CORRELATION BETWEEN TEACHER TURNOVER RATES IN THE STATE OF ALASKA AND STANDARDIZED TEST SCORES IN THE AREA OF MATHEMATICS ON THE STANDARDS BASED ASSESSMENT/HIGH SCHOOL QUALIFYING EXAM

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A

DISSERTATION

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By

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ABSTRACT

This study utilized bivariate correlations, partial correlations, multivariate analysis including Hotelling-T, and observed power to investigate the possible correlations and connections of teacher turnover in Alaska's public school system to performance on the standards-based assessment of the Alaska High School Qualifying Exam (HSQE). The study focused on the results in the content area of mathematics involving the 10^{th} grade standards-based assessment (SBA).

Results from the study indicate two primary correlations exist as applied to the proficiency levels on the mathematics portion of the 10^{th} grade mathematics SBA, teacher turnover and percent Alaska Native of school population.

The results indicate that teacher turnover is statistically significant with an inverse relationship in relation to standards-based test scores, and the students most likely being impacted by teacher turnover are located in Alaska school districts that have large Alaska Native student populations.

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CHAPTER ONE: INTRODUCTION

Teacher turnover is a significant issue in many Alaskan schools with the effects of such turnover echoing through the schools, communities, budgets, and most importantly the students and their academic experiences. The purpose of this dissertation is to consider the connections of teacher turnover to performance on standards-based exams, specifically in the area of mathematics.

There are many possible factors to consider when exploring the connection between teacher turnover and standardized test scores. Of significant note in the literature are connections to socio-economic levels of the students. "Secondary high-need schools, particularly those serving students from low-income families, registered the most severe teacher shortages" (Ingersoll, 2001).

Another possible connection reflected in the literature is ethnicity and teacher turnover. "Difficult-to-staff urban schools with high poverty and high-minority student populations experience the greatest number of out-of-field teaching, which is linked to teacher turn-over" (Ingersoll, 2002).

This study will also consider school size as a variable. Alaska has schools that range from ten students to several thousand students and studies indicate there is a connection between school size and teacher turnover. "Public and private schools with lowest enrollments had the highest teacher turnover. Large public schools had lower turnover rates than the smallest public schools (i.e., under 300 students)" (Ingersoll & Rossi, 1995). In Alaska, over 80 percent of the schools fall under this 300 student enrollment threshold.

A key aspect of the study being completed as part of this dissertation is the exploration of the influence of each of these variables on one another, individually, and in various combinations in relation to standards based test scores.

1.1 What is the Definition of Teacher Turnover?

For the purposes of this study "teacher turnover" includes teachers exiting the profession, teacher subject area transfers, as well as teachers changing schools (Boe, Cook, & Sunderland, 2008). There is a difference between teachers exiting the profession and teachers who transfer to a new duty assignment. However, for the results of this study if a teacher leaves their current duty assignment they fall in the category of teacher turnover.

1. 2 Who are the Educators that are Turning Over?

Completing a teaching degree or teacher certification program takes a significant amount of time and money. The most recent higher education costs from the CollegeBoard puts the average costs of a private school at $26,273 per year. Public schools cost on average $7,020 per year with many teacher certification programs adding a 5th year (some at graduate tuition). The 5-year price-range for completing teaching training can vary from $35,100 - $131,365. This is a significant investment of time and money by those committed to becoming teachers.

The majority of the teachers exiting the profession tend to be either new teachers, or retiring teachers. "It is well known that teacher attrition follows a u-shaped pattern with a high probability of leaving in the first few years and in the later years near retirement" (Liu, 2007).

1.3 Why are Teachers Leaving?

A national study by The National Center for Education Statistics(NCES) listed the following reasons indicated by teachers leaving the profession or transferring to a new duty assignment: not enough time for planning/preparation; teaching workload too heavy; classes too large; salary, student behavior; and not enough influence over school policies (Bobbitt, 1994). This was a national study and in Alaska there are many similar findings.

1.4 What are the Trends in Alaska?

A fairly recent and substantive survey was completed regarding Alaska teacher supply and demand in 2005. The educators cited low salaries, lack of administrative support, and classroom discipline issues. The study also noted key factors that indicate unique circumstances that contribute to Alaska educator turnover (Hill & Hirshberg, 2006).

Many schools in Alaska are in remote locations accessible only by plane or boat, so access can be both expensive and difficult.

Housing availability and housing costs are often problematic, and in some rural Alaskan communities, teacher housing even lacks water and sewer hookups.

> Health care, shopping options, entertainment, and other "city" amenities can be quite limited.
>
> Teachers in rural schools are often required to teach multiple subjects across several grade levels.
>
> Cultural differences can create difficulties, especially for those who come to Alaska from the "lower 48" states. Alaska is home to many Alaska Native cultures, each having distinct languages, belief systems, traditions, and cultural practices, and it can be difficult for non-Native educators to learn how to work effectively within Native communities. (p.2)

1.5 Teacher Experience Rural and Urban

"On average from FY99-00 through FY03-04,.....rural teachers were ten times more likely (than urban) to change districts (6% compared to 0.6%)"(Hill & Hirshberg, 2006). Since many of these rural teachers go to urban schools, the urban schools are getting teachers with more experience. Therefore, the negative impacts of teacher turnover in urban districts may be tempered by replacement teachers that have experience. In the rural schools however, the exiting teachers tend to be replaced with newer and less experienced educators. This is a subtle but powerful consideration. The school district with the higher teacher turnover is also receiving an increased population of less experienced educators.

Another consideration regarding the turnover of teachers in rural schools is that the departing teacher may also be the administrator of the school. This indicates that teacher turnover may also contribute to administrator turnover in the school, community, and the district.

In the rural areas when a principal-teacher leaves, the incoming teacher has to learn the role of a new educator, administrator, and community member. The educator must do so with the added challenge of working within a new cultural environment. He/she must also become the purveyor of administrative policies and attempt to create bonds with his/her colleagues. These educators must develop lesson plans, implement school wide programs, complete administrative tasks/reports, all while complying with state and federal regulations. All of this must be done on a beginning teacher's salary within a community that has been tinged by a steady stream of new (and often very temporary) educators.

Such challenging work conditions contribute to the rate of turnover. "70 percent of public school teachers who moved to a different school cited dissatisfaction with workplace conditions or the administration as "very important" in their decisions to leave" (Ash, 2007).

1.6 Socio-Economic Connections

The following results were reported in the 2003 Trends in Mathematics and Science Study (TIMSS), "in schools with 75% or more students eligible for free or reduced-price lunch, a measure of poverty, students scored 110 points below their peers in schools at which fewer than 10% of the students receive a subsidy"

(Ruddock,2005). The consideration of poverty among student populations is noted in Alaska as well.

> Many schools in rural Alaska face the problems found in low socio-economic status (SES) settings everywhere. While not all Bush communities are Low SES settings, the lack of a cash economy in most isolated villages is the norm. (Alaska Teacher Placement, 2010)

The combination of socio-economic status with other variables is of concern in many schools of Alaska, as there is a compounding effect of such variables. "Many of Alaska's rural districts magnify problems that contribute to teacher turnover nationwide—including remoteness, small enrollment, high rates of poverty, and high needs and low achievement among students" (Hill & Hirshberg, 2006).

Though Alaska has many of the same educational issues seen at the national level, it is a distinct state in many ways and the area of public education is no exception.

The following is a condensed history of Alaska's educational system. This dissertation is not a comprehensive historical review of the Alaska Public Education System. However a significant part of this study warrants a foundation in Alaska's Educational history, as many of the more pertinent historical events and key pieces of legislation are seminal to the variable of ethnicity, specifically when applied to Alaska Native students.

1.7 Historical Aspects of the Alaska Public School System

Alaska's school system has in many ways been swimming in a morass of dual cultural systems from its inception. The first constructed schools were of parochial origins and built by the Russians. These "educators" viewed the local cultures as paganistic, non-Christian and therefore evil and of limited or no value. Such parochial views continued even when schools were switched to government control as many of the schools were then sub-contracted by the government to local churches.

When Russian rule started in Alaska around 1785, the first schools they established were small Russian Orthodox schools. These first schools were impacted by the Treaty of Cession in 1867. This treaty caused many of the Russian missionaries to leave and thus teacher turnover began.

When the schools where vacated by the Orthodox missionaries the Presbyterian Church moved in under the leadership of Sheldon Jackson. He became superintendent of the Presbyterian missions and was officially recognized by the US government in 1884 as the agent for education in Alaska. (Daley & James, 1998)

The connection between government and church-based schools continued to grow, especially in the time from 1885 to 1895. (Barnhardt, 1985) The Office of Education contracted with missionary societies to maintain schools in conjunction with the missions. As of 1888, Territorial Governor Albert P. Swineford reported that religious denominations were responsible for the support of 28 of the 43 schools in the territory.

For the first 100 years of education in Alaska, there was a religion based system implementing a foreign curriculum on an indigenous people with the consent of the federal and territorial governments. During this time there were several key federal mandates that were meant to help govern Alaskans and continue the growth of Alaskan schools.

In 1884, The Organic Act was passed and required the Secretary of the Interior to "make needful and proper provision for the education of the children of school age in the Territory of Alaska, without reference to race, until such time as permanent provisions shall be made for the same."

The de facto segregated system continued to grow along racial lines. In 1904, of the forty-seven schools the Bureau of Education operated, thirty-five were Native and twelve were white. This dual system was further reinforced by the 1905 Nelson Act that, in effect, established a dual system as a matter of law. This piece of legislation provided that any community outside of an incorporated town, having a school population of twenty "white children and children of mixed blood who lead a civilized life" could petition the clerk of court for establishment of a school district. The Territorial Governor was responsible for funding such requests (Barnhardt, 1985).

The Alaska Territorial Governor was not required to accept the petitions of Alaska Native peoples at this time. In 1908 the case of Davis v. Sitka School Board went even further to separate schooling along racial lines as the petition for mandamus to admit children of mixed blood was denied by the court, finding that "civilization" required Natives not only to adopt white man's style of living, but to cease associating with Natives. This meant a person of mixed heritage could only receive an education in their local area if they renounced all ties with their Native heritage, Native community, Native friends, and Native family. This was by default a court approved dual school system.

These philosophical and legislative underpinnings continued as the legislative body became more organized. In 1917, the Alaska Territorial Legislature was granted control of the local territorial schools. They were empowered to establish and maintain schools for "white and colored children and children of mixed blood who lead a civilized life" (Barnhardt, 1985).

These laws continued with small changes and few challenges. One such challenge was Jones v. Ellis (1929). The decision of Jones v. Ellis held that a child of mixed blood who led a civilized life and resided within city limits had a legal right to attend city schools notwithstanding existence of Indian schools in the city which the child could also attend. Thus if you were of mixed blood, civilized, lived within the city limits, and no native schools were around, then you could attend the "white" school. Of important implication here is the challenge to such laws indicate that Alaska Native peoples understood the importance of education and were willing to fight for it. Outside the "urban centers", Native Education was the responsibility of the Bureau of Education and after 1931, the Bureau of Indian Affairs (BIA).

The Territorial Governor was responsible for funding schools inside incorporated communities, and for the petition to create schools where at least twenty white or civilized mixed blood children lived. The Federal Bureau of Education and Department of Interior was responsible for Native schools.

The Snyder Act of 1921, Public Law 67-85, focused on Native children who did not have access to public schools, with eligible "Native" being at least ¼ Native. This measure of blood quantum being at least ¼ Alaska Native to qualify for federal services is still recognized today for many issues as the basic minimum to be classified as Alaska Native or Indian. I personally have one of these cards as issued through the Department of the Interior, Bureau of Indian Affairs certifying my blood degree. Without this card I could not receive many of the benefits as established in the Alaska Native Claims Settlement Act, but that's jumping ahead.

In 1934 the Johnson O'Malley Act (JOM) passed to help provide a means of transferring education of Native children from the federal government to state and local school systems. This was slow to implement in Alaska as the full costs of the schools were not included. Between 1942 and 1954, about forty-six schools were transferred from federal to territorial control. Even then these efforts were stopped because of the territory's inability to assume the cost. To this day Johnson O'Malley funding still exists in the form of federal funding to Alaska school systems and is sometimes included in the funding and operations of Alaska Native Education Programs. This separate system of local versus federal school systems remained in place until discussions about Alaska's formal statehood became a reality.

As a result of Alaska's statehood, opponents of the dual system argued about the inconsistencies with the new Alaska Constitution. The Alaska Constitution now requires the state to maintain a system of public schools open to all the children of the state. While twenty-eight schools were transferred to the state school system between 1967 and 1970, there were still fifty-one BIA Day Schools in operation as of 1974.

In 1975, The Indian Education and Self-Determination Act laid the foundation for a philosophy encouraging exercise of community control over BIA operated schools. It took over 200 years for Alaska to begin to establish, as a matter of law and legislation, a system that allowed for some community control of local schools. This however created a real dilemma as communities were being pushed to implement educational policies and practices that they were not prepared for.

In March 1973, the State of Alaska and the Alaska Federation of Natives (AFN) agreed to the transfer of JOM administration to AFN, partially in 1974 and completely in 1975. AFN's problems with inexperience and lack of technical assistance led to a voluntary termination of the agreement. The 1975 "Molly Hootch" case was brought to the courts in an effort to compel the state to provide secondary schools in the plaintiffs' communities of residence (Tobeluk v. Lind, 1974). Through this point in time, rural Native students were given the option of attending state-operated regional boarding schools, BIA boarding schools, boarding home programs, or participation in state-funded correspondence studies.

Two key claims under the Molly Hootch case were the right of education under Alaska's constitution, and equal protection. The Alaska Supreme Court ruled against the right of education, and remanded for equal protection consideration, resulting in a negotiated settlement in which 102 out of 121 eligible villages opted for their own high schools.

The Molly Hootch ruling is key, but many people do not realize that a large part of the case was actually lost as the right of education was ruled against, but the ruling on equal protection was remanded for further consideration, thus allowing for a settlement in which many communities were able to establish their own schools.

A key organizational piece of legislation in 1975 was the dissolution of the Alaska State-Operated School System (ASOSS) to be replaced by 21 Regional Educational Attendance Areas (REAAs). While substantial decentralization did occur, it did not give total control to the villages. Village education committees became advisory only, with no substantive formal powers

In January of 1977 the BIA instituted a policy concerning the transfer of limited powers to the villages which required the village to concur before agreeing to the transfer of school power. This gave the communities time to prepare and work with the BIA in transferring local schools. This momentum of local control continued in 1978 with the comprehensive restructuring of the BIA education program that further increased federal incentives favoring community control of BIA day schools. This restructuring also included, for the first time in Alaska, a clear reference regarding the inclusion of teacher hiring/firing and curriculum.

In the following years transfers accelerated. From 1974-1982 fourteen of the fifty one remaining BIA day schools were transferred to the state. In 1982 seventeen schools were transferred to state control due to congressional funding cuts. The following year, Tuntutuliak school was also transferred to the state.

In 1983 it was agreed that the federal government would transfer the remaining BIA schools to the state. The state assumed control of Mt Edgecumbe Boarding School and the BIA announced nine of the remaining 19 day schools would be closed in 1984. Five additional schools, Akiachak, Akiak, Chefornak, Chevak, and Tuluksak, were contracted out to Native governments under the Self-Determination Act. By 1986 all remaining day schools had been transferred to the State of Alaska. The process of overcoming the dual system that had existed for the previous 200 years was finally complete.

Recent decisions that reinforce this hard reality include the decision in the case of Kasayulie v State, 3AN-97-3782 CIV (1999). This decision held that Alaska had a dual, arbitrary, unconstitutional, and racially discriminatory system for funding school facilities, and that education in Alaska was a fundamental right for all citizens. The issue regarding funding has permeated Alaskan history and the right to properly funded schools is still being fought for. Even though the State's motion to reopen the decision was denied in March 2001, this is an appealable order.

There have been and will be many more legal issues involving Alaska schools, but possibly the most comprehensive decision may be Moore v. State, 3AN-04-9756 CI, (2004). This decision held that the State's constitutional obligation to maintain schools had four components. I will focus on the subsection of this decision regarding assessments and achievement as they are most pertinent to this dissertation.

> First there must be rational educational standards that set out what it is that children should be expected to learn, meeting or exceeding a constitutional floor of an adequate knowledge base for children.
> The Education Clause does not require the State to insure that each child achieves proficiency in the content and performance standards; instead, the State takes responsibility for insuring that each child is accorded a meaningful opportunity to achieve proficiency in reading, writing, math and science – the four subjects encompassed within the State's performance standards. (p.174)

This presents a critical distinction between the responsibilities of insuring students achieve proficiency in meeting state standards and affording them the opportunity. This means as long as the local district is deemed as providing "meaningful opportunities" then the state is compliant with its obligation.

Another question is how does one define "meaningful"? A meaningful education may vary from community to community and this disconnect is reflected in issues such as teacher turnover and reduced achievement scores.

> With respect to the State's content standards and subjects other than reading, writing, math, and science, it is sufficient from a constitutional standpoint that each student receives meaningful

> exposure to those other content standards during the course of that child's schooling. (p.176)

Just what is meaningful exposure and how does one measure it? The question of measuring or assessing proficiency is addressed in the following section of the decision. This section requires that an adequate method be developed to assess that learning is occurring in regards to the required standards. In Alaska at the high school level the High School Graduation Qualifying Exam is the official instrument. The plaintiffs did not challenge the legitimacy of the exam, as noted below.

> It is undisputed that the State has developed a comprehensive system to assess proficiency in reading, writing and math, and intends to assess proficiency in science. (p.177)
>
> Plaintiffs do not assert that (the) current system fails to adequately or accurately assess proficiency in subjects tested. (p.178)

The primary concern of this decision can be viewed in the attention to detail regarding the section on funding of education in the State of Alaska. The decision includes the seriousness of the achievement gap in many areas and that more money isn't the answer. This decision also indicates that there is no clear program that if funded, could assist in the area of achievement.

