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# Sex Stratification Among Principals in California's K-12 System

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ABSTRACT OF THE DISSERTATION

Sex Stratification Among Principals in California's K-12 System

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Research in education involving sex segregation is dominated by a historic paradigm of conflict and sexual politics theory, even when these paradigms may now be inconsistent with the findings of the latest research. Utilizing the California Department of Education's Professional Assignment Information Form (PAIF) in conjunction with the National Center for Education Statistics (NCES) datum from 2001-02 to 2008-09 school years this study employs rational choice theory to explain the increases females now enjoy in obtaining the principal position throughout the broad range of schools in California. While previous work contends that women are only gaining access to the principal position in areas that would be seen as "unfavorable" to men, this study finds that women are being made principals systematically in all areas and across nearly all variables. Women are gaining in total proportion of principalships in the more desirable schools in eight of the ten variables studied. Specifically, the hiring of women into principalship positions is

increasing in all categories of schools. These include high schools, rich schools, high achieving schools, schools with low pupil-teacher ratios, schools in suburbs and in small towns and in most small schools, regardless of their locations and other factors. Remarkably, these gains are being achieved by women, all while having equal or less education on average than men. However, two variables, "years in the district" and "years teaching", show that women have more years than men in holding the position of principal. The significance of the findings of this study is outlined, as well as suggestions for possible future research.

TABLE OF CONTENTS

List of Tables

List of Charts

# CHAPTER I

# THE RESEARCH OBJECTIVE

## Introduction

> *"On February 8, 1964, two days before the Civil Rights Act moved from the House to the Senate, Representative Howard W. Smith, a conservative Democrat from Virginia and strong opponent of the measure, offered an amendment that would prohibit sex discrimination in employment and expand the Act's coverage to include 21 million women of all races and ethnicities. The amendment changed the course of history, but the motives behind it have been the subject of considerable debate. Many have interpreted Smith's proposal as an effort to sink the entire bill. Indeed, in the floor debate that ensued, many lawmakers mocked the notion of addressing sex discrimination in employment. But others saw the amendment as the culmination of vigorous advocacy by a small group of women's advocates who seized an opportunity to remedy longstanding job discrimination problems facing women. Despite formidable odds, women's rights advocates led a successful fight to secure passage of the amendment in the House. Shortly thereafter, the Senate passed the Civil Rights Act of 1964 and on July 2, President Lyndon Johnson signed it into law. For the first time, federal law would provide comprehensive employment discrimination protection for all women and people of color" (Bird, 1997)*

On July 2, 2014 the nation will mark the 50th anniversary of the Civil Rights Act of 1964. The bill was the culmination of years of exertion, carried out by those who fought for civil rights and for the promise of equality under the law for all people. The Act brought with it Title VII, which included groundbreaking legislation that offered protection against sex discrimination in employment and a

hope of equality for all. Yet, nearly 50 years later the topic of sexual discrimination continues to make headlines.

In April of 2014, President Barack Obama announced plans to sign an executive order "prohibiting federal contractors from retaliating against workers who discuss their pay" as well as directing the Labor Department to implement new rules "requiring federal contractors to provide compensation data" that reports specifically on both race and gender (AP.org, April 8, 2014). It is believed that secrecy in compensation rates promotes inequality and hurts women. Recently the Pentagon lifted its ban on women in combat, exciting a flurry of debate on whether or not women should be in combat situations. The U.S. Congress continues to wrestle with the Paycheck Fairness Act, legislation aimed to expand the scope of the Equal Pay Act of 1963, which has been rejected twice in the Senate, most recently in the summer of 2012; however, President Obama has promised that he will not leave office till the Act is passed. Indeed, the topic of sex discrimination in employment continues to make headlines.

This brief introduction highlights the concerns at the heart of sexual discrimination; does there continue to be a difference in how men and women receive pay, get jobs, advance in their career, or chose careers? Scholars and politicians have debated the size of the pay gap and what level of inequality gender plays in the attainment of employment (Furchtgott-Roth & Stