3_White is the only coefficient that is statistically significant from zero at an alpha level of .05. This indicated that this variable significantly affects the probability of the AYP attainment. Finally, the odds ratios of the logistic regression coefficients (Exp B), is “a comparison of the probability of an event to the probability of the event not happening” (Hair, et al, 1998, p.242). These terms are particularly beneficial for practical interpretation of the logistic coefficients in that they express a percent increase (or decrease) in odds (likelihood). For example, the odds ratio of the variable Attendance as a percentage of enrollment is 1.588, which indicates that as attendance in a LEA increases, the odds of AYP – Reading attainment increase by about 59%, controlling for other variables.

An omnibus test of the overall model coefficients was not statistically significant [$\chi^2 = (16, 148) = 18.728, p = .283$], which indicates that the independent variables included in the model did not

cooperatively differentiate LEAs that would attain AYP and those that would not. However, the classification table for the model revealed that 73.6 % of the LEAs were categorized correctly. Additionally, according to the Cox & Snell R Square (which provides a measurement of overall model fit); the overall model explains about 23% of the variation in the dependent variable.

Finally, Hair, et al. (1998) recommend the calculation of Press’s Q Statistic, which “compares the number of correct classifications with the total sample size and the number of groups” (p. 270). The calculated value is then compared to the chi-square critical value for 1 degree of freedom to determine statistical significance. The Press’s Q statistic associated with this model is 12.81, which is statistically significant at an alpha level of .01 (critical value is 6.63). This indicates that the predictions associated with this model are significantly greater than chance. Figure 1 presents the calculations for the Press’s Q statistic associated with this model.

$$\text{Press's Q} = [N - (nK)]^2 = [75 - (53 * 2)]^2 = 12.81$$

$$N(K-1) \quad 75(2-1)$$

Figure 1. Press’s Q Statistic for Research Question 1 (Model 1).

For purposes of model validation, a logistic regression analysis using the same variables was applied to the holdout sample. In comparison to the initial model, the logistic regression model using the holdout sample had a classification accuracy of 69.8%, similar to that of the original sample (73.6%). Additionally, the variables that exhibited the most influence over whether LEAs attained AYP in reading

are the reading scores of students in grades 6 and 4 from the white ethnic subgroup and attendance per enrollment, respectively. These results are similar to those of the original sample, in which attendance per enrollment and reading scores of students in the white ethnic subgroup in grades 3 and 5 contributed most to the probability of whether an LEA would attain AYP in reading.

A comparison of the results of the regression analyses of the original and the holdout samples reveal a number of similarities in the area of variable contributions. In the models derived for both samples, the three variables with the most influence over whether a district will attain AYP are attendance as a percentage of enrollment, and reading scores of white students (grades 3 and 5 in the original sample and grades 4 and 6 in the holdout sample). It should be noted, however, that the magnitude of the contributions of the most influential variables varies from model to model.

To determine the impact of each variable upon the model, a second logistic regression analysis was conducted. Once more the "Enter" method, in which all independent variables are entered into the model simultaneously, was utilized to determine the relative contribution of each variable to the model. The results of this analysis indicated that the variables exerting the most influence on the dependent variable are: attendance per enrollment and the math scores of grades 8 and 5 in the

white ethnic subgroup, respectively.

For purposes of practical interpretation, the log odds of the regression coefficients (represented by exp B in Table 5) will be explained. Similar to the results of the first regression model, the variable

attendance as a percentage of enrollment has an odds ratio of 2.036. This indicates that with all other variables held constant (controlling for differences), for every unit change in this variable the odds that a LEA's will attain AYP increase by approximately 104%. Additionally, the variable Math_8_White (which represents the math scores of students in the white ethnic subgroup) has an odds ratio of 1.216, which denotes that with all other variables held constant, for every unit change in this variable the odds that a LEA's will attain AYP increase by approximately 22%. Finally, the variable Math_5_White (which represents the math scores of students in the white ethnic subgroup) has an odds ratio of 1.101. This signifies that with all other variables held constant, for every unit change in this variable the odds that a LEA's will attain AYP increase by approximately 10%. However, of these variables impacting the dependent variable most considerably, only one is deemed statistically significant at an alpha level of .05 according to the Wald statistic. The variable Math_8_White (Wald $\chi^2 = 5.799$, $p = .016$) changes the probability of the dependent variable at a statistically significant level.

An omnibus test of the overall model coefficients was statistically significant [$\chi^2 = (16,148) = 35.001$, $p = .004$], which signifies that the independent variables included in the model collectively differentiate LEAs that would attain AYP in math and those that would not. Furthermore, the classification table for the model indicated that 77.3 % of the LEAs were correctly classified. Additionally, the Cox & Snell R² Square statistic (which provides a measurement of overall model fit) indicates that approximately 39% of the variation in the dependent variable is explained by the independent variables included in the model.

Finally, the Press Q statistic (which denotes whether the classification accuracy of the model is better than chance) associated with this model is 22.41, which is statistically significant at an alpha

level of .01 (critical value 6.63). This indicates that the predictions associated with this model are significantly greater than chance. In order to validate the model, a second logistic regression analysis was conducted using identical independent variables with the holdout sample. In comparison to the initial model, the classification accuracy of the validation model was 77.9%, which was similar to that of the original sample (77.3). However, the variables that contributed most considerably to changes in the dependent variable (attainment of AYP in math) were attendance per enrollment, and the math scores of students from both the white and black ethnic subgroups (respectively) in grade 3. These results share some similarities with those of the original sample in that the variable attendance per enrollment and the math scores of students in the white ethnic subgroup exerted the most influence over changes in the dependent variable. However, in a trend observed only in this sample (holdout), the scores of students in the black ethnic subgroup in grade 3 contribute the next highest influence to changes in the dependent variable. Possible explanations for this trend are evidenced by the descriptive statistics of the independent variables (Table 3). A visual inspection of the mean scores of each ethnic subgroup reveals that the mean math scores for students in the black subgroup are highest in grade 3. This could explain the greater influence exerted by this variable in the validation model.

When evaluating the results of the regression analyses of the original and the holdout samples some similarities are apparent. In the models derived for both samples, the variable influencing AYP- Math attainment most is attendance as a percentage of enrollment. Additionally, the second most influential contributors to AYP attainment in math are the math scores of white students in grade 5 (original sample) and grade 3 (holdout sample). However, in reference to the third most powerful variable the models diverge. In the model associated with the original sample, the math scores of White students in 2nd grade rank third in terms of influence, whereas in the model derived for the holdout

sample, the math scores of Black students in 3rd grade are the third most influential.

Summary of Findings

This research involved the investigation of the prediction of AYP in reading and math for Mississippi LEAs, using the variables presently utilized for the calculation of AYP. The findings associated with this question suggested that the variables influencing whether a LEA will attain AYP in reading or math are: attendance per enrollment and the reading or math scores in grades 3 and 5 (reading) and grades 8 and 5 (math) of students in the white ethnic subgroup. Additionally, the models generated by the logistic regression analyses successfully classified the cases with an accuracy that is statistically greater to that which can be attributed to chance.

Interpretations and Implications

To address the first variable attendance as a percentage of enrollment, the interpretation of the impact of the attendance rate on the attainment of AYP is simplistic: the higher the number of students in attendance, the more likely a LEA is to attain AYP. This is a sensible inference in that students must be in attendance in order to learn. Additionally, it can be inferred that the test scores from each grade and subgroup are related to attendance. The implication of this finding, which signified the critical role of student attendance in meeting state and federal accountability requirements, is that educational and

governmental leaders should examine the odds ratios (which signify the changes in the likelihood that a district will attain AYP) for this variable for each of the original derived models and determine the

appropriateness of the current AYP calculations given the relevance of this variable determined during this study.

To address the second set of variables, the reading and math scores of the students from the White ethnic subgroup, the findings implied that LEAs with higher compositions of white students could have an advantage in the attainment of AYP in reading and math than LEAs composed primarily of minority students.

The findings of this research could be utilized to assist educators, administrators, and educational leaders in the prediction of Mississippi LEAs attainment of AYP in reading and math. As evidenced by the results of the logistic regression analyses, the most powerful predictors of AYP are attendance per enrollment, and the reading and math scores of students from the White ethnic subgroup. The reading and math scores from the White ethnic subgroup exhibited more influence in the prediction of AYP in reading and math because the mean scores of this subgroup surpassed the scores of students from the Black ethnic subgroup in each grade. These findings mirror the research of Hall, et al, (2003), which indicated that the size of the achievement gap among students of differing ethnic and socioeconomic groups is one of several factors influencing AYP attainment. Specifically, the research of Hall, et al. , (2003) indicates that states with more pronounced inconsistencies in student achievement by ethnic subgroup “will likely identify more schools as not making AYP than states with smaller achievement gaps” (p.10). This is consistent with the findings of this research as evidenced through the descriptive statistics of the dependent variables, AYP in reading and math. As presented in Tables 1 and 2, 59.1% of LEAs did not attain AYP in reading and 48.3% did not attain AYP in math.

Given this, if educational leaders at the state level (for example)

wanted to predict if Mississippi LEAs would attain AYP in reading and math, they should examine the attendance rate as well as the scores of the students. Thus, after the LEAs predicted not to attain AYP in reading or math were identified, the educational leaders would most likely recommend the necessary changes at the district level (from minor curricular, instructional, or administrative modifications to substantial methods of reform at the district and school levels. First, since attendance was identified as a critical factor in the attainment of AYP in both reading and math, the educational leaders would probably recommend that the districts implement programs or policies to increase student attendance while stressing the essentiality of this factor to parents, teachers, and administrators. Second, as indicated by the findings of the study, student performance on the MCT can greatly impact a district's attainment of AYP in reading and math. To improve student achievement for both ethnic subgroups (as evidenced by scores on the Mississippi Curriculum Test) and thus the likelihood of AYP attainment, educational leaders would most likely suggest remediation or a combination of remediation and research-based instructional methods, as recommended by NCLB (2001). Additionally, educational leaders might possibly caution teachers and administrators (especially in LEAs comprised chiefly of low-performing students) to incorporate techniques to guard against the tendency of teachers to focus upon students who are closest to attaining proficiency, and basically ignore the needs of the high-performing or extremely low-performing students as evidence by the research of Sanders (2003).

Conclusion

In summary, this study demonstrated that using the variables utilized for the calculation of AYP, a predictive model can be successfully utilized to classify Mississippi LEAs that will and will not attain AYP in reading and math with an accuracy greater than that which can be attributed to chance.

Using multiple logistic regression analyses, the results of this study indicated that overall, the predictor variables included in the calculation of AYP can be utilized to predict whether a district will attain AYP at an accuracy greater than that which can be attributed to chance. The substantial impact of the variable representing attendance is expected, given the logical inference that student attendance positively influences achievement. Additionally, because attendance as a percentage of enrollment was the most influential variable in each of the models derived during the course of this research,

it is reasonable that this variable is included in the calculation of AYP. Therefore, the findings of this study reinforce NCLB's recommendations for the variables to be included for the calculation of AYP.

The next most influential variables were the scores of students in the White ethnic subgroup in grades 3 and 5 (reading) and grades 8 and 5 (math). These scores were more powerful predictors of AYP attainment because the mean scores of this subgroup surpassed the scores of students from the Black ethnic subgroup in each grade. Therefore, these findings substantiate the foundation upon which NCLB is based: inconsistencies in achievement exist among the ethnic subgroups and must be addressed. Though the scope of this study did not include the basis for the achievement gap upon which NCLB is founded, it is apparent based on the findings of this study that this gap must be attended to.

Recommendations

During the course of this study, several areas necessitating further research were identified. First, an inspection of the descriptive statistics associated with the independent variables utilized in this study revealed an achievement gap between groups of students in differing ethnic subgroups in each grade (2-8). The factors contributing to these discrepancies in achievement were not identified during this research, but it is recommended that future research be conducted to determine the basis for this gap. The factors affecting the achievement of these students must be identified and explained before this gap can be effectively addressed by local, state, and federal educational systems.

Additionally, the descriptive statistics indicated that an elevated amount of within-group reading and math score variation exists in the black subgroup, in comparison to the within-group variation of the white ethnic subgroup. Future research should seek to explain this within-group variation. Moreover, the descriptive statistics revealed that the reading scores of students from both ethnic subgroups were highest in 4th grade students and the math scores of students in both ethnic subgroups were highest in third grade. Future research should be conducted to determine if this trend is common to other states with similar proportions of students as well as the factors contributing to the achievement of students in both groups. Additional studies should be conducted to provide explanation for these group achievement plateaus occur in these grades. Finally, the models derived for the prediction of AYP should be applied to other states with similar proportions of students to determine degree to which this predictive model can be generalized. Given that the state of Mississippi is one of five states with the highest population of minority students (United States Department of Education, 2004), the accuracy of the logistic regression models resulting from this research could be affected. Therefore based on the findings of this research, it is recommended that Mississippi LEAs devise and implement measures to

increase student attendance and enhance the reading and math scores of students in all subgroups in order for LEAs to increase the likelihood of AYP attainment in reading and math.

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