> Although the achievement gap is a serious concern, plaintiffs failed to establish that additional funding to the districts would reduce or remedy this gap. (p.179)

The decision also makes note that resources should not and cannot be divided into a federal versus state level of contribution.

> At statehood, the State depended heavily on federal money; in Molly Hootch, the Court held that to interpret the Education clause to require large expenditures of state money would have been considered preposterous at the time of statehood. There is no evidence that the State has used federal funds inconsistently with federal requirements, or used (them) to supplant instead of supplement state or local funds. (p.180)

The final section contains some of the strongest language regarding achievement by Alaska's students. The court makes it clear that the State of Alaska must work with local districts to help students address the education standards as established by the state. This court also notes that the state must have precedence over local control of a school if the state standards are not being met.

> But if a district, despite adequate funding, is failing to accord a child a meaningfully opportunity to acquire proficiency in the state's standards, concept of local control must give way. (p.185)

This is a powerful ruling that directly connects student achievement to local input on education. The court decision also infers that as long as students in a school are given a meaningful opportunity to learn in the four primary state content areas the local districts may have the majority of control in their school. If achievement levels are not met then the State of Alaska has an obligation to increase oversight and control of the school.

> The court made such a decision. The efforts made by the State of Alaska regarding the Yupiit district are inadequate. But efforts taken as of trial, particularly with respect to Yupiit School District, are constitutionally inadequate. While the court recognizes that the state of Alaska had taken some steps in the right direction in Yupiit as of that date, the State has not satisfied it's constitutional obligation to the children of that district to accord them an adequate education. (p.187)

The court then goes on to state that unless the State of Alaska can demonstrate adequate support and oversight of adequate education then lack of achievement on the HSQE cannot be used to withhold a diploma (p.193). The part involving the HSQE and a diploma has been stayed by the court, so it is not a matter of enforceable law, yet. The court makes special note that there is no "silver bullet" and new avenues should be funded and explored as the status quo isn't getting it done.

The court's ruling also states that students do not have a fundamental right to a high school diploma. Fair enough, as it must be earned. The decision does in no uncertain terms reaffirm the fundamental right to an adequate education and the use of an exam to measure achievement levels is allowed so long as the preparation by the district meets an adequate standard of quality. The current status of the ruling is as follows.

> Procedural due process: State acknowledges that a diploma is a property interest; Court need not resolve whether education is a fundamental right, because individual does not have a fundamental right to receive a high school diploma, so heightened standard is inapplicable. State has to proceed with fundamental fairness, and it is fundamentally unfair to condition receipt of a HS diploma on the exit exam at this time. So for children in Yupiit, and any other district identified by State (or Court in future) as not receiving an adequate education, the HS Graduation Qualifying Exam cannot be used to preclude a child from receiving a HS diploma. (p.192)

This comprehensive decision covers many aspects of Alaska's educational issues, with many future issues yet to be resolved. The key aspects that pertain to this dissertation are that a set of content standards are in place, the testing methods are valid, and that the State of Alaska must follow specific guidelines as they offer "meaningful exposure" and an "adequate education" in the specific content areas.

The history and legal decisions discussed have a very strong connection to all of Alaska's students. These connections are especially strong in many of the smaller schools where the predominant number of students are poor, Alaska Native, and experiencing significant teacher turnover. The question then becomes, <u>What are the areas of influences for these variables and is there a connection between teacher turnover, school size, poverty levels, ethnicity, and performance on standards-based exams?</u>

CHAPTER TWO: LITERATURE REVIEW

Public schools, private schools, school districts, and state education departments all seek to provide the best educational experience to their students. For each student, a large part of this experience is his/her teacher. But what if the teacher keeps changing? Recent work by the Alliance for Excellent Education references the nearly 400,000 educators who leave the teaching profession, switch schools, or change teaching assignments each year ("Understanding and Reducing Teacher Turnover," 2008).

Teacher turnover includes teachers exiting the profession, teachers transferring to a new grade level, subject area transfers, and school transfers. Recent studies put these rates at 25.6% per year (Boe, Cook, & Sunderland, 2008). Meaning about 1 in 4 teachers will not be in the same duty assignment in the next year. The National Commission on Teaching and America's Future (NCTAF) Executive Director Tom Carroll asserts, "The truth is that we can't keep enough good teachers."

Teacher turnover has become a large economic issue. The National Commission on Teaching and America's Future in Washington, D.C. created a "calculator" which allows schools and districts to estimate the costs associated with their teacher turnover. This study, which focused on the dollar cost to districts also makes note of the "real" cost to students. "These dollar amounts, large as they are, do not include the price students pay when qualified teachers leave, or of the negative effect on academic achievement" (Ayala, 2007). Jeffrey Capizzano, public-policy and research director for Teaching Strategies, Washington, D.C., states it very clearly. "Teacher turnover is one of the most serious and complicated issues in early-childhood education" (Shellenbarger, 2006).

2. 1 Teacher Turnover Impact on Student Teacher Relationships

Teachers and the relationships they forge with their students are crucial at all levels and stages of a student's development (Hill & Taylor, 2004). Parents view their children's teachers as a key aspect of their child's educational development. If the teacher is constantly changing then so does the working relationship with the student, his/her parents, and other school professionals. Continual change often leads to decreased achievement by the student due to the lack of time to build the proper teacher relationships. This is a severe hindrance to academic progress and may have an impact on student behavior as well (Hill & Taylor, 2004).

"This lack of confidence leads to inconsistent behavior responses from the student and may be exacerbated by the lack of understanding from the teacher, which can lead to decreased academic progress" (Kinniburgh, Blaustein, Spinazzola, & van der Kolk, 2005). Relationships between teachers and students can be especially critical when students are transitioning between grade levels from elementary to middle or from middle to high schools (Murray & Pianta, 2007). "Findings from numerous studies suggest that the quality of the relationships that children form with teachers has important implications for their emotional and behavioral well-being" (Pianta, & Steinberg, 1992).

Other researchers have reported that this decline in teacher/student relationships can directly impact adolescents' social and emotional health. "Students who reported the greatest declines in teacher-student relationship quality also had the greatest increases in depression" (Reddy, Rhoades, & Muhall, 2003).

Another effect of teacher turnover is interaction with parents. When parents are not able to build effective bonds with the teacher then parents' expectations may be different from the teachers. "When families do not agree with each other or with schools about appropriate behavior, the authority and effectiveness of teachers, parents, or other adults may be undermined" (Hill & Taylor, 2004). This inconsistency of expectations may then lead to decreased academic achievement from the student (Benner & Mistry, 2007). If decreased achievement is measured through assessment, the question then becomes whether teacher turnover is impacting student performance in the application of these assessments.

2.2 Teacher Turnover and Assessments

As teachers progress through their career, they develop tricks of the trade. Years working as professionals allows them to diversify their methodologies, and create assessment systems that match the subjects being taught. This proper use of classroom assessment is critical to student learning (Ohlsen, 2007). Assessment serves many functions, including the overall enrichment of the learning experience for the student. "Good assessment enhances instruction; it is not an activity that merely audits learning" (Stiggins, 2001).

The classroom context is one of nearly constant formal and informal assessment over time and across many dimensions of behavior. However, among the many assessment options available to secondary teachers, common practice indicates that teachers devise some variation of a test to determine student learning levels for summative grading purposes (Brualdi, 1998). This vital skill of varying assessments to meet student needs is developed over a teacher's career and this skill takes time, especially when many teacher preparation programs may not focus on teaching the skill of assessment development. "Teachers in 35 of 50 states are not required to take a course or to demonstrate competency in the area of assessment" (Tienken & Wilson, 2001).

An advanced form of assessment is the question and answer method or Socratic method. This method has been proven to strengthen student-teacher relationships as well as increase student reading comprehension (Kinniburgh & Shaw, 2009). Methods such as the Socratic method are challenging for many inexperienced teachers who are trying to develop many basic teaching techniques, let alone develop various academic relationships with their students. "This technique also relies on establishing certain relationships with the students which have been proven to suffer with teacher turnover" (Shellenbarger, 2006).

2. 3 Standards-Based Assessments

This study will utilize standards-based assessment scores. Standards-based assessments are a type of criterion reference exam. The assessment compares test-takers exam scores to pre-determined criteria (performance standards), in a set of subject content areas.

This assessment form contrasts to norm-referenced scores, in that norm-referenced exam scores compare the test-takers score to other test takers' scores. Norm-referenced scoring occurs when a student's score is compared to the scores of all test takers in a norming group of heterogeneous test takers of the same age and grade level who took the test at roughly the same time in a previous year. Either scenario must include a standardized exam instrument. The critical separating component is either comparing the score of each test-taker to a set of criteria/standards or comparing each test-takers score to the scores of a specific group of other test-takers.

The use of standards-based test scores has been a divisive element of education since their inception. This literature review will touch briefly on the history of standards-based testing, but does not enter the debate about their educational value in general. In this study, standardized tests, or more exactly standards-based assessments, are the measuring instrument used to demonstrate student proficiency in math. It is, however, useful to know how these assessments became an important indicator when reporting student success.

How did standards-based tests get here and why are their results so readily accepted by many? "High-stakes testing is the practice of attaching important consequences to standard(s-based) test scores, and it is the engine that drives the No Child Left Behind (NCLB) Act" (Nichols & Berliner, 2008).

Five reasons for Americans' acceptance of high stakes testing were also stated by Nichols and Berliner. First, basic business models were applied to schools as a matter of practicality. Second, private business and the government believe the U.S. economy depend on a educated workforce. Third, as U.S. demographics are evolving the school system will assimilate the various groups. Fourth, the middle class and upper social class view test results as advantageous to their children. Fifth, as test results are published there is a sporting event attitude applied to the exam results of the students (Nichols & Berliner, 2008).

This concept of winning is becoming very ingrained in many districts and such a scenario was foretold. As standards-based tests became more and more central to American school systems' assessment, leaders acknowledged the issue of the public and policy makers placing too much emphasis on assessment results. "We have an enormous re-education job to do in order to convince a now skeptical public that norm-referenced standardized testing is not the answer to everyone's prayer" (Corbett, 1979).

The Association for Childhood Education International (ACEI) expressed these same views in a recent study of standardized testing. "Standardized tests are now used to hold up children and schools for comparison; the scores are used to discriminate rather than diagnose, punish rather than reward" (Solley, 2007).
The history clearly indicates standardized testing and the resulting interpretation of these test results are here to stay.

2.4 No Child Left Behind Act--Its Impact on Teacher Retention and High-Stakes Testing

Dr. Deborah Hill makes this key observation of The No Child Left Behind Act and its impact on teacher retention as an unexpected consequence of this legislation. "Its intent is to close achievement gaps among students who belong to minority groups, have disabilities, are economically disadvantaged or have limited English proficiency. Framers failed to foresee its impact on teacher retention" (Hill & Barth, 2004). The testing system may have actually had an influence on its own results, but who is making the decision to increase the implementation of these testing systems?

Former US Education Secretary Rod Paige states, "We can only measure a teacher's success through the improvement of his or her students; in my opinion, there is no other measure." When the Secretary of Education makes such a statement about educational systems, processes are put in place to accommodate such opinions. NCLB is the primary driver of such processes. "Testing children in 4th, 8th, and 12th grades is now mandatory. Accountability systems that require assessments to prove children's growth in academic subjects are mandatory" (Solley, 2007).

NCLB's impact on testing is also evidenced by all fifty states requiring such testing and these tests being expanded to almost every grade level. "Today, because of NCLB, all 50 states have some form of standardized testing whereby students are tested every year, beginning in the 3rd grade. In many states, 1st and 2nd-graders are also tested" (Sack-Min, 2009).

Assessment experts speak to how the results are then utilized as a way of comparing results among the test takers. " Today, it continues to be the mission of a standardized test-maker to develop a set of items that allows for making accurate comparisons among test-takers and then rank-ordering those who take the test" (Popham, 2002). So far this literature review has touched upon the topics of teacher turnover and standards-based assessments. Both of these issues are here and they are of concern, but is there a connection or more specifically is there a correlation between the two?

2.5 Correlation: What Does that Really Mean?

Many studies are designed to determine or to validate a perceived set of outcomes based upon the basic cause and effect relationship with many studies producing very straightforward and empirical results. While cause and effect are vital to almost any good research process, many cases yield a larger set of variables for review than initially envisioned. "The identification of cause-and-effect relationships plays an indispensable role in policy research, both for applied problem solving and for building theories of policy processes"(Mahoney, 2000).

This point can be of great importance to this study as a strong correlation will hopefully open avenues for future studies. These future studies will guide the inclusion of a larger set of variables, allowing for an increased level of precision regarding causes of teacher turnover, the impact on students, test scores, and communities in various settings. This does not mean that we toss out correlation formulas as too simplistic, but it does require us to seek a much more in-depth set of explanations once a correlation is established. We have established a method for the correlation of two variables but as a key turns a lock on a door, where does this correlation lead us?

2.6 Correlation versus Causation

"One of the most common errors we find in the press is the confusion between correlation and causation in scientific and health-related studies" (Stats.org, 2010). On the flip side many people and researchers have their results shaded by intrinsic knowledge, or they just know. "Unfortunately, intuition can lead one astray when distinguishing between causality and correlation" (Mahoney, 2001).

If a correlation can be established between teacher turnover and standards-based test scores then we will have the basis to create further studies of inquiry. "When we are interested in determining the correlation between two variables, X and Y, the first thing we have to do is to measure the two variables. This is not a minor point" (Masgoret & Gardner, 2003).

2.7 What is the Alaska Connection?

This study will be focusing on the land of my ancestors, Alaska, but is there a need for such work in Alaska? The 2005 National Assessment of Educational

Progress (NAEP) results point to some very clear trends along ethnicity and exam scores. "In a depressing spiral to the bottom, the percentage of students from each racial and ethnic group falling below 'basic' has increased from 1996 to 2005" (Mervis, 2007). The same trends may be observed in the scores of Alaska's students, especially our Alaska Native populations. In mathematics on the 1998 NAEP the average score for 4th Graders nationwide was 231; for Alaska's Caucasian students the average score was 232; and for Alaska Native students the average score was 210. In a continuing trend the average NAEP score for 8th Graders nationwide was 281; for Alaska's Caucasian students the average score was 287; and for Alaska Native students the average score was 257.

If we further disaggregate the results into the four levels of proficiency on the NAEP Standardized Mathematics Exams, Advanced, Proficient, Basic, and Below Basic and apply them to Alaskan students, the results continue to display this trend between ethnicity and score results. Of Alaska's Caucasian students 9% scored at the Advanced level, 37% scored at or above the Proficient level, 31% scored at or above the Basic level, and 23 % scored below the Basic level. Of Alaska Native students, 1 % scored at the Advanced level, 12% scored at or above the Proficient level, 36% scored at or above the Basic level , and 51 % scored below the Basic level. Clearly in Alaska among the Alaska Native student populations there is an exam score difference along ethnic lines. These results point to a clear set of populations that are being affected by educational issues. The primary cultural group being affected is the Alaska Native population.

The Alaska Native student population is a significant part of Alaska's overall student population. "According to the 2005–2006 Common Core Data (CCD), the state with the largest population of American Indian and Alaska Native students as a percentage of the total student population is Alaska (26.6%)" (National Center for Educational Statistics (NCES), 2007).

Recent work completed through the Alaska Rural Systemic Initiative indicates the importance of student achievement in mathematics, ethnic/cultural connections, and testing.

> All of these recent breakthroughs in our understanding of how mathematical knowledge is constructed and utilized provide extensive opportunities for research on mathematics learning across cultures that has significant implications for schooling, particularly since mathematics is one of the critical elements in current assessment systems associated with the 2001 federal No Child Left Behind Act (p.18) (Barnhardt & Kawagley, 2005).

2.8 Impacts on Budgets

"The cost related to 761 teacher movers (teachers transferring to other schools) was about $10,611,317. The total cost of teacher turnover, not including retirement, was estimated at $18,531,647"(Hill & Hirshberg, 2006). The study also states the following about Alaska teacher turnover and the number of positions

Alaska must fill each year. "Each year, new positions and teacher turnover create about 1,100 vacant teaching positions"(Hill & Hirshberg, 2006).

The large number of teachers turning over each year creates a personnel vortex that cannot be met by the University of Alaska campuses who "graduated about 220 teachers each year"(Hill & Hirshberg, 2006).

Not all of these newly trained teachers choose to teach, and not all stay in Alaska. Even if every graduate took a job in Alaska public schools, three-quarters of the vacant positions must be filled from other sources. Some of these sources are alternative teacher training programs.

2.9 Alternative Training Programs for Educators

"The New Teacher Project (TNTP) works with states, districts and universities to create and run alternative routes to certification, offer high-need certified teacher recruitment programs"(Department of Education, 2004). Many such alternative processes or routes take place in the poorer districts, including Alaska. UAF's School of Education works with interns that are placed as teachers before they complete their teacher preparation programs.

The Department of Education goes on to note that "Classes in high-poverty schools were less likely to be staffed by a highly qualified teacher than were classes in low-poverty schools" (Department of Education, 2007). Though the report touts a 92 % rate of highly qualified teachers teaching in core subject areas, this rate was then tempered by the fact that high poverty districts "were less likely to be staffed by highly qualified teachers." The discrepancy in Alaska is substantial. "In high-poverty schools, the percentage of classes taught by (Highly Qualified Teachers) HQTs ranged from 99.5 (North Dakota) to 36.3 percent for elementary (Alaska)" (Department of Education, 2007).

2.10 In Summary of Teacher Turnover and Student Performance

In closing, as educators we may have anecdotal evidence or a gut feeling that teacher turnover would impact standardized test scores. Is there a connection between teacher turnover and standardized test scores? Clearly there are other variables to consider including ethnicity, poverty levels and school size.

As researchers and educators we must not be content to make assumptions about possible connections. Intuitive beliefs regarding teacher turnover and student achievement has been part of the educational landscape for years. However few statistical analyses exist to validate or refute such assumptions. This study attempts to utilize statistical data to speak to the validity of such a correlation in Alaska.

CHAPTER THREE: METHODOLOGY

All data being utilized in this dissertation was collected and provided by the Alaska State Department of Education. The data is publicly available with no personal or individual data being utilized. To further insure the privacy and protection of any single student, whenever possible, data sets were averaged over multiple years. By minimizing the reporting of single year data sets, small school districts results could not be interpolated in a manner to identify a specific student's exam results.

Averaging the data also minimizes any single year anomalies while offering a better demonstration of long term trends and connections. This data was then compiled, calculations performed, and results presented at the Alaska school district level. Alaska school districts are determined by the state of Alaska, not by the author of this dissertation.

3.1 Data Sets

The ten data sets/variables being utilized for this dissertation are:

Teacher Turnover

Not Proficient 10th Grade Standards-Based Assessment (SBA) Mathematics Exam

Below Proficient 10th Grade SBA Mathematics Exam

Proficient 10th Grade SBA Mathematics Exam

Advanced 10th Grade SBA Mathematics Exam

Not Proficient Combined with Below Proficient 10th Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10th Grade SBA Mathematics Exam

School Size

Percent of student population reported as Receiving Free or Reduced Lunch

Percent of student population reported as Alaska Native

There are details regarding two of the variables worth noting. School size was classified by the Alaska State Activities Association's (ASAA) 4A, 3A, 2A, and 1A secondary school classification system. 1A Secondary School Classification ranges from 0- 50 students, 2A Secondary School Classification ranges from 51-100 students, 3A Secondary School Classification ranges from 101 to 400 students and 4A Secondary School Classification ranges from 401 students or greater.

If a student is receiving free or reduced lunch it is an indicator of poverty. Income Eligibility Guidelines, 2009-10 for Free/Reduced lunch are calculated according to the following established Federal Income Guidelines.

Household Size	**Yearly**	**Monthly**	**Weekly**
1	$25,031	$2,086	$482
2	$33,689	$2,808	$648
3	$42,347	$3,529	$815
4	$51,005	$4,251	$981
5	$59,663	$4,972	$1,148
6	$68,321	$5,694	$1,314

For each additional family member, add: $8,658, $722, or $167 respectively.

3.2 Variable Notation Legend

Due to the variable name restrictions of the statistical software being utilized, the following "Naming Key" reports the variable descriptor as noted in the tables. The shortened descriptor is displayed in the results section of the tables as well as the corresponding appendix to that table; the entire variable name is utilized in the narrative portion of the results.

Teacher Turnover = turnoverrate

Not Proficient 10th Grade SBA Mathematics Exam = npmathSBA

Below Proficient 10th Grade SBA Mathematics Exam = bpmathSBA

Proficient 10th Grade SBA Mathematics Exam = profmathSBA

Advanced 10th Grade SBA Mathematics Exam = amathSBA

Not Proficient Combined with Below Proficient 10th Grade SBA Mathematics Exam = np-bpmathSBA

Proficient Combined with Advanced Proficient 10th Grade SBA Mathematics Exam = aprofmathSBA

School Size = schoolsize

Percent of student population reported as Receiving Free or Reduced Lunch = reducedlunch

Percent of student population reported as Alaska Native = aknative

3.3 Combinations of Variables

All possible combinations of independent variables were tested at the bivariate level. As a safety check initial testing in Statistical Package for the Social Sciences (SPSS) was performed with variable order being altered and results checked to account for changes in variable order. This check was performed before the partial correlations analysis and the multivariate analysis as well. Order of variables did not alter any results. However, to allow for consistency of reporting, analysis results maintain a progressive order whenever possible.

Bivariate results were reported for the following variable combinations:

Teacher Turnover

Not Proficient 10th Grade SBA Mathematics Exam

Below Proficient 10th Grade SBA Mathematics Exam

Proficient 10th Grade SBA Mathematics Exam

Advanced 10th Grade SBA Mathematics Exam

Not Proficient Combined with Below Proficient 10th Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10th Grade SBA Mathematics Exam

School Size

Not Proficient 10th Grade SBA Mathematics Exam

Below Proficient 10th Grade SBA Mathematics Exam

Proficient 10th Grade SBA Mathematics Exam

Advanced 10th Grade SBA Mathematics Exam

Not Proficient Combined with Below Proficient 10^{th} Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10^{th} Grade SBA Mathematics Exam

Free/Reduced Lunch

Not Proficient 10^{th} Grade SBA Mathematics Exam

Below Proficient 10^{th} Grade SBA Mathematics Exam

Proficient 10^{th} Grade SBA Mathematics Exam

Advanced 10^{th} Grade SBA Mathematics Exam

Not Proficient Combined with Below Proficient 10^{th} Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10^{th} Grade SBA Mathematics Exam

Percent of Student Population Alaska Native

Not Proficient 10^{th} Grade SBA Mathematics Exam

Below Proficient 10^{th} Grade SBA Mathematics Exam

Proficient 10^{th} Grade SBA Mathematics Exam

Advanced 10^{th} Grade SBA Mathematics Exam

Not Proficient Combined with Below Proficient 10^{th} Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10^{th} Grade SBA Mathematics Exam

3.4 First Order Partial Correlations

When calculating first order partial correlations a control variable was designated and partial correlations were then calculated on the remaining independent variables, along with the two dependent variables Below Proficient

Combined with Not Proficient and Proficient Combined with Advanced scores on the 10^{th} Grade SBA.

The independent variables were:

Teacher Turnover= turnoverrate

School Size = schoolsize

Percent of student population reported as Receiving Free/Reduced Lunch = reducedlunch

Percent of student population reported as Alaska Native = aknative

The two dependent variables tested were:

Not Proficient Combined with Below Proficient 10^{th} Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10^{th} Grade SBA Mathematics Exam

These variables were selected for two primary reasons. The variables reported the strongest bivariate correlations for all scenarios and the variables also indicate binary results on the standardized 10^{th} Grade SBA, pass or fail.

3.5 Combinations of Variables in Partial Correlations

Control Variable: Teacher Turnover= turnoverrate

School Size = schoolsize

Percent of student population reported as Receiving Free/Reduced Lunch = reducedlunch

Percent of student population reported as Alaska Native = aknative

Not Proficient Combined with Below Proficient 10th Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10th Grade SBA Mathematics Exam

Control Variable: School Size = schoolsize

Percent of student population reported as Receiving Free/Reduced Lunch = reducedlunch

Percent of student population reported as Alaska Native = aknative

Teacher Turnover= turnoverrate

Not Proficient Combined with Below Proficient 10th Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10th Grade SBA Mathematics Exam

Control Variable: Percent of student population reported as Receiving Free/ Reduced Lunch = reducedlunch

School Size = schoolsize

Percent of student population reported as Alaska Native = aknative

Teacher Turnover= turnoverrate

Not Proficient Combined with Below Proficient 10th Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10th Grade SBA Mathematics Exam

Control Variable: Percent of student population reported as Alaska Native = aknative

School Size = schoolsize

Teacher Turnover= turnoverrate

Percent of student population reported as Receiving Free/Reduced Lunch = reducedlunch

Not Proficient Combined with Below Proficient 10th Grade SBA Mathematics Exam

Proficient Combined with Advanced Proficient 10th Grade SBA Mathematics Exam

3.6 Initial Testing

Data sets were initially tested for bivariate correlations utilizing Pearson's correlation formula. A general form of this equation is listed below.

$$r = \frac{\sum XY - \frac{\sum X \sum Y}{N}}{\sqrt{\left(\sum X^2 - \frac{(\sum X^2)}{N}\right)\left(\sum Y^2 - \frac{(\sum Y^2)}{N}\right)}}$$

With the following definition of the variables:

r = *rho* the correlation being calculated

X= First data set.

Y= Second data set.

$\sum$ = The summation of the given variable

N = Number of values in the data sets

The resulting values of Rho were tested and reported along generally accepted statistically significant confidence intervals of 95% and 99% with two tailed t-tests. The general formula for t-test is as follows.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{X_1X_2} \cdot \sqrt{\frac{2}{n}}}$$

With the following definition of the variables:

t = the t statistic being calculated

$\bar{X}_1$ = The arithmetic mean of the first data set.

$\bar{X}_2$ = The arithmetic mean of the second data set.

$S_{X_1X_2}$. = The estimator of standard deviation for the two data sets being evaluated.

n = Number of participants in the data sets

The following formula further clarifies how part of the denominator for the above formula is calculated.

$$S_{X_1X_2} = \sqrt{\frac{S_{X_1}^2 + S_{X_2}^2}{2}}$$

These calculations were implemented with the assistance of the software program, *Statistical Package for the Social Sciences (SPSS).* This is an established statistical software program first released in 1968 with the 18th version being the most current. The 18th version is known as *Predictive Analysis Software (PASW)* as the rights to the software were recently purchased by *International Business Machines (IBM).*

Initial data sets were provided in Microsoft Excel spreadsheets and converted to a format that SPSS could more readily utilize. Numerical values were not changed during this process. Correlations were run three different times to check for errors or differences in reported results; there were none.

Each variable was then paired with the other nine variables for a direct bivariate correlation comparison. The resulting correlation values run along the established +1 to -1 value. These values and their possible connections are discussed in the results section of this dissertation.

To further verify initial bivariate correlation trends the data was then re-tested utilizing Spearman's correlation formula. Spearman's correlation formula varies from Pearson's correlation formula in that the computations are done after the values are converted to ranks. That is, the smallest value of X becomes a rank of 1, the next value of X is converted to 2, and so on and so forth. The general formula for Spearman's correlation is as follows.

$$r_s = 1 - \frac{6(\sum D^2)}{N(N^2 - 1)}$$

With the following definition of the variables:

r_s = Spearman's Rank Order Coefficient being calculated.

6 = Is a constant of the stated formula.

$\sum D^2$ = The summation of the difference between the subject ranks of the two variables being tested.

N = Number of participants or subjects in the data sets.

The resulting correlations were applied along identical confidence intervals of 95% and 99% with two tailed t-tests. The results of Spearman's bivariate correlations and Pearson's bivariate correlations followed similar patterns.

Once the initial bivariate correlation test results were evaluated for possible connections, the researcher then utilized the process of partial correlations to further observe possible connections and interactions between the independent variables.

3.7 Partial Correlations

Partial correlation computations are utilized when there may be interactions between the variables. The process of utilizing partial correlations allows the researcher to consider the cases when these interacting variables cannot be fully isolated from the other variables. This process also allows a researcher to more fully investigate the bivariate correlation computations with an emphasis on possible inter-connections of the variables. The following is a general example of the formulas being utilized in the calculation of partial correlations.

$$\hat{p}XY \cdot Z = \frac{N\sum_{i=1}^{N} r_{X,i} r_{Y,i} - \sum_{i=1}^{N} r_{X,i} r_{Y,i} \sum_{i=1}^{N} r_{Y,i}}{\sqrt{N\sum_{i=1}^{N} r_{X,i}^2 - \left(\sum_{i=1}^{N} r_{X,i}^2\right)^2} \sqrt{N\sum_{i=1}^{N} r_{Y,i}^2 - \left(\sum_{i=1}^{N} r_{Y,i}^2\right)^2}}$$

$\hat{p}XY \cdot Z =$ The partial correlation being calculated between the variables X, Y, Z.

N = Number of participants or subjects in the data sets.

$\sum$ = The summation of the following values.

i = 1 is the initial stating point of the summation.

$r_{X,i}$= The residual value of the variable X.

$r_{Y,i}$= The residual value of the variable Y.

The calculation of partial correlations was completed within SPSS to minimize any variance between statistical programs. Results from the initial partial correlations were analyzed by the researcher. As trends became evident the process of applying Hotelling–T Squared analysis to further investigate the partial correlations and explore/extend the multivariate analysis was included. Here is the general Hotelling-T Squared formula.

$$T^2 = \frac{n_1 n_2(\bar{X}_1 - \bar{X}_2)'S^{-1}(\bar{X}_1 - \bar{X}_2)}{n_1 + n_2}$$

$\bar{X}_1$ = The arithmetic mean of the first data set.

$\bar{X}_2$ = The arithmetic mean of the second data set.

$'S^{-1}$ = Sample matrix.

n = Number of participants in the data sets.

This study reports the Hotelling Trace Coefficient which divides the Hotelling-T Squared result by (N-m) where N is the total sample size, and m is the number of groups. The Hotelling Trace Coefficient, also known as Lawley-Hotelling or Hotelling-Lawley Trace, is used as a multivariate test of mean differences between groups.

The application of multivariate analysis will also allow variables to be evaluated in multiple combinations with in-depth analysis of multiple factors interacting with one another. Information is presented in a condensed chart format with narrative explanation below the charts. The complete data results for each chart are available as an appendix and are noted with each chart in their respective results section.

CHAPTER FOUR: RESULTS

Results for the correlations analysis include several pieces of information. The first part contains a table of the results for that data run. The second part contains a brief narrative regarding that data set. The third part is a brief summary regarding the results for that type of testing; bivariate, partial correlation, multivariate analysis and Hotelling Trace. Finally a comprehensive discussion of trends in the results is covered in the summary and conclusions chapter of the dissertation.

The following is a sample table of the results for a correlation analysis. The sample table is then followed by a table that briefly explains to the reader how to read these tables.

Table 4.1 (Sample)Teacher Turnover Pearson Correlations

		turn over rate	aprof math SBA	bp-np math SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
turnoverrate	Pearson Correlation	1	-.531**	.554**	-.367**	-.429**	.344*	.438**
	Sig. (2-tailed)		.000	.000	.006	.001	.011	.001
	N	54	54	54	54	54	54	54

**. Correlation is significant at the 0.01 level (2-tailed).

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

Table 4.2 (Sample) Type of Correlation Being Performed and Variable Name.			
Teacher Turnover Pearson Correlations			
		Names of variables being correlated to variable listed on the left side.	npmath SBA
turnoverrate Name of variable being correlated to variables listed across the top of the results.	Type of correlation being preformed.	These correlations are based on the data set of the single variable on the left with the data set of the single variable listed above. Correlations have possible range values of -1, to +1. The closer the value is to "0" the less correlation there is.	.438**
	Sig. (2-tailed)→ Statistical significance value. The closer the number is to .000 the stronger the significance. A common indicator of significance is .05 or below, and .01 or below, noted above the correlation values as **, or *. 2-tailed test means the test was run for both positive and negative results.		.001
	N	Number of complete data sets for these calculations.	54
**. Correlation is significant at the 0.01 level (2-tailed). This indicates there is less than a 1% chance these results can occur randomly, or these results occur within a 99% confidence interval of being statistically significant.			
*. Correlation is significant at the 0.05 level (2-tailed). This indicates there is less than a 5% chance these results can occur randomly, or these results occur within a 95% confidence interval of being statistically significant.			

For the sample provided above:

The correlation being completed is Pearson's bivariate correlation. Variables being correlated include teacher turnover and not proficient math 10th grade SBA. The correlation value is a positive .438**, which is statistically significant to the .01 level. The overall significance of the test was .001, which is very significant. The number of Alaska school districts that had enough data sets for this test was 54.

4.1 Teacher Turnover Bivariate Correlation Results

Table 4.3 Teacher Turnover Pearson's Correlations

		turn over rate	aprof math SBA	bp-np math SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
turnoverrate	Pearson Correlation	1	-.531**	.554**	-.367**	-.429**	.344*	.438**
	Sig. (2-tailed)		.000	.000	.006	.001	.011	.001
	N	54	54	54	54	54	54	54

Results excerpted from Appendix A
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.4 Teacher Turnover Spearman's Correlations

			turn over rate	aprof math SBA	bp-np math SBA	amath SBA	prof math SBA	bpmath SBA	npmath SBA
Spearman's rho	turnover rate	Correlation Coefficient	1.000	-.539**	.580**	-.488**	-.376**	.377**	.495**
		Sig. (2-tailed)	.	.000	.000	.000	.005	.005	.000
		N	54	54	54	54	54	54	54

Results excerpted from Appendix B
**. Correlation is significant at the 0.01 level (2-tailed).

4.2 Narrative Teacher Turnover Bivariate Correlations

The correlation results indicate there are statistically significant results with 99% confidence in the areas of: not proficient math 10th grade SBA, proficient math 10th grade SBA, advanced math 10th grade SBA, below proficient combined with not proficient math 10th grade SBA, and advanced proficient combined with proficient math 10th grade SBA.

The correlation results indicate there are statistically significant results with

95% confidence in the area of: below proficient math 10th grade SBA.

The results indicate there is a very strong connection between teacher turnover and results on the state of Alaska math 10th grade SBA. The correlations are evident across all proficiency levels of the exam. Teacher turnover has a very strong negative correlation in the combined area of advanced and proficient 10th grade SBA scores on the exam. There is direct correlation between with teacher turnover and below proficient and not proficient of the 10th grade SBA exam scores. The results are similar for both Pearson's and Spearman's correlations applications.

4.3 School Size Bivariate Correlation Results

Table 4.5 School Size Pearson's Correlations									
		school size	aprofmath SBA	bp-np SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
schoolsize	Pearson Correlation	1	-.374**	.403**	-.246	-.335*	.154	.385**
	Sig. (2-tailed)		.006	.003	.076	.014	.272	.004
	N	53	53	53	53	53	53	53

Results excerpted from Appendix C
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.6 School Size Spearman's Correlations									
			school size	aprof math SBA	bp-np math SBA	amath SBA	prof math SBA	bpmath SBA	npmath SBA
Spearman's rho	schoolsize	Correlation Coefficient	1.000	-.414**	.456**	-.440**	-.320*	.183	.447**
		Sig. (2-tailed)	.	.002	.001	.001	.020	.191	.001
		N	53	53	53	53	53	53	53

Results excerpted from Appendix D
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

4.4 Narrative School Size Bivariate Correlations

The correlation results indicate there are statistically significant results with 99% confidence in the areas of: not proficient math 10th grade SBA , below proficient combined with not proficient math 10th grade SBA, and advanced proficient combined with proficient math 10th grade SBA.

The correlation results indicate there are statistically significant results with 95% confidence in the areas of: proficient math 10th grade SBA and below proficient math 10th grade SBA.

The following variables indicate little or no correlation with school size: below proficient math 10th grade SBA.

The results indicate there are some strong connections between school size and results on the state of Alaska math 10th grade SBA. The correlation has strong indications that school size has a negative correlation in the combined area of advanced and proficient for students. These results also indicate a connection of a student scoring in some areas of the lower proficiency levels on the exam with regards to school size.

The results are similar for both Pearson's and Spearman's correlations applications with the exception of advanced math 10th grade SBA.

4.5 Free/Reduced Lunch Bivariate Correlation Results

Table 4.7 Free/Reduced Lunch Pearson's Correlations

		reduced lunch	aprof math SBA	bp-np math SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
reducedlunch	Pearson Correlation	1	-.358*	.384**	-.427**	-.156	.203	.355*
	Sig. (2-tailed)		.013	.007	.002	.289	.167	.013
	N	48	48	48	48	48	48	48

Results excerpted from Appendix E
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.8 Free/Reduced Lunch Spearman's Correlations

			reduced lunch	aprofmath SBA	bp-np math SBA	amath SBA	prof math SBA	bpmath SBA	npmath SBA
Spearman's rho	reduced lunch	Correlation Coefficient	1.000	-.378**	.410**	-.480**	-.101	.227	.359*
		Sig. (2-tailed)	.	.008	.004	.001	.494	.121	.012
		N	48	48	48	48	48	48	48

Results excerpted from Appendix F
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

4.6 Narrative Free/Reduced Bivariate Correlations

The correlation results indicate there are statistically significant results with 99% confidence in the areas of: advanced math 10th grade SBA, below proficient combined with not proficient math 10th grade SBA.

The correlation results indicate there are statistically significant results with 95% confidence in the area of: not proficient math 10th grade SBA.

The following variables indicate little or no correlation with free/reduced lunch: proficient math 10th grade SBA and below proficient math 10th grade SBA.

These results indicate there are connections between free/reduced lunch and exam results on the Alaska math 10th grade SBA. The correlation demonstrates with very strong indications that free/reduced lunch has a negative correlation in the area of advanced math 10th grade SBA. There is also a very strong correlation between the below proficient combined with not proficient math 10th grade SBA and free/reduced lunch.

The results are similar for both Pearson's and Spearman's correlations applications.

4.7 Percent Alaska Native of School Population Bivariate Correlation Results

Table 4.9 Percent Alaska Native of School Population Pearson's Correlations

		ak native	aprofmath SBA	bp-npmath SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
aknative	Pearson Correlation	1	-.621**	.645**	-.532**	-.418**	.318*	.566**
	Sig. (2-tailed)		.000	.000	.000	.002	.019	.000
	N	54	54	54	54	54	54	54

Results excerpted from Appendix G
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.10 Percent Alaska Native of School Population Spearman's Correlations

			ak native	aprof math SBA	bp-npmath SBA	amath SBA	prof math SBA	bpmath SBA	npmath SBA
Spearman's rho	aknative	Correlation Coefficient	1.000	-.608**	.634**	-.554**	-.384**	.335*	.566**
		Sig. (2-tailed)	.	.000	.000	.000	.004	.013	.000
		N	54	54	54	54	54	54	54

Results excerpted from Appendix H
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

4.8 Narrative Percent Alaska Native of School Population Bivariate Correlation Results

The correlation results indicate there are statistically significant results with 99% confidence in the areas of: not proficient math 10th grade SBA, proficient math 10th grade SBA, advanced math 10th grade SBA, below proficient combined with not proficient math 10th grade SBA, and advanced proficient combined with proficient math 10th grade SBA.

The correlation results indicate there are statistically significant results with 95% confidence in the area of: below proficient math 10th grade SBA.

The results indicate there is a very strong connection between percent Alaska Native students of school population and exam results on the state of Alaska math 10th grade SBA. The correlation is for all proficiency levels of the exam with very strong indications that percent Alaska Native students of school population has a negative correlation in the combined area of advanced and proficient 10th grade SBA for students.

The results also indicate a connection of a student scoring in the advanced or proficient level is impacted by the percent Alaska Native students of school population just as the connection for scoring lower on the exam correlates fairly directly with the percent Alaska Native students of school population.

The results are similar for both Pearson's and Spearman's correlations applications.

4.9 Summary Bivariate Correlations Results

All four of the variables; teacher turnover, school size, percent students receiving free/reduced lunch, and percent of Alaska Native students in the school population, indicate significant correlations between many areas of proficiency in regards to the Alaska 10^{th} grade math SBA.

The variables of teacher turnover and percent Alaska Native demonstrate strong initial trends that are statistically significant at all proficiency levels of the Alaska 10^{th} grade math SBA.

4.10 Partial Correlations Teacher Turnover Results

Table 4.11 Partial Correlations Controlled for Teacher Turnover

Control Variables			bp-npmath SBA	aprofmath SBA	reduced lunch	school size	aknative
turnover rate	reducedlunch	Correlation	.211	-.187	1.000	.163	.677
		Significance (2-tailed)	.159	.213	.	.279	.000
	schoolsize	Correlation	.076	-.047	.163	1.000	.248
		Significance (2-tailed)	.614	.758	.279	.	.096
	aknative	Correlation	.411	-.389	.677	.248	1.000
		Significance (2-tailed)	.005	.007	.000	.096	.

4.11 Narrative Partial Correlations Teacher Turnover Results

The partial correlation results indicate when teacher turnover is controlled for; there are statistically significant results with 99% confidence in the areas of: below proficient combined with not proficient math 10th grade SBA and percent Alaska Native students of school population and advanced proficient combined with proficient Math 10th grade SBA and percent Alaska Native students of school population

The correlation results indicate there are no statistically significant results with 95% confidence.

The results indicate that when teacher turnover is controlled for, or the influence of teacher turnover is removed from the results, there is a very strong connection between percent Alaska Native student population and results on the state of Alaska math 10^{th} grade SBA .

The proficiency levels on the Alaska math 10^{th} grade SBA exam demonstrate a very strong indication that percent Alaska Native students of school population have a strong negative correlation in the combined area of advanced and proficient for students and a statistically significant correlation in the percent Alaska Native students of school population in regards to the below proficient and not proficient combined score on the Alaska 10^{th} grade math SBA.

The other two variables of school size and free/reduced lunch have no statistically significant correlations with regards to the 10^{th} grade math SBA results when teacher turnover is controlled for.

Of significant note a very strong correlation between percent Alaska Native students of school population and percent receiving free/reduced lunch is indicated. This shows a very strong connection between poverty levels and Alaska Native student populations regardless of teacher turnover.

4.12 Partial Correlations School Size Results

Table 4.12 Partial Correlations Controlled for School Size							
Control Variables			bp-npmath SBA	aprofmath SBA	turnover rate	reduced lunch	aknative
schoolsize	turnoverrate	Correlation	.433	-.426	1.000	.222	.452
		Significance (2-tailed)	.003	.003	.	.139	.002
	reducedlunch	Correlation	.274	-.255	.222	1.000	.680
		Significance (2-tailed)	.066	.087	.139	.	.000
	aknative	Correlation	.522	-.508	.452	.680	1.000
		Significance (2-tailed)	.000	.000	.002	.000	.

4.13 Narrative Partial Correlations School Size Results

The partial correlation results indicate that when school size is controlled for, there are statistically significant results with 99% confidence in the areas of: below proficient combined with not proficient math 10th grade SBA and percent Alaska Native students of school population; advanced proficient combined with proficient math 10th grade SBA and percent Alaska Native students of school population; below proficient combined with not proficient math 10th grade SBA and teacher turnover; and advanced proficient combined with proficient math 10th grade SBA and teacher turnover.

The partial correlation results indicate there are no statistically significant results with 95% confidence.

The results indicate that when school size is controlled for, or the influence of school size is removed from the results, there is a very strong connection between percent Alaska Native student population and results on the Alaska math 10th grade SBA. This is demonstrated by a very strong negative correlation in the combined advanced and proficient for Alaska 10th grade math SBA and a statistically significant correlation in the percent Alaska Native students of school population in regards to the below proficient and not proficient combined score on the Alaska 10th grade math SBA.

The variable of free/reduced lunch exhibits no statistically significant correlations with regards to the 10th grade math SBA results. It is worth noting that these results would be significant at the 90% level of confidence. This indicates some level of connection between free/reduced lunch and proficiency levels on the Alaska 10th grade SBA when controlling for school size.

It is of significant note that a very strong correlation between teacher turnover and Alaska Native student population is indicated. The results also indicate a very strong connection between Alaska Native student percentage of school population and the teacher turnover regardless of school sizes.

4.14 Partial Correlations Free/Reduced Lunch Results

Table 4.13 Partial Correlations Controlled for Free/Reduced Lunch							
Control Variables			bp-np mathSBA	aprofmath SBA	turnover rate	school size	aknative
reduced lunch	turnoverrate	Correlation	.485	-.467	1.000	.566	.564
		Significance (2-tailed)	.001	.001	.	.000	.000
	schoolsize	Correlation	.306	-.276	.566	1.000	.449
		Significance (2-tailed)	.039	.063	.000	.	.002
	aknative	Correlation	.543	-.529	.564	.449	1.000
		Significance (2-tailed)	.000	.000	.000	.002	.

4.15 Narrative Partial Correlations Free/Reduced Lunch Results

The partial correlation results indicate when free/reduced lunch is controlled for there are statistically significant results with 99% confidence in the areas of: below proficient combined with not proficient math 10th grade SBA and percent Alaska Native of school population; advanced proficient combined with proficient math 10th grade SBA and percent Alaska Native of school population; below proficient combined with not proficient math 10th grade SBA and teacher turnover; and advanced proficient combined with proficient math 10th grade SBA and teacher turnover.

The correlation results indicate there is one statistically significant result with 95% confidence: below proficient combined with not proficient math 10th grade SBA and school size.

The results indicate that when free/reduced lunch is controlled for, or the influence of free/reduced lunch is removed from the results, there is a very strong connection between percent Alaska Native of school population and results on the Alaska math 10^{th} grade SBA.

The proficiency levels on the math 10^{th} grade SBA exam demonstrate a very strong indication that percent Alaska Native of school population have a very strong negative correlation in the combined area of advanced and proficient for students and a statistically significant correlation in the percent Alaska Native of school population in regards to the below proficient and not proficient combined score on the Alaska 10^{th} grade math SBA.

The results also indicate that when free/reduced lunch is controlled for, or the influence of free/reduced lunch is removed from the results, there is a very strong connection between teacher turnover and results on the Alaska math 10^{th} grade SBA. These results demonstrate a very strong indication that teacher turnover has a very strong negative correlation in the combined area of advanced and proficient for students and a statistically significant correlation in the percent Alaska Native of school population in regards to the below proficient and not proficient combined score on the Alaska 10^{th} grade math SBA.

The variable of school size demonstrates statistically significant correlations with regards to the below proficient combined with not proficient 10^{th} grade math SBA results when controlling for free/reduced lunch. It is worth noting again that the results between school size and advanced combined with proficient levels on the Alaska 10th grade SBA when controlling for free/reduced lunch.

It is significant to note that a very strong correlation between teacher turnover and percent Alaska Native of school population is indicated. This, once again, shows a very strong connection between and Alaska Native student populations and the teacher turnover regardless of free/reduced lunch.

The variable of school size demonstrates statistically significant correlations with regards to teacher turnover when controlling for free/reduced lunch.

4.16 Partial Correlations Percent Alaska Native of School Population Results

Table 4.14 Partial Correlations Controlled for Percent Alaska Native of School Population							
Control Variables			bp-np mathSBA	aprofmath SBA	reduced lunch	turnover rate	school size
aknative	reducedlunch	Correlation	-.136	.146	1.000	-.148	-.070
		Significance (2-tailed)	.368	.333	.	.327	.643
	turnoverrate	Correlation	.273	-.257	-.148	1.000	.428
		Significance (2-tailed)	.067	.084	.327	.	.003
	schoolsize	Correlation	.091	-.061	-.070	.428	1.000
		Significance (2-tailed)	.546	.686	.643	.003	.

4.17 Narrative Partial Correlations Percent Alaska Native of School Population

The partial correlation results indicate that when and percent Alaska Native students of school population is controlled for there are statistically significant results with 99% confidence in the areas of: teacher turnover and school size.

The results indicate that when percent Alaska Native of school population is controlled for, or the influence of percent Alaska Native of school population is removed from the results, there is a very strong connection between teacher turnover and school size.

The correlation results indicate that there are no statistically significant results with 95% confidence.

The variables of school size and free/reduced lunch have no statistically significant correlations with regards to the 10^{th} grade math SBA results when percent Alaska Native of school population is controlled for.

It is significant to note that correlations at the 90% confidence exist between teacher turnover and both the below proficient and not proficient combined scores and the advanced and proficient combined scores of the Alaska 10^{th} grade SBA.

4.18 Multivariate Analysis and Hotelling's Trace for Teacher Turnover and Free/Reduced Lunch Results

Table 4.15 Multivariate Tests Teacher Turnover and Free/Reduced Lunch

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
turnoverrate	Hotelling's Trace	.352	7.754[a]	2.000	44.00	.001	15.508	.936
reducedlunch	Hotelling's Trace	.075	1.644[a]	2.000	44.00	.205	3.289	.328

Table 4.16 Tests of Between-Subjects Effects Teacher Turnover and Free/Reduced Lunch

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
turnoverrate	bp-npmathSBA	4124.731	1	4124.731	14.383	.000	14.383	.960
	aprofmathSBA	3691.900	1	3691.900	12.720	.001	12.720	.937
reducedlunch	bp-npmathSBA	613.803	1	613.803	2.140	.150	2.140	.299
	aprofmathSBA	475.530	1	475.530	1.638	.207	1.638	.240

***For complete test results refer to Appendix I

4.19 Narrative Multivariate Analysis and Hotelling's Trace for Teacher Turnover and Free/Reduced Lunch Results

The multivariate analysis results indicate there are two statistically significant results with 99% confidence: teacher turnover and below proficient combined with not proficient 10th grade SBA; and teacher turnover and advanced combined with proficient 10th grade SBA.

The results indicate that there are no statistically significant results with 95% confidence.

The observed power value has two connections to note: teacher turnover and below proficient combined with not proficient 10th grade SBA as well as teacher turnover and advanced combined with proficient 10th grade SBA.

Direct comparison through Hotelling's Trace indicates teacher turnover exceeds free/reduced lunch at nearly five times the reported value and influence for free/reduced lunch.

4.20 Multivariate Analysis and Hotelling's Trace for Teacher Turnover and School Size Results

Table 4.17 Multivariate Test Teacher Turnover and School Size

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
turnoverrate	Hotelling's Trace	.211	5.167[a]	2.000	49.000	.009	10.334	.803
schoolsize	Hotelling's Trace	.067	1.634[a]	2.000	49.000	.206	3.269	.329

Table 4.18 Tests of Between-Subjects Effects Teacher Turnover and School Size

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
turnoverrate	bp-npmathSBA	3100.727	1	3100.727	10.41	.002	10.415	.886
	aprofmathSBA	3023.202	1	3023.202	9.998	.003	9.998	.873
schoolsize	bp-npmathSBA	187.989	1	187.989	.631	.431	.631	.122
	aprofmathSBA	106.978	1	106.978	.354	.555	.354	.090

***For complete test results refer to Appendix J

4.21 Narrative Multivariate Analysis and Hotelling's Trace for Teacher Turnover and School Size Results

The multivariate analysis results indicate that there are two statistically significant results with 99% confidence: teacher turnover and below proficient combined with not proficient 10th grade SBA as well as teacher turnover and advanced combined with proficient 10th grade SBA.

The results indicate that there are no statistically significant results with 95% confidence.

The observed power value has two connections to note: teacher turnover and below proficient combined with not proficient 10^{th} grade SBA as well as teacher turnover and advanced combined with proficient 10^{th} grade SBA.

Direct comparison through Hotelling's Trace indicates teacher turnover exceeds school size at nearly three times the reported value and influence for school size.

4.22 Multivariate Analysis and Hotelling's Trace for Teacher Turnover and Percent Alaska Native of School Population

Table 4.19 Multivariate Tests Teacher Turnover and Percent Alaska Native of School Population

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
turnoverrate	Hotelling's Trace	.104	2.599[a]	2.000	50.000	.084	5.199	.495
aknative	Hotelling's Trace	.327	8.171[a]	2.000	50.000	.001	16.343	.949

Table 4.20 Tests of Between-Subjects Effects Teacher Turnover and Percent Alaska Native of School Population

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
turnoverrate	bp-npmathSBA	1040.210	1	1040.210	4.523	.038	4.523	.550
	aprofmathSBA	913.306	1	913.306	3.844	.055	3.844	.486
aknative	bp-npmathSBA	3446.240	1	3446.240	14.98	.000	14.984	.967
	aprofmathSBA	3109.123	1	3109.123	13.08	.001	13.085	.944

***For complete test results refer to Appendix K

4.23 Narrative Multivariate Analysis and Hotelling's Trace for Teacher Turnover and Percent Alaska Native of School Population

The multivariate analysis results indicate there are two statistically significant results with 99% confidence: percent Alaska Native of school population and below proficient combined with not proficient 10th grade math SBA as well as percent Alaska Native of school population and advanced combined with proficient 10th grade math SBA

The results indicate there are two statistically significant results at or near the 95% confidence: teacher turnover and below proficient combined with not proficient 10^{th} grade math SBA; and teacher turnover and advanced combined with proficient 10^{th} grade math SBA.

The observed power value has two connections to note; percent Alaska Native of school population and below proficient combined with not proficient 10^{th} grade math SBA as well as percent Alaska Native of school population and advanced combined with proficient 10^{th} grade math SBA.

Direct comparison through Hotelling's Trace indicates percent Alaska Native of school population exceeds teacher turnover at just over three times the reported value and influence for percent Alaska Native of school population.

4.24 Multivariate Analysis and Hotelling's Trace for Free/Reduced Lunch and School Size

Table 4.21 Multivariate Tests Free/Reduced Lunch and School Size								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
reduced lunch	Hotelling's Trace	.108	2.312[a]	2.000	43.000	.111	4.625	.444
schoolsize	Hotelling's Trace	.178	3.820[a]	2.000	43.000	.030	7.641	.664

Table 4.22 Tests of Between-Subjects Effects Free/Reduced Lunch and School Size								
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
reducedlunch	bp-npmathSBA	1230.584	1	1230.584	3.563	.066	3.563	.455
	aprofmathSBA	1075.805	1	1075.805	3.068	.087	3.068	.403
schoolsize	bp-npmathSBA	1566.017	1	1566.017	4.534	.039	4.534	.549
	aprofmathSBA	1276.777	1	1276.777	3.641	.063	3.641	.463

***For complete test results refer to Appendix L

4.25 Narrative Multivariate Analysis and Hotelling's Trace for Free/Reduced Lunch and School Size

The multivariate analysis results indicate that there are no statistically significant results with 99% confidence when comparing free/reduced lunch and school size.

The results indicate there is one statistically significant result with 95% confidence: school size and below proficient combined with not proficient 10th grade math SBA.

The results indicate three statistically significant results at the 90%

confidence: free/reduced lunch and below proficient combined with not proficient 10^{th} grade math SBA; free/reduced lunch and advanced combined with proficient 10^{th} grade math SBA; and school size and advanced proficient combined with proficient 10^{th} grade math SBA.

The observed power value denotes school size as slightly more influential then free/reduced lunch when applied to this set of variables.

Direct comparison through Hotelling's Trace indicates school size has a slightly greater influence upon the given test score results when compared directly with free/reduced lunch and only school size is statistically significant with 95% confidence.

4.26 Multivariate Analysis and Hotelling's Trace for Free/Reduced Lunch and Percent Alaska Native of School Population

Table 4.23 Multivariate Tests Free/Reduced Lunch and Percent Alaska Native of School Population								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
reducedlunch	Hotelling's Trace	.024	.525[a]	2.000	44.000	.595	1.050	.131
aknative	Hotelling's Trace	.451	9.915[a]	2.000	44.000	.000	19.830	.978

Table 4.24 Tests of Between-Subjects Effects Free/Reduced Lunch and Percent Alaska Native of School Population								
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
reducedlunch	bp-npmathSBA	227.913	1	227.913	.862	.358	.862	.149
	aprofmathSBA	261.740	1	261.740	.979	.328	.979	.162
aknative	bp-npmathSBA	5128.508	1	5128.508	19.391	.000	19.391	.991
	aprofmathSBA	4717.880	1	4717.880	17.641	.000	17.641	.984

***For complete test results refer to Appendix M

4.27 Narrative Multivariate Analysis and Hotelling's Trace for Free/Reduced Lunch and Percent Alaska Native of School Population

The multivariate analysis results indicate that there are statistically significant results with 99% confidence when comparing: percent Alaska Native of school population and below proficient combined with not proficient math SBA; and percent Alaska Native of school population and advanced combined with proficient math SBA.

The results indicate there are no statistically significant results with 95% confidence.

The observed power value for percent Alaska Native of school population is almost the maximum theoretical value of 1.000 for all scenarios, with a value almost eight times greater than free/reduced lunch.

Direct comparison through Hotelling's Trace indicates percent Alaska Native of school population value is twenty times greater than the observed value for free/reduced lunch. The results regarding percent Alaska Native of school population are significant at the highest theoretical value.

4.28 Multivariate Analysis and Hotelling's Trace for Percent Alaska Native of School Population and School Size

Table 4.25 Multivariate Tests Percent Alaska Native of School Population and School Size

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
aknative	Hotelling's Trace	.456	11.179[a]	2.000	49.000	.000	22.357	.989
schoolsize	Hotelling's Trace	.062	1.523[a]	2.000	49.000	.228	3.046	.309

Table 4.26 Tests of Between-Subjects Effects Percent Alaska Native of School Population and School Size

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
aknative	bp-npmathSBA	5430.080	1	5430.080	21.622	.000	21.622	.995
	aprofmathSBA	5186.859	1	5186.859	20.017	.000	20.017	.992
schoolsize	bp-npmathSBA	139.508	1	139.508	.555	.460	.555	.113
	aprofmathSBA	74.685	1	74.685	.288	.594	.288	.082

***For complete test results refer to Appendix N

4.29 Narrative Multivariate Analysis and Hotelling's Trace for Percent Alaska Native of School Population and School Size

The multivariate analysis results indicate that there are statistically significant results with 99% confidence when comparing: percent Alaska Native of school population and below proficient combined with not proficient math SBA; and percent Alaska Native of school population and advanced combined with proficient math SBA.

The results indicate there are no statistically significant results with 95% confidence.

The observed power value for percent Alaska Native of school population is almost the maximum theoretical value of 1.000 for all scenarios, with a value about three times greater than school size. School size has no statistically significant results to report in this set of results.

Direct comparison through Hotelling's Trace indicates percent Alaska Native of school population value is nearly eight times greater than the observed value for school size. The results for both comparisons regarding percent Alaska Native of school population are significant at the highest theoretical value.

4.30 Multivariate Analysis and Hotelling's Trace for Percent Alaska Native of School Population and Teacher Turnover

Table 4.27 Multivariate Tests Percent Alaska Native of School Population and Teacher Turnover

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
aknative	Hotelling's Trace	.327	8.171[a]	2.000	50.000	.001	16.343	.949
turnover rate	Hotelling's Trace	.104	2.599[a]	2.000	50.000	.084	5.199	.495

Table 4.28 Tests of Between-Subjects Effects Percent Alaska Native of School Population and Teacher Turnover

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
aknative	bp-npmathSBA	3446.240	1	3446.240	14.984	.000	14.984	.967
	aprofmathSBA	3109.123	1	3109.123	13.085	.001	13.085	.944
turnoverrate	bp-npmathSBA	1040.210	1	1040.210	4.523	.038	4.523	.550
	aprofmathSBA	913.306	1	913.306	3.844	.055	3.844	.486

***For complete test results refer to Appendix 11A

4.31 Narrative Multivariate Analysis and Hotelling's Trace for Percent Alaska Native of School Population and Teacher Turnover

The multivariate analysis results indicate that there are two statistically significant results with 99% confidence: percent Alaska Native of school population and below proficient combined with not proficient math SBA; and percent Alaska Native of School population and advanced combined with proficient math SBA.

The results indicate there are two statistically significant results with 95% confidence: teacher turnover and below proficient combined with not proficient math SBA; and teacher turnover and advanced combined with proficient math SBA

The observed power value for percent Alaska Native of school population is about two times greater times greater than teacher turnover.

Direct comparison through Hotelling's Trace indicates percent Alaska native of school population value is nearly three times greater than the observed value for teacher turnover. The results for comparisons regarding percent Alaska Native of school population are significant with 99% confidence.

The comparisons regarding teacher turnover are statistically significant at the 90% confidence level.

4.32 Summary of 2 Covariate Systems

When completing the initial analysis of systems with two covariates the results indicate that the variables percent of Alaska Native of school population and teacher turnover are the two primary variables that are statistically significant when applied in direct comparison with school size and free/reduced lunch.

The statistical impact of these variables is so large that they render the other variables statistically insignificant when applied to the 10^{th} grade SBA math exam results.

The other connection to note is when free/reduced lunch and school size variables are placed in direct comparison with one another each of these two variables remain statistically significant.

4.33 Multivariate Analysis and Hotelling's Trace for Teacher Turnover, Free/Reduced Lunch, and School Size

Table 4.29 Multivariate Tests for Teacher Turnover, Free/Reduced Lunch, and School Size

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
turnoverrate	Hotelling's Trace	.189	3.959a	2.000	42.000	.027	7.917	.679
reducedlunch	Hotelling's Trace	.067	1.405a	2.000	42.000	.257	2.810	.285
schoolsize	Hotelling's Trace	.047	.984a	2.000	42.000	.382	1.969	.210

Table 4.30 Multivariate Tests of Between-Subjects Effects Teacher Turnover, Free/Reduced Lunch, and School Size

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
turnoverrate	bp-npmathSBA	2401.37	1	2401.371	8.070	.007	8.070	.793
	aprofmathSBA	2372.60	1	2372.601	7.813	.008	7.813	.780
reducedlunch	bp-npmathSBA	545.235	1	545.235	1.832	.183	1.832	.263
	aprofmathSBA	449.099	1	449.099	1.479	.231	1.479	.221
schoolsize	bp-npmathSBA	24.176	1	24.176	.081	.777	.081	.059
	aprofmathSBA	3.671	1	3.671	.012	.913	.012	.051

***For complete test results refer to Appendix P

4.34 Narrative Multivariate Analysis and Hotelling's Trace for Teacher Turnover, Free/Reduced Lunch, and School Size

The multivariate analysis results indicate there are two statistically significant results with 99% confidence: teacher turnover and below proficient combined with not proficient math 10th grade SBA.; and teacher turnover and advanced combined with proficient math 10th grade SBA.

The results indicate there are no statistically significant results at the 95% or 90% confidence.

The observed power value for teacher turnover is about three times greater than free/reduced lunch and school size.

Direct comparison through Hotelling's Trace indicates the Hotelling's Trace value for teacher turnover is nearly three times greater than the observed value for free/reduced lunch, and about four times greater than school size. The results for comparisons regarding teacher turnover are significant with 95% confidence. The other results are not statistically significant.

4.35 Multivariate Analysis and Hotelling's Trace for Percent Alaska Native of School Population, Free/Reduced Lunch, and School Size

Table 4.31 Multivariate Tests Percent Alaska Native of School Population, Free/Reduced Lunch, and School Size

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
aknative	Hotelling's Trace	.295	6.190[a]	2.000	42.000	.004	12.381	.869
reducedlunch	Hotelling's Trace	.028	.591[a]	2.000	42.000	.558	1.183	.142
schoolsize	Hotelling's Trace	.063	1.316[a]	2.000	42.000	.279	2.631	.269

Table 4.32 Tests of Between-Subjects Effects Percent Alaska Native of School Population, Free/Reduced Lunch, and School Size

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
aknative	bp-npmathSBA	3453.631	1	3453.631	12.646	.001	12.646	.935
	aprofmathSBA	3427.280	1	3427.280	12.278	.001	12.278	.929
reducedlunch	bp-npmathSBA	202.457	1	202.457	.741	.394	.741	.134
	aprofmathSBA	248.005	1	248.005	.888	.351	.888	.152
schoolsize	bp-npmathSBA	80.993	1	80.993	.297	.589	.297	.083
	aprofmathSBA	32.124	1	32.124	.115	.736	.115	.063

***For complete test results refer to Appendix Q

4.36 Narrative Multivariate Analysis and Hotelling's Trace for Percent Alaska Native of School Population, Free/Reduced Lunch, and School Size.

The multivariate analysis results indicate that there are two statistically significant results with 99% confidence: percent Alaska Native of school population and below proficient combined with not proficient math SBA; and percent Alaska Native of school population and advanced combined with proficient math SBA.

The results indicate there are no statistically significant results at the 95% or 90% confidence.

The observed power value for percent Alaska Native of school population is about seven times greater than free/reduced lunch, and eleven times greater than school size.

Direct comparison through Hotelling's Trace indicates the Hotelling's Trace value for percent Alaska Native of school population is nearly ten times greater than the observed value for free/reduced lunch, and about five times greater than school size.

The results for comparisons regarding percent Alaska Native of school population are significant with 99% confidence. The other results are not statistically significant.

4.37 Multivariate Analysis and Hotelling's Trace for Teacher Turnover, Percent Alaska Native of School Population, and Free/Reduced Lunch

Table 4.33 Multivariate Tests Teacher Turnover, Percent Alaska Native of School Population, and Free/Reduced Lunch

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
turnoverrate	Hotelling's Trace	.089	1.911[a]	2.000	43.000	.160	3.822	.375
aknative	Hotelling's Trace	.168	3.611[a]	2.000	43.000	.036	7.222	.637
reducedlunch	Hotelling's Trace	.017	.367[a]	2.000	43.000	.695	.734	.105

Table 4.34 Tests of Between-Subjects Effects Teacher Turnover, Percent Alaska Native of School Population, and Free/Reduced Lunch

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
turnoverrate	bp-npmathSBA	814.090	1	814.090	3.231	.079	3.231	.420
	aprofmathSBA	694.141	1	694.141	2.693	.108	2.693	.362
aknative	bp-npmathSBA	1817.867	1	1817.867	7.214	.010	7.214	.748
	aprofmathSBA	1720.122	1	1720.122	6.674	.013	6.674	.715
reducedlunch	bp-npmathSBA	113.984	1	113.984	.452	.505	.452	.101
	aprofmathSBA	145.723	1	145.723	.565	.456	.565	.114

***For complete test results refer to Appendix R

4.38 Narrative Multivariate Analysis and Hotelling's Trace for Teacher Turnover, Percent Alaska Native of School Population, and Free/Reduced Lunch

The multivariate analysis results indicate that there is one statistically significant result with 99% confidence: percent Alaska Native of school population and below proficient combined with not proficient math SBA.

The results indicate that there is one statistically significant result with 95% confidence: percent Alaska Native of school population and advanced combined with proficient math SBA.

The results indicate there are two statistically significant results at the 90%

confidence: teacher turnover and advanced combined with proficient math SBA; and teacher turnover and below proficient combined with not proficient math SBA.

The observed power value for percent Alaska Native of school population is about seven times greater than free/reduced lunch, and two times greater than teacher turnover.

Direct comparison through Hotelling's Trace indicates the Hotelling's Trace value for percent Alaska Native of school population is nearly ten times greater than the observed value for free/reduced lunch, and about two times greater than teacher turnover. The results for comparisons regarding percent Alaska Native of school population are significant with 95% confidence. The other results are not statistically significant.

4.39 Summary of Multivariate Analysis with Three Covariates

When completing the initial multivariate analysis of systems with three covariates the results indicate that the variables percent Alaska Native of school population and teacher turnover are the two primary variables that are statistically significant when applied in direct comparison with school size and free/reduced lunch.

The statistical impact of these variables has been consistently noted in the bivariate correlations, and further accentuated in the two covariate systems. In the three covariate systems the statistical influence of teacher turnover and percent Alaska Native of school population remains so large that they render the other variables statistically insignificant when applied to the Alaska10th grade math SBA exam results.

The other connection to note when the variables free/reduced lunch and school size are placed in any covariate system with percent Alaska Native of school population and teacher turnover, neither of these two variables remains statistically significant.

CHAPTER FIVE: SUMMARY

The statistical evidence from the series of correlations in this dissertation establishes that there is a connection between teacher turnover and standards-based mathematics test performance. Small schools with a predominant percentage of students that are Alaska Native are especially negatively affected by teacher turnover. "Turnover is a much bigger problem for rural than for urban districts. As a group, Alaska's five largest districts—the ones we classify as "urban"—have about 11% teacher turnover a year, compared with 24% among rural districts"(Hill & Hirshberg 2006) .

We have learned that a key factor in increasing student achievement is the ability of the teacher to stay. There is a clear connection between student achievement and their teacher remaining in the community. In Alaska it has been a long-standing challenge.

> The unique features of teaching in Alaska center upon the notion that, for most new teachers it is an extreme environment. The extremity takes not only a physical form but cultural, social, and linguistic forms as well. It has been the underlying theme of this report that such features exert unusual demands on the willingness of teachers to hold forth their effort for an extended period of time(p.18)(Orvik, 1970).

The aspects of cultural, linguistic and social challenge can be so foreign that when combined with the daily rigors of teaching, they cannot be overcome and the teacher leaves.

The recommended programmatic issues that need to be addressed should include the following:

1. New teachers should receive a substantive pre-orientation and training program tailored to the specific teaching situation they will be entering. If possible a member from the community should attend the training with the new teacher to assist in building the bonds with the community. This will allow the community member to better understand the educational responsibilities the teacher has and allow the community member to act as a liaison with the rest of the community.
2. The educator must have a continuous support structure in place with regular communication throughout the school year. This includes contact with central administration and educational peers.
3. There should be a follow-up session at the end of each year to discuss issues that arose throughout the year and how to better manage these issues.
4. In-state teacher training programs must increase their focus on local community members. This must include distance delivery options to allow future teachers to complete as much of their training in their communities.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Inclusion of Culture

The inclusion of culture within curriculum standards is critical if academic achievement is to be reflected. "Align the science, mathematics, and technology curriculum with the assessed cultural needs and concerns of the community" (American Indian & Engineering Society, 1995) .

In America we have a long history of a dominant society trying to force a singular cultural norm upon a diverse set of ethnic populations and cultures. As a nation we have yet to resolve many of these issues and such disparities may become reflected in student achievement scores.

The results of this study indicate that if we are to increase student achievement in specific Alaskan communities then we need to address cross-cultural communication as part of the performance standards. This does not imply we should lower achievement standards, rather it means culture and academic standards can and must work in unison. "They pointed out that the Indigenous cultural components must be tied to state K-12 testing standards. Without such ties, many teachers may not attempt to infuse culture into the classroom"("Study Tells How to Best Teach Native Students," 2008).

The challenge is to raise the cultural communication standards to a level equal to mathematics achievement standards. Specific mathematics content standards are in place. There are also Alaska cultural standards in place. The emphasis on cultural standards is not on equal footing with the more easily quantifiable math content standards. Cultural standards require increased attention and importance.

> The entwined nature of content, pedagogy, and culture implies that all three need to be addressed, not only in mathematics curriculum like Building a Fish Rack and other Math in a Cultural Context (MCC) modules, but also in teachers' professional development" (p.99) (Rickard, 2005).

6.2 Teacher Training

"Content, pedagogy, and culture" must be addressed in teacher development programs (Rickard, 2005). People from both native and non-native cultures working in unison as qualified professionals will foster an environment that will assist in better preparing educators for the cultural immersion they may experience.

The fact of the matter is many education programs are not cultivating professional educators from multiple cultural backgrounds. In Alaska this is manifested by the lack of Alaska Native university level faculty. The lack of Alaska Native faculty can be directly connected to the lack of Alaska Native undergraduate students. "The severe underrepresentation of Native Americans among those earning degrees reflects both extremely low enrollment or participation rates and generally poor retention rates for Native American college students"(Larimore & McClellan, 2005). If there are fewer undergraduate students from a given ethnic group, then there will be fewer graduate students. This implies even fewer future faculty members to assist in developing the cultural standards we are speaking of. In Alaska we can see this on our own campus, where at the "University of Alaska Fairbanks 16% of Native Americans that enroll complete in 6 years, all races averaged is 70%"(Education Trust, 2003). If a given ethnicity or culture has little or no faculty representation in the teacher preparation programs then the educators being prepared, aren't.

6.3 Cultural Inclusion at the University Level

New teacher's who have not gone through proper cultural training, may go into a school setting that in itself is an extension of the cultural misunderstandings that permeate much of the current system. The lack of cultural foundations and communications may be observed by the lower achievement on various content exams.

This lack of a truly diversified university and teacher education program is sometimes camouflaged by programs that flaunt faculty members of color but do not often implement systematic philosophies in their daily actions. "Too often, institutions fail to make a whole hearted commitment; instead they hire some faculty of color to implement diversity, and the process stalls"(Brayboy, 2003) . However, what sometimes appears as opposing cultures can be combined to create a greater level of achievement on all sides.

> These initiatives foster connectivity between two interdependent but historically disconnected and alienated educational systems—the

> indigenous knowledge systems rooted in native cultures, and the formal education system that has been imported. These systems have complementary scientific and mathematical knowledge and skills that can strengthen the quality of education for students throughout rural Alaska. (p.1)(Hill, Kawagley, & Barnhardt, 2000)

Math content professionals and cultural standards professionals work in two areas that many times still remain divided. " In general the professional mathematicians were on one side, and the math educators were on the other"(Mervis, 2006). Only with both sides seeking to understand and work within any given cultural standards will achievement in content areas such as math follow. We must eliminate this either/or battle as the results of combining the two areas can be very effective.

> If mathematics teachers of American Indian and Alaska Native (AIAN) students practice these principles under standards-based reforms and connect mathematics content with AIAN students' culturally-embedded daily experiences, they should be able to enhance the classroom learning experience of these students (p.21)(Akiba, Chiu, Zhuang, & Mueller, 2008).

6.4 Student Self Views

Enhancing the connection between a student's experience and their self view is critical to enhancing achievement. Students who view their culture as important will then view themselves as important, which is a foundation for increased student achievement. "Students with higher academic self-concept and higher achievement expectancies tended to earn higher mathematics course grades"(House, 2001).

6.5 Advanced Mathematics Scores

A key concept we should review is the lack of Alaska Native students that scored Advanced on standardized mathematics exams. The 2005 NAEP scores reported that 1% of Alaska Native students scored in the Advanced level of mathematics. Those numbers work out to about seventy five Alaska Native secondary students a year scoring Advanced on the exam. In reviewing the Alaska 10th grade math SBA scores, on average there were twelve to thirteen districts that reported a 0% for students scoring Advanced on the high school qualifying exam. The average percentage of Alaska Native students for these districts was over 80%. If students are not scoring Advanced in core subject areas then how can they be prepared for college? If Alaska Native students aren't successful in college the cultural diversity won't materialize in university faculty population, making it tougher to break the cycle.

> For over six generations, Alaska Native people have been experiencing negative feedback in their relationships with external systems. Though diminished and often in the background, much of the traditional knowledge systems and world views remain intact and in practice. There is a growing appreciation of the contributions that indigenous knowledge can make to our contemporary understanding

> in areas such as medicine, resource management, meteorology, biology and in basic human behavior and educational practices. Yet in order to fully benefit from these contributions, more indigenous scholars are needed (p.13)(Barnhardt & Kawagley, 2005).

6.6 What Can Educators Do?

As educators we must find effective ways to prepare our students in a manner that incorporates content and culture within these systems. This includes a systematic incorporation of both content and cultural standards in teacher preparation programs, in local, state and national legislation, as well as in our classrooms.

By better preparing teachers in both content and cultural areas we can seek to lessen teacher turnover and the corresponding negative impacts this turnover has on the communities and students left in the wake of such consistent abandonment.

The impact of teacher turnover can be observed in the achievement levels of the students as assessed in the exams. The mathematics exams can be very telling as they are accepted as a core area and their results can be readily quantified and compared in a variety of conditions. We must exercise caution in these comparisons as there may be many mitigating circumstances that bias or create false positives in the results of such comparisons. The real danger being that these inferences may then unduly influence an all too impressionable public with a slew of misconceptions regarding our schools, their staffs, teacher preparation programs, or worst of all, the students.

6.7 Closing Statement

In closing, Alaska Native and American Indian peoples have endured generations of hardships and broken promises in the area of education, with teacher turnover being a substantial contributor. What follows is a very personal essay by an Alaska Native person and how teacher turnover affected them as a student. The essay is unedited and presented as written by the original author.

6. 8 How Teachers Leaving Affected Me by K.W.

Public education in rural Alaska during the 1960's through 1970's varied a lot depending upon where a person lived but in all areas of rural Alaska one constant experienced by my generation of school children was teacher turn-over. My reflections on how this affected me and, I can only surmise my peers, follows in a description of emotions, confidence and academic growth.

I grew up in a large (by the standards of the time) rural community described as both "village" and "town" as it was about 500 people that included Yupik, Aleut and Dene' families as well as non-Native settlers from religious mission and commercial fishing activities. As a result we did have both an elementary and a full high school for our education with the high school by the 1970's serving as a regional boarding school.

At that time there was no pre-school or kindergarten offerings in the community so our education began with first grade. The first and second grades were taught by local missionaries that were long standing members of our community and so we as children knew them and they in turn knew our families. My first experience with a "new" teacher was upon entering my third grade classroom. She was young, energetic and it turned out that her husband was an art teacher for the high school that year as well. As a result we had a wonderful school year with decorated classroom walls, project based activities and my classmates and I loved our teacher. On the last day of school as we lined up to head home for the day, and the summer break, she announced that she was saying good-bye as she was leaving and not returning to our school. I was devastated, confused and remember to this day the image of the tearful good-byes we relayed as we left the classroom. Over the years as I thought back on the memory I realized how foolish it was to think that everyone who came to our community would stay there indefinitely but why did it affect me so strongly? What I believe explains it is that up to that point in time I had been surrounded in my life by a community of people (over half of which I was related to as extended family) that did not leave, was never expected to leave, and if they died they were buried there so in essence we hadn't experienced having someone so intricately woven into our life and then being confronted with the reality that we would NEVER see them again.

So, my fourth and fifth grades were the same except for the fact that I expected the same, the teacher was there for the school year and then they would be gone. I did not allow myself to become emotionally attached to them since they were not "one of us".

And when the new school year was about to begin it was interesting to see what new person would be in the classroom.

By sixth grade our school experienced a significant change in that there were three teacher couples that arrived that year and they actually stayed and became career long teachers in our community. We actually saw them in the community outside of the school, they shopped in our local grocery store (such that it was), volunteered in our community spring carnival and became active in the local community.

With this new influx of "permanent" teachers we as students saw more integration of the elementary and high schools and experimenting in curriculum. As an example, the school created a "middle school" concept to help with our transition from grade school to junior high/high school. They called it a CORE program and we had high school students help us as middle school students and we were allowed to take one class a day in the high school building.

Once in high school we saw the difference between these permanent teachers and those teachers that came for just one year and then left. The "short termers" never expected much from us and we were able to get by with little effort and good behavior. The permanent teachers knew what we were capable of (or not as the case may be) from having taught us in the previous years so we did have to perform and were more accountable to them. They also knew our parents so we were less likely to get by with excuses. And when we did have difficulties they worked with us one-on-one to get over the problems.

During my high school years our permanent teachers were in the areas of math, science, home economics and physical education. We had revolving door teachers in the areas of English and social sciences. As a result, when I graduated and went on the college I was well prepared for math, science and physical education and required developmental courses in English and reading comprehension. Obviously a direct parallel to the teaching stability/instability of the relevant course matter in high school.

The final area I would like to comment on is the impact the teacher turn-over had on my confidence. The fact that teachers would come and then leave, never to return, in my mind, made me think that it was because we weren't good enough for them. As an adult I can now understand that their decisions were not based on us as students but at that time I did not have the maturity to see that. We had seasonal fishermen in our community that we saw leave every fall but we always saw them again the next spring so it was that difference...the finality of seeing someone leave and not having a concept of where they were going that we reasoned must be better than where we lived that made me feel inferior.

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APPENDICES

Appendix A: Teacher Turnover Pearson's Correlations

		turn over rate	aprof math SBA	bp-np math SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
turnoverrate	Pearson Correlation	1	-.531**	.554**	-.367**	-.429**	.344*	.438**
	Sig. (2-tailed)		.000	.000	.006	.001	.011	.001
	N	54	54	54	54	54	54	54
aprofmath SBA	Pearson Correlation	-.531**	1	-.992**	.652**	.791**	-.564**	-.835**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	54	54	54	54	54	54	54
bp-npmath SBA	Pearson Correlation	.554**	-.992**	1	-.656**	-.792**	.552**	.847**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	54	54	54	54	54	54	54
amath SBA	Pearson Correlation	-.367**	.652**	-.656**	1	.064	-.352**	-.562**
	Sig. (2-tailed)	.006	.000	.000		.648	.009	.000
	N	54	54	54	54	54	54	54
profmath SBA	Pearson Correlation	-.429**	.791**	-.792**	.064	1	-.453**	-.668**
	Sig. (2-tailed)	.001	.000	.000	.648		.001	.000
	N	54	54	54	54	54	54	54
bpmath SBA	Pearson Correlation	.344*	-.564**	.552**	-.352**	-.453**	1	.029
	Sig. (2-tailed)	.011	.000	.000	.009	.001		.833
	N	54	54	54	54	54	54	54
npmath SBA	Pearson Correlation	.438**	-.835**	.847**	-.562**	-.668**	.029	1
	Sig. (2-tailed)	.001	.000	.000	.000	.000	.833	
	N	54	54	54	54	54	54	54

**. Correlation is significant at the 0.01 level (2-tailed).

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

Appendix B: Teacher Turnover Spearman's Correlations

			turn over rate	aprof math SBA	bp-np math SBA	amath SBA	prof math SBA	bpmath SBA	npmath SBA
Spearman's rho	turnover rate	Correlation Coefficient	1.000	-.539**	.580**	-.488**	-.376**	.377**	.495**
		Sig. (2-tailed)	.	.000	.000	.000	.005	.005	.000
		N	54	54	54	54	54	54	54
	aprofmath SBA	Correlation Coefficient	-.539**	1.000	-.983**	.694**	.727**	-.669**	-.790**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000
		N	54	54	54	54	54	54	54
	bp-npmath SBA	Correlation Coefficient	.580**	-.983**	1.000	-.725**	-.707**	.653**	.808**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000
		N	54	54	54	54	54	54	54
	amath SBA	Correlation Coefficient	-.488**	.694**	-.725**	1.000	.158	-.411**	-.619**
		Sig. (2-tailed)	.000	.000	.000	.	.253	.002	.000
		N	54	54	54	54	54	54	54
	profmath SBA	Correlation Coefficient	-.376**	.727**	-.707**	.158	1.000	-.472**	-.585**
		Sig. (2-tailed)	.005	.000	.000	.253	.	.000	.000
		N	54	54	54	54	54	54	54
	bpmath SBA	Correlation Coefficient	.377**	-.669**	.653**	-.411**	-.472**	1.000	.187
		Sig. (2-tailed)	.005	.000	.000	.002	.000	.	.176
		N	54	54	54	54	54	54	54
	npmath SBA	Correlation Coefficient	.495**	-.790**	.808**	-.619**	-.585**	.187	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.176	.
		N	54	54	54	54	54	54	54

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix C : School Size Pearson's Correlations

		School size	aprof math SBA	bp-np SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
schoolsize	Pearson Correlation	1	-.374**	.403**	-.246	-.335*	.154	.385**
	Sig. (2-tailed)		.006	.003	.076	.014	.272	.004
	N	53	53	53	53	53	53	53
aprofmath SBA	Pearson Correlation	-.374**	1	-.992**	.652**	.791**	-.564**	-.835**
	Sig. (2-tailed)	.006		.000	.000	.000	.000	.000
	N	53	54	54	54	54	54	54
bp-npmath SBA	Pearson Correlation	.403**	-.992**	1	-.656**	-.792**	.552**	.847**
	Sig. (2-tailed)	.003	.000		.000	.000	.000	.000
	N	53	54	54	54	54	54	54
amath SBA	Pearson Correlation	-.246	.652**	-.656**	1	.064	-.352**	-.562**
	Sig. (2-tailed)	.076	.000	.000		.648	.009	.000
	N	53	54	54	54	54	54	54
profmath SBA	Pearson Correlation	-.335*	.791**	-.792**	.064	1	-.453**	-.668**
	Sig. (2-tailed)	.014	.000	.000	.648		.001	.000
	N	53	54	54	54	54	54	54
bpmath SBA	Pearson Correlation	.154	-.564**	.552**	-.352**	-.453**	1	.029
	Sig. (2-tailed)	.272	.000	.000	.009	.001		.833
	N	53	54	54	54	54	54	54
npmath SBA	Pearson Correlation	.385**	-.835**	.847**	-.562**	-.668**	.029	1
	Sig. (2-tailed)	.004	.000	.000	.000	.000	.833	
	N	53	54	54	54	54	54	54

**. Correlation is significant at the 0.01 level (2-tailed).

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

Appendix D: School Size Spearman's Correlations

			school size	aprof math SBA	bp-npmath SBA	amath SBA	prof math SBA	bpmath SBA	npmath SBA
Spearman's rho	school size	Correlation Coefficient	1.000	-.414**	.456**	-.440**	-.320*	.183	.447**
		Sig. (2-tailed)	.	.002	.001	.001	.020	.191	.001
		N	53	53	53	53	53	53	53
	aprof math SBA	Correlation Coefficient	-.414**	1.000	-.983**	.694**	.727**	-.669**	-.790**
		Sig. (2-tailed)	.002	.	.000	.000	.000	.000	.000
		N	53	54	54	54	54	54	54
	bp-npmath SBA	Correlation Coefficient	.456**	-.983**	1.000	-.725**	-.707**	.653**	.808**
		Sig. (2-tailed)	.001	.000	.	.000	.000	.000	.000
		N	53	54	54	54	54	54	54
	amath SBA	Correlation Coefficient	-.440**	.694**	-.725**	1.000	.158	-.411**	-.619**
		Sig. (2-tailed)	.001	.000	.000	.	.253	.002	.000
		N	53	54	54	54	54	54	54
	profmath SBA	Correlation Coefficient	-.320*	.727**	-.707**	.158	1.000	-.472**	-.585**
		Sig. (2-tailed)	.020	.000	.000	.253	.	.000	.000
		N	53	54	54	54	54	54	54
	bpmath SBA	Correlation Coefficient	.183	-.669**	.653**	-.411**	-.472**	1.000	.187
		Sig. (2-tailed)	.191	.000	.000	.002	.000	.	.176
		N	53	54	54	54	54	54	54
	npmath SBA	Correlation Coefficient	.447**	-.790**	.808**	-.619**	-.585**	.187	1.000
		Sig. (2-tailed)	.001	.000	.000	.000	.000	.176	.
		N	53	54	54	54	54	54	54

**. Correlation is significant at the 0.01 level (2-tailed).

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

Appendix E: Free/Reduced lunch Pearson's Correlations								
		reduced lunch	aprofmath SBA	bp-npmath SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
reducedlunch	Pearson Correlation	1	-.358*	.384**	-.427**	-.156	.203	.355*
	Sig. (2-tailed)		.013	.007	.002	.289	.167	.013
	N	48	48	48	48	48	48	48
aprofmath SBA	Pearson Correlation	-.358*	1	-.992**	.652**	.791**	-.564**	-.835**
	Sig. (2-tailed)	.013		.000	.000	.000	.000	.000
	N	48	54	54	54	54	54	54
bp-npmathSBA	Pearson Correlation	.384**	-.992**	1	-.656**	-.792**	.552**	.847**
	Sig. (2-tailed)	.007	.000		.000	.000	.000	.000
	N	48	54	54	54	54	54	54
amathSBA	Pearson Correlation	-.427**	.652**	-.656**	1	.064	-.352**	-.562**
	Sig. (2-tailed)	.002	.000	.000		.648	.009	.000
	N	48	54	54	54	54	54	54
profmathSBA	Pearson Correlation	-.156	.791**	-.792**	.064	1	-.453**	-.668**
	Sig. (2-tailed)	.289	.000	.000	.648		.001	.000
	N	48	54	54	54	54	54	54
bpmathSBA	Pearson Correlation	.203	-.564**	.552**	-.352**	-.453**	1	.029
	Sig. (2-tailed)	.167	.000	.000	.009	.001		.833
	N	48	54	54	54	54	54	54
npmathSBA	Pearson Correlation	.355*	-.835**	.847**	-.562**	-.668**	.029	1
	Sig. (2-tailed)	.013	.000	.000	.000	.000	.833	
	N	48	54	54	54	54	54	54
*. Correlation is significant at the 0.05 level (2-tailed).								
**. Correlation is significant at the 0.01 level (2-tailed).								

Appendix F: Free/Reduced lunch Spearman's Correlations

			reduced lunch	aprof math SBA	bp-np math SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
Spearman's rho	Reduced lunch	Correlation Coefficient	1.000	-.378**	.410**	-.480**	-.101	.227	.359*
		Sig. (2-tailed)	.	.008	.004	.001	.494	.121	.012
		N	48	48	48	48	48	48	48
	aprof math SBA	Correlation Coefficient	-.378**	1.000	-.983**	.694**	.727**	-.669**	-.790**
		Sig. (2-tailed)	.008	.	.000	.000	.000	.000	.000
		N	48	54	54	54	54	54	54
	bp-npmath SBA	Correlation Coefficient	.410**	-.983**	1.000	-.725**	-.707**	.653**	.808**
		Sig. (2-tailed)	.004	.000	.	.000	.000	.000	.000
		N	48	54	54	54	54	54	54
	amath SBA	Correlation Coefficient	-.480**	.694**	-.725**	1.000	.158	-.411**	-.619**
		Sig. (2-tailed)	.001	.000	.000	.	.253	.002	.000
		N	48	54	54	54	54	54	54
	profmath SBA	Correlation Coefficient	-.101	.727**	-.707**	.158	1.000	-.472**	-.585**
		Sig. (2-tailed)	.494	.000	.000	.253	.	.000	.000
		N	48	54	54	54	54	54	54
	bpmath SBA	Correlation Coefficient	.227	-.669**	.653**	-.411**	-.472**	1.000	.187
		Sig. (2-tailed)	.121	.000	.000	.002	.000	.	.176
		N	48	54	54	54	54	54	54
	npmath SBA	Correlation Coefficient	.359*	-.790**	.808**	-.619**	-.585**	.187	1.000
		Sig. (2-tailed)	.012	.000	.000	.000	.000	.176	.
		N	48	54	54	54	54	54	54

**. Correlation is significant at the 0.01 level (2-tailed).

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

Appendix G: Percent Alaska Native of School Population Pearson's Correlations								
		ak native	aprofmath SBA	bp-npmath SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
aknative	Pearson Correlation	1	-.621**	.645**	-.532**	-.418**	.318*	.566**
	Sig. (2-tailed)		.000	.000	.000	.002	.019	.000
	N	54	54	54	54	54	54	54
aprofmathSBA	Pearson Correlation	-.621**	1	-.992**	.652**	.791**	-.564**	-.835**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	54	54	54	54	54	54	54
bp-npmathSBA	Pearson Correlation	.645**	-.992**	1	-.656**	-.792**	.552**	.847**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	54	54	54	54	54	54	54
amathSBA	Pearson Correlation	-.532**	.652**	-.656**	1	.064	-.352**	-.562**
	Sig. (2-tailed)	.000	.000	.000		.648	.009	.000
	N	54	54	54	54	54	54	54
profmathSBA	Pearson Correlation	-.418**	.791**	-.792**	.064	1	-.453**	-.668**
	Sig. (2-tailed)	.002	.000	.000	.648		.001	.000
	N	54	54	54	54	54	54	54
bpmathSBA	Pearson Correlation	.318*	-.564**	.552**	-.352**	-.453**	1	.029
	Sig. (2-tailed)	.019	.000	.000	.009	.001		.833
	N	54	54	54	54	54	54	54
npmathSBA	Pearson Correlation	.566**	-.835**	.847**	-.562**	-.668**	.029	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.833	
	N	54	54	54	54	54	54	54
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

Appendix H: Percent Alaska Native of School Population Spearman's Correlations										
			ak native	aprof math SBA	bp-npmath SBA	amath SBA	profmath SBA	bpmath SBA	npmath SBA
Spearman's rho	aknative	Correlation Coefficient	1.000	-.608**	.634**	-.554**	-.384**	.335*	.566**
		Sig. (2-tailed)	.	.000	.000	.000	.004	.013	.000
		N	54	54	54	54	54	54	54
	aprof math SBA	Correlation Coefficient	-.608**	1.000	-.983**	.694**	.727**	-.669**	-.790**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000
		N	54	54	54	54	54	54	54
	bp-npmath SBA	Correlation Coefficient	.634**	-.983**	1.000	-.725**	-.707**	.653**	.808**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000
		N	54	54	54	54	54	54	54
	amath SBA	Correlation Coefficient	-.554**	.694**	-.725**	1.000	.158	-.411**	-.619**
		Sig. (2-tailed)	.000	.000	.000	.	.253	.002	.000
		N	54	54	54	54	54	54	54
	profmath SBA	Correlation Coefficient	-.384**	.727**	-.707**	.158	1.000	-.472**	-.585**
		Sig. (2-tailed)	.004	.000	.000	.253	.	.000	.000
		N	54	54	54	54	54	54	54
	bpmath SBA	Correlation Coefficient	.335*	-.669**	.653**	-.411**	-.472**	1.000	.187
		Sig. (2-tailed)	.013	.000	.000	.002	.000	.	.176
		N	54	54	54	54	54	54	54
	npmath SBA	Correlation Coefficient	.566**	-.790**	.808**	-.619**	-.585**	.187	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.176	.
		N	54	54	54	54	54	54	54

**. Correlation is significant at the 0.01 level (2-tailed).

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

Appendix I :Multivariate Tests Teacher Turnover and Reduced Lunch								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.995	4514.423[a]	2.000	44.000	.000	9028.845	1.000
	Wilks' Lambda	.005	4514.423[a]	2.000	44.000	.000	9028.845	1.000
	Hotelling's Trace	205.201	4514.423[a]	2.000	44.000	.000	9028.845	1.000
	Roy's Largest Root	205.201	4514.423[a]	2.000	44.000	.000	9028.845	1.000
turnover rate	Pillai's Trace	.261	7.754[a]	2.000	44.000	.001	15.508	.936
	Wilks' Lambda	.739	7.754[a]	2.000	44.000	.001	15.508	.936
	Hotelling's Trace	.352	7.754[a]	2.000	44.000	.001	15.508	.936
	Roy's Largest Root	.352	7.754[a]	2.000	44.000	.001	15.508	.936
reduced lunch	Pillai's Trace	.070	1.644[a]	2.000	44.000	.205	3.289	.328
	Wilks' Lambda	.930	1.644[a]	2.000	44.000	.205	3.289	.328
	Hotelling's Trace	.075	1.644[a]	2.000	44.000	.205	3.289	.328
	Roy's Largest Root	.075	1.644[a]	2.000	44.000	.205	3.289	.328
a. Exact statistic								
b. Computed using alpha =								
c. Design: Intercept + turnoverrate + reducedlunch								

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	7068.783[a]	2	3534.391	12.324	.000	24.649	.994
	aprofmathSBA	6148.016[c]	2	3074.008	10.591	.000	21.182	.984
Intercept	bp-npmathSBA	2228.715	1	2228.715	7.772	.008	7.772	.779
	aprofmathSBA	39668.731	1	39668.73	136.67	.000	136.674	1.000
turnoverrate	bp-npmathSBA	4124.731	1	4124.731	14.383	.000	14.383	.960
	aprofmathSBA	3691.900	1	3691.900	12.720	.001	12.720	.937
reduced lunch	bp-npmathSBA	613.803	1	613.803	2.140	.150	2.140	.299
	aprofmathSBA	475.530	1	475.530	1.638	.207	1.638	.240
Error	bp-npmathSBA	12905.030	45	286.778				
	aprofmathSBA	13060.964	45	290.244				
Total	bp-npmathSBA	137289.00	48					
	aprofmathSBA	140915.00	48					
Corrected Total	bp-npmathSBA	19973.813	47					
	aprofmathSBA	19208.979	47					
a. R Squared = .354 (Adjusted R Squared = .325)								

Appendix J: Multivariate Tests Teacher Turnover and School Size								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.997	8747.440[a]	2.000	49.000	.000	17494.880	1.000
	Wilks' Lambda	.003	8747.440[a]	2.000	49.000	.000	17494.880	1.000
	Hotelling's Trace	357.038	8747.440[a]	2.000	49.000	.000	17494.880	1.000
	Roy's Largest Root	357.038	8747.440[a]	2.000	49.000	.000	17494.880	1.000
turnover rate	Pillai's Trace	.174	5.167[a]	2.000	49.000	.009	10.334	.803
	Wilks' Lambda	.826	5.167[a]	2.000	49.000	.009	10.334	.803
	Hotelling's Trace	.211	5.167[a]	2.000	49.000	.009	10.334	.803
	Roy's Largest Root	.211	5.167[a]	2.000	49.000	.009	10.334	.803
schoolsize	Pillai's Trace	.063	1.634[a]	2.000	49.000	.206	3.269	.329
	Wilks' Lambda	.937	1.634[a]	2.000	49.000	.206	3.269	.329
	Hotelling's Trace	.067	1.634[a]	2.000	49.000	.206	3.269	.329
	Roy's Largest Root	.067	1.634[a]	2.000	49.000	.206	3.269	.329
a. Exact statistic								
b. Computed using alpha =								
c. Design: Intercept + turnoverrate + schoolsize								

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	6588.274[a]	2	3294.137	11.064	.000	22.128	.988
	aprofmathSBA	5973.174[c]	2	2986.587	9.877	.000	19.753	.978
Intercept	bp-npmathSBA	3974.115	1	3974.115	13.348	.001	13.348	.948
	aprofmathSBA	44644.731	1	44644.73	147.64	.000	147.640	1.000
turnoverrate	bp-npmathSBA	3100.727	1	3100.727	10.415	.002	10.415	.886
	aprofmathSBA	3023.202	1	3023.202	9.998	.003	9.998	.873
schoolsize	bp-npmathSBA	187.989	1	187.989	.631	.431	.631	.122
	aprofmathSBA	106.978	1	106.978	.354	.555	.354	.090
Error	bp-npmathSBA	14886.405	50	297.728				
	aprofmathSBA	15119.505	50	302.390				
Total	bp-npmathSBA	150794.00	53					
	aprofmathSBA	156812.00	53					
Corrected Total	bp-npmathSBA	21474.679	52					
	aprofmathSBA	21092.679	52					
a. R Squared = .307 (Adjusted R Squared = .279)								
b. Computed using alpha =								
c. R Squared = .283 (Adjusted R Squared = .255)								

Appendix K: Multivariate Tests Teacher Turnover and Percent Alaska Native of School Population								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.996	6775.892[a]	2.000	50.000	.000	13551.784	1.000
	Wilks' Lambda	.004	6775.892[a]	2.000	50.000	.000	13551.784	1.000
	Hotelling's Trace	271.036	6775.892[a]	2.000	50.000	.000	13551.784	1.000
	Roy's Largest Root	271.036	6775.892[a]	2.000	50.000	.000	13551.784	1.000
turnover rate	Pillai's Trace	.094	2.599[a]	2.000	50.000	.084	5.199	.495
	Wilks' Lambda	.906	2.599[a]	2.000	50.000	.084	5.199	.495
	Hotelling's Trace	.104	2.599[a]	2.000	50.000	.084	5.199	.495
	Roy's Largest Root	.104	2.599[a]	2.000	50.000	.084	5.199	.495
aknative	Pillai's Trace	.246	8.171[a]	2.000	50.000	.001	16.343	.949
	Wilks' Lambda	.754	8.171[a]	2.000	50.000	.001	16.343	.949
	Hotelling's Trace	.327	8.171[a]	2.000	50.000	.001	16.343	.949
	Roy's Largest Root	.327	8.171[a]	2.000	50.000	.001	16.343	.949
a. Exact statistic								
b. Computed using alpha =								
c. Design: Intercept + turnoverrate + aknative								

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	10153.024	2	5076.512	22.072	.000	44.144	1.000
	aprofmathSBA	9080.930[c]	2	4540.465	19.109	.000	38.219	1.000
Intercept	bp-npmathSBA	3685.421	1	3685.421	16.024	.000	16.024	.975
	aprofmathSBA	50625.958	1	50625.95	213.06	.000	213.068	1.000
turnoverrate	bp-npmathSBA	1040.210	1	1040.210	4.523	.038	4.523	.550
	aprofmathSBA	913.306	1	913.306	3.844	.055	3.844	.486
aknative	bp-npmathSBA	3446.240	1	3446.240	14.984	.000	14.984	.967
	aprofmathSBA	3109.123	1	3109.123	13.085	.001	13.085	.944
Error	bp-npmathSBA	11729.957	51	229.999				
	aprofmathSBA	12117.829	51	237.604				
Total	bp-npmathSBA	151635.00	54					
	aprofmathSBA	160533.00	54					
Corrected Total	bp-npmathSBA	21882.981	53					
	aprofmathSBA	21198.759	53					
a. R Squared = .464 (Adjusted R Squared = .443)								
b. Computed using alpha =								
c. R Squared = .428 (Adjusted R Squared = .406)								

Appendix L: Multivariate Free/Reduced Lunch and School Size								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.997	7552.920[a]	2.000	43.000	.000	15105.839	1.000
	Wilks' Lambda	.003	7552.920[a]	2.000	43.000	.000	15105.839	1.000
	Hotelling's Trace	351.299	7552.920[a]	2.000	43.000	.000	15105.839	1.000
	Roy's Largest Root	351.299	7552.920[a]	2.000	43.000	.000	15105.839	1.000
reduced lunch	Pillai's Trace	.097	2.312[a]	2.000	43.000	.111	4.625	.444
	Wilks' Lambda	.903	2.312[a]	2.000	43.000	.111	4.625	.444
	Hotelling's Trace	.108	2.312[a]	2.000	43.000	.111	4.625	.444
	Roy's Largest Root	.108	2.312[a]	2.000	43.000	.111	4.625	.444
schoolsize	Pillai's Trace	.151	3.820[a]	2.000	43.000	.030	7.641	.664
	Wilks' Lambda	.849	3.820[a]	2.000	43.000	.030	7.641	.664
	Hotelling's Trace	.178	3.820[a]	2.000	43.000	.030	7.641	.664
	Roy's Largest Root	.178	3.820[a]	2.000	43.000	.030	7.641	.664
a. Exact statistic								
b. Computed using alpha =								
c. Design: Intercept + *reducedlunch* + *schoolsize*								

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	4350.650[a]	2	2175.325	6.298	.004	12.597	.876
	aprofmathSBA	3663.342[c]	2	1831.671	5.223	.009	10.446	.805
Intercept	bp-npmathSBA	5570.891	1	5570.891	16.130	.000	16.130	.975
	aprofmathSBA	36656.381	1	36656.38	104.53	.000	104.530	1.000
reduced lunch	bp-npmathSBA	1230.584	1	1230.584	3.563	.066	3.563	.455
	aprofmathSBA	1075.805	1	1075.805	3.068	.087	3.068	.403
schoolsize	bp-npmathSBA	1566.017	1	1566.017	4.534	.039	4.534	.549
	aprofmathSBA	1276.777	1	1276.777	3.641	.063	3.641	.463
Error	bp-npmathSBA	15196.584	44	345.377				
	aprofmathSBA	15429.892	44	350.679				
Total	bp-npmathSBA	136448.00	47					
	aprofmathSBA	137194.00	47					
Corrected Total	bp-npmathSBA	19547.234	46					
	aprofmathSBA	19093.234	46					
a. R Squared = .223 (Adjusted R Squared = .187)								
b. Computed using alpha =								
c. R Squared = .192 (Adjusted R Squared = .155)								

Appendix M: Multivariate Free/Reduced Lunch and Percent Alaska Native of School Population								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.997	7225.446[a]	2.000	44.000	.000	14450.892	1.000
	Wilks' Lambda	.003	7225.446[a]	2.000	44.000	.000	14450.892	1.000
	Hotelling's Trace	328.429	7225.446[a]	2.000	44.000	.000	14450.892	1.000
	Roy's Largest Root	328.429	7225.446[a]	2.000	44.000	.000	14450.892	1.000
reduced lunch	Pillai's Trace	.023	.525[a]	2.000	44.000	.595	1.050	.131
	Wilks' Lambda	.977	.525[a]	2.000	44.000	.595	1.050	.131
	Hotelling's Trace	.024	.525[a]	2.000	44.000	.595	1.050	.131
	Roy's Largest Root	.024	.525[a]	2.000	44.000	.595	1.050	.131
aknative	Pillai's Trace	.311	9.915[a]	2.000	44.000	.000	19.830	.978
	Wilks' Lambda	.689	9.915[a]	2.000	44.000	.000	19.830	.978
	Hotelling's Trace	.451	9.915[a]	2.000	44.000	.000	19.830	.978
	Roy's Largest Root	.451	9.915[a]	2.000	44.000	.000	19.830	.978
a. Exact statistic								
b. Computed using alpha =								
c. Design: Intercept + reducedlunch + aknative								

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	8072.559[a]	2	4036.280	15.262	.000	30.523	.999
	aprofmathSBA	7173.996[c]	2	3586.998	13.412	.000	26.824	.997
Intercept	bp-npmathSBA	10042.140	1	10042.14	37.970	.000	37.970	1.000
	aprofmathSBA	45492.034	1	45492.03	170.09	.000	170.099	1.000
reducedlunch	bp-npmathSBA	227.913	1	227.913	.862	.358	.862	.149
	aprofmathSBA	261.740	1	261.740	.979	.328	.979	.162
aknative	bp-npmathSBA	5128.508	1	5128.508	19.391	.000	19.391	.991
	aprofmathSBA	4717.880	1	4717.880	17.641	.000	17.641	.984
Error	bp-npmathSBA	11901.253	45	264.472				
	aprofmathSBA	12034.984	45	267.444				
Total	bp-npmathSBA	137289.00	48					
	aprofmathSBA	140915.00	48					
Corrected Total	bp-npmathSBA	19973.813	47					
	aprofmathSBA	19208.979	47					
a. R Squared = .404 (Adjusted R Squared = .378)								
b. Computed using alpha =								
c. R Squared = .373 (Adjusted R Squared = .346)								

Appendix N: Multivariate Percent Alaska Native of School Population School Size								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.998	11509.108[a]	2.000	49.000	.000	23018.217	1.000
	Wilks' Lambda	.002	11509.108[a]	2.000	49.000	.000	23018.217	1.000
	Hotelling's Trace	469.760	11509.108[a]	2.000	49.000	.000	23018.217	1.000
	Roy's Largest Root	469.760	11509.108[a]	2.000	49.000	.000	23018.217	1.000
aknative	Pillai's Trace	.313	11.179[a]	2.000	49.000	.000	22.357	.989
	Wilks' Lambda	.687	11.179[a]	2.000	49.000	.000	22.357	.989
	Hotelling's Trace	.456	11.179[a]	2.000	49.000	.000	22.357	.989
	Roy's Largest Root	.456	11.179[a]	2.000	49.000	.000	22.357	.989
schoolsize	Pillai's Trace	.059	1.523[a]	2.000	49.000	.228	3.046	.309
	Wilks' Lambda	.941	1.523[a]	2.000	49.000	.228	3.046	.309
	Hotelling's Trace	.062	1.523[a]	2.000	49.000	.228	3.046	.309
	Roy's Largest Root	.062	1.523[a]	2.000	49.000	.228	3.046	.309

a. Exact statistic

b. Computed using alpha =

c. Design: Intercept + aknative + schoolsize

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	8917.628[a]	2	4458.814	17.754	.000	35.508	1.000
	aprofmathSBA	8136.830[c]	2	4068.415	15.701	.000	31.402	.999
Intercept	bp-npmathSBA	7045.240	1	7045.240	28.053	.000	28.053	.999
	aprofmathSBA	51908.909	1	51908.90	200.33	.000	200.330	1.000
aknative	bp-npmathSBA	5430.080	1	5430.080	21.622	.000	21.622	.995
	aprofmathSBA	5186.859	1	5186.859	20.017	.000	20.017	.992
schoolsize	bp-npmathSBA	139.508	1	139.508	.555	.460	.555	.113
	aprofmathSBA	74.685	1	74.685	.288	.594	.288	.082
Error	bp-npmathSBA	12557.052	50	251.141				
	aprofmathSBA	12955.849	50	259.117				
Total	bp-npmathSBA	150794.00	53					
	aprofmathSBA	156812.00	53					
Corrected Total	bp-npmathSBA	21474.679	52					
	aprofmathSBA	21092.679	52					

a. R Squared = .415 (Adjusted R Squared = .392)

b. Computed using alpha =

c. R Squared = .386 (Adjusted R Squared = .361)

Appendix O: Multivariate Percent Alaska Native of School Population Teacher Turnover								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.996	6775.892[a]	2.000	50.000	.000	13551.784	1.000
	Wilks' Lambda	.004	6775.892[a]	2.000	50.000	.000	13551.784	1.000
	Hotelling's Trace	271.036	6775.892[a]	2.000	50.000	.000	13551.784	1.000
	Roy's Largest Root	271.036	6775.892[a]	2.000	50.000	.000	13551.784	1.000
aknative	Pillai's Trace	.246	8.171[a]	2.000	50.000	.001	16.343	.949
	Wilks' Lambda	.754	8.171[a]	2.000	50.000	.001	16.343	.949
	Hotelling's Trace	.327	8.171[a]	2.000	50.000	.001	16.343	.949
	Roy's Largest Root	.327	8.171[a]	2.000	50.000	.001	16.343	.949
turnover rate	Pillai's Trace	.094	2.599[a]	2.000	50.000	.084	5.199	.495
	Wilks' Lambda	.906	2.599[a]	2.000	50.000	.084	5.199	.495
	Hotelling's Trace	.104	2.599[a]	2.000	50.000	.084	5.199	.495
	Roy's Largest Root	.104	2.599[a]	2.000	50.000	.084	5.199	.495
a. Exact statistic								
b. Computed using alpha =								
c. Design: Intercept + aknative + turnoverrate								

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	10153.024	2	5076.512	22.072	.000	44.144	1.000
	aprofmathSBA	9080.930[c]	2	4540.465	19.109	.000	38.219	1.000
Intercept	bp-npmathSBA	3685.421	1	3685.421	16.024	.000	16.024	.975
	aprofmathSBA	50625.958	1	50625.95	213.06	.000	213.068	1.000
aknative	bp-npmathSBA	3446.240	1	3446.240	14.984	.000	14.984	.967
	aprofmathSBA	3109.123	1	3109.123	13.085	.001	13.085	.944
turnoverrate	bp-npmathSBA	1040.210	1	1040.210	4.523	.038	4.523	.550
	aprofmathSBA	913.306	1	913.306	3.844	.055	3.844	.486
Error	bp-npmathSBA	11729.957	51	229.999				
	aprofmathSBA	12117.829	51	237.604				
Total	bp-npmathSBA	151635.00	54					
	aprofmathSBA	160533.00	54					
Corrected Total	bp-npmathSBA	21882.981	53					
	aprofmathSBA	21198.759	53					
a. R Squared = .464 (Adjusted R Squared = .443)								
b. Computed using alpha =								
c. R Squared = .428 (Adjusted R Squared = .406)								

Appendix P: Multivariate Teacher Turnover and Free/Reduced Lunch and School Size								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.997	6046.165[a]	2.000	42.000	.000	12092.330	1.000
	Wilks' Lambda	.003	6046.165[a]	2.000	42.000	.000	12092.330	1.000
	Hotelling's Trace	287.913	6046.165[a]	2.000	42.000	.000	12092.330	1.000
	Roy's Largest Root	287.913	6046.165[a]	2.000	42.000	.000	12092.330	1.000
turnover rate	Pillai's Trace	.159	3.959[a]	2.000	42.000	.027	7.917	.679
	Wilks' Lambda	.841	3.959[a]	2.000	42.000	.027	7.917	.679
	Hotelling's Trace	.189	3.959[a]	2.000	42.000	.027	7.917	.679
	Roy's Largest Root	.189	3.959[a]	2.000	42.000	.027	7.917	.679
reduced lunch	Pillai's Trace	.063	1.405[a]	2.000	42.000	.257	2.810	.285
	Wilks' Lambda	.937	1.405[a]	2.000	42.000	.257	2.810	.285
	Hotelling's Trace	.067	1.405[a]	2.000	42.000	.257	2.810	.285
	Roy's Largest Root	.067	1.405[a]	2.000	42.000	.257	2.810	.285
schoolsize	Pillai's Trace	.045	.984[a]	2.000	42.000	.382	1.969	.210
	Wilks' Lambda	.955	.984[a]	2.000	42.000	.382	1.969	.210
	Hotelling's Trace	.047	.984[a]	2.000	42.000	.382	1.969	.210
	Roy's Largest Root	.047	.984[a]	2.000	42.000	.382	1.969	.210
a. Exact statistic								
b. Computed using alpha =								
c. Design: Intercept + turnoverrate + reducedlunch + schoolsize								

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	6752.021[a]	3	2250.674	7.564	.000	22.691	.979
	aprofmathSBA	6035.943[c]	3	2011.981	6.626	.001	19.877	.960
Intercept	bp-npmathSBA	2189.407	1	2189.407	7.358	.010	7.358	.755
	aprofmathSBA	37649.833	1	37649.83	123.98	.000	123.988	1.000
turnoverrate	bp-npmathSBA	2401.371	1	2401.371	8.070	.007	8.070	.793
	aprofmathSBA	2372.601	1	2372.601	7.813	.008	7.813	.780
reduced lunch	bp-npmathSBA	545.235	1	545.235	1.832	.183	1.832	.263
	aprofmathSBA	449.099	1	449.099	1.479	.231	1.479	.221
schoolsize	bp-npmathSBA	24.176	1	24.176	.081	.777	.081	.059
	aprofmathSBA	3.671	1	3.671	.012	.913	.012	.051
Error	bp-npmathSBA	12795.213	43	297.563				
	aprofmathSBA	13057.291	43	303.658				
Total	bp-npmathSBA	136448.00	47					
	aprofmathSBA	137194.00	47					
Corrected Total	bp-npmathSBA	19547.234	46					
	aprofmathSBA	19093.234	46					
a. R Squared = .345 (Adjusted R Squared = .300), b. Computed using alpha = , c. R Squared = .316 (Adjusted R								

Appendix Q: Multivariate Percent Alaska Native of School Population and Free/Reduced Lunch and School Size								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.997	7289.222[a]	2.000	42.000	.000	14578.443	1.000
	Wilks' Lambda	.003	7289.222[a]	2.000	42.000	.000	14578.443	1.000
	Hotelling's Trace	347.106	7289.222[a]	2.000	42.000	.000	14578.443	1.000
	Roy's Largest Root	347.106	7289.222[a]	2.000	42.000	.000	14578.443	1.000
aknative	Pillai's Trace	.228	6.190[a]	2.000	42.000	.004	12.381	.869
	Wilks' Lambda	.772	6.190[a]	2.000	42.000	.004	12.381	.869
	Hotelling's Trace	.295	6.190[a]	2.000	42.000	.004	12.381	.869
	Roy's Largest Root	.295	6.190[a]	2.000	42.000	.004	12.381	.869
reduced lunch	Pillai's Trace	.027	.591[a]	2.000	42.000	.558	1.183	.142
	Wilks' Lambda	.973	.591[a]	2.000	42.000	.558	1.183	.142
	Hotelling's Trace	.028	.591[a]	2.000	42.000	.558	1.183	.142
	Roy's Largest Root	.028	.591[a]	2.000	42.000	.558	1.183	.142
schoolsize	Pillai's Trace	.059	1.316[a]	2.000	42.000	.279	2.631	.269
	Wilks' Lambda	.941	1.316[a]	2.000	42.000	.279	2.631	.269
	Hotelling's Trace	.063	1.316[a]	2.000	42.000	.279	2.631	.269
	Roy's Largest Root	.063	1.316[a]	2.000	42.000	.279	2.631	.269
a. Exact statistic								
b. Computed using alpha =								
c. Design: Intercept + aknative + reducedlunch + schoolsize								

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	7804.282[a]	3	2601.427	9.526	.000	28.577	.995
	aprofmathSBA	7090.622[c]	3	2363.541	8.468	.000	25.403	.989
Intercept	bp-npmathSBA	6576.438	1	6576.438	24.081	.000	24.081	.998
	aprofmathSBA	33540.824	1	33540.82	120.16	.000	120.162	1.000
aknative	bp-npmathSBA	3453.631	1	3453.631	12.646	.001	12.646	.935
	aprofmathSBA	3427.280	1	3427.280	12.278	.001	12.278	.929
reduced lunch	bp-npmathSBA	202.457	1	202.457	.741	.394	.741	.134
	aprofmathSBA	248.005	1	248.005	.888	.351	.888	.152
schoolsize	bp-npmathSBA	80.993	1	80.993	.297	.589	.297	.083
	aprofmathSBA	32.124	1	32.124	.115	.736	.115	.063
Error	bp-npmathSBA	11742.952	43	273.092				
	aprofmathSBA	12002.612	43	279.131				
Total	bp-npmathSBA	136448.00	47					
	aprofmathSBA	137194.00	47					

Appendix R: Multivariate Teacher Turnover and Percent Alaska Native of School Population and Free/Reduced Lunch

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.995	4083.734[a]	2.000	43.000	.000	8167.469	1.000
	Wilks' Lambda	.005	4083.734[a]	2.000	43.000	.000	8167.469	1.000
	Hotelling's Trace	189.941	4083.734[a]	2.000	43.000	.000	8167.469	1.000
	Roy's Largest Root	189.941	4083.734[a]	2.000	43.000	.000	8167.469	1.000
turnover rate	Pillai's Trace	.082	1.911[a]	2.000	43.000	.160	3.822	.375
	Wilks' Lambda	.918	1.911[a]	2.000	43.000	.160	3.822	.375
	Hotelling's Trace	.089	1.911[a]	2.000	43.000	.160	3.822	.375
	Roy's Largest Root	.089	1.911[a]	2.000	43.000	.160	3.822	.375
aknative	Pillai's Trace	.144	3.611[a]	2.000	43.000	.036	7.222	.637
	Wilks' Lambda	.856	3.611[a]	2.000	43.000	.036	7.222	.637
	Hotelling's Trace	.168	3.611[a]	2.000	43.000	.036	7.222	.637
	Roy's Largest Root	.168	3.611[a]	2.000	43.000	.036	7.222	.637
reduced lunch	Pillai's Trace	.017	.367[a]	2.000	43.000	.695	.734	.105
	Wilks' Lambda	.983	.367[a]	2.000	43.000	.695	.734	.105
	Hotelling's Trace	.017	.367[a]	2.000	43.000	.695	.734	.105
	Roy's Largest Root	.017	.367[a]	2.000	43.000	.695	.734	.105

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	8886.649[a]	3	2962.216	11.756	.000	35.267	.999
	aprofmathSBA	7868.137[c]	3	2622.712	10.176	.000	30.527	.997
Intercept	bp-npmathSBA	3298.809	1	3298.809	13.091	.001	13.091	.943
	aprofmathSBA	32032.121	1	32032.12	124.27	.000	124.278	1.000
turnoverrate	bp-npmathSBA	814.090	1	814.090	3.231	.079	3.231	.420
	aprofmathSBA	694.141	1	694.141	2.693	.108	2.693	.362
aknative	bp-npmathSBA	1817.867	1	1817.867	7.214	.010	7.214	.748
	aprofmathSBA	1720.122	1	1720.122	6.674	.013	6.674	.715
reducedlunch	bp-npmathSBA	113.984	1	113.984	.452	.505	.452	.101
	aprofmathSBA	145.723	1	145.723	.565	.456	.565	.114
Error	bp-npmathSBA	11087.163	44	251.981				
	aprofmathSBA	11340.842	44	257.746				
Total	bp-npmathSBA	137289.00	48					
	aprofmathSBA	140915.00	48					
Corrected Total	bp-npmathSBA	19973.813	47					
	aprofmathSBA	19208.979	47					
a. R Squared = .445 (Adjusted R Squared = .407)								

Appendix S: Multivariate Teacher Turnover and Percent Alaska Native of School Population and School Size								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	.997	8689.313[a]	2.000	48.000	.000	17378.627	1.000
	Wilks' Lambda	.003	8689.313[a]	2.000	48.000	.000	17378.627	1.000
	Hotelling's Trace	362.055	8689.313[a]	2.000	48.000	.000	17378.627	1.000
	Roy's Largest Root	362.055	8689.313[a]	2.000	48.000	.000	17378.627	1.000
turnover rate	Pillai's Trace	.070	1.804[a]	2.000	48.000	.176	3.609	.359
	Wilks' Lambda	.930	1.804[a]	2.000	48.000	.176	3.609	.359
	Hotelling's Trace	.075	1.804[a]	2.000	48.000	.176	3.609	.359
	Roy's Largest Root	.075	1.804[a]	2.000	48.000	.176	3.609	.359
aknative	Pillai's Trace	.227	7.033[a]	2.000	48.000	.002	14.067	.912
	Wilks' Lambda	.773	7.033[a]	2.000	48.000	.002	14.067	.912
	Hotelling's Trace	.293	7.033[a]	2.000	48.000	.002	14.067	.912
	Roy's Largest Root	.293	7.033[a]	2.000	48.000	.002	14.067	.912
schoolsize	Pillai's Trace	.037	.925[a]	2.000	48.000	.404	1.850	.201
	Wilks' Lambda	.963	.925[a]	2.000	48.000	.404	1.850	.201
	Hotelling's Trace	.039	.925[a]	2.000	48.000	.404	1.850	.201
	Roy's Largest Root	.039	.925[a]	2.000	48.000	.404	1.850	.201

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power
Corrected Model	bp-npmathSBA	9790.809[a]	3	3263.603	13.687	.000	41.061	1.000
	aprofmathSBA	9006.382[c]	3	3002.127	12.171	.000	36.513	.999
Intercept	bp-npmathSBA	3549.333	1	3549.333	14.885	.000	14.885	.966
	aprofmathSBA	45875.363	1	45875.363	185.987	.000	185.987	1.000
turnoverrate	bp-npmathSBA	873.181	1	873.181	3.662	.062	3.662	.467
	aprofmathSBA	869.552	1	869.552	3.525	.066	3.525	.453
aknative	bp-npmathSBA	3202.535	1	3202.535	13.431	.001	13.431	.949
	aprofmathSBA	3033.208	1	3033.208	12.297	.001	12.297	.930
schoolsize	bp-npmathSBA	4.204	1	4.204	.018	.895	.018	.052
	aprofmathSBA	23.863	1	23.863	.097	.757	.097	.061
Error	bp-npmathSBA	11683.870	49	238.446				
	aprofmathSBA	12086.297	49	246.659				
Total	bp-npmathSBA	150794.00	53					
	aprofmathSBA	156812.00	53					
Corrected Total	bp-npmathSBA	21474.679	52					
	aprofmathSBA	21092.679	52					

Appendix T:Linear Regression Model School Size and Reduced Lunch and Teacher Turnover			
Model	Variables Entered	Variables Removed	Method
	schoolsize, reducedlunch, turnoverrate[a]	.	Enter
a. All requested variables entered.			
b. Dependent Variable: aprofmathSBA			

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.562[a]	.316	.268	17.42578
a. Predictors: (Constant), schoolsize, reducedlunch, turnoverrate				

ANOVA[b]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6035.943	3	2011.981	6.626	.001[a]
	Residual	13057.291	43	303.658		
	Total	19093.234	46			
a. Predictors: (Constant), schoolsize, reducedlunch, turnoverrate						
b. Dependent Variable: aprofmathSBA						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	79.053	7.099		11.135	.000
	turnoverrate	-.931	.333	-.463	-2.795	.008
	reducedlunch	-.134	.111	-.168	-1.216	.231
	schoolsize	-.887	8.067	-.018	-.110	.913
a. Dependent Variable: aprofmathSBA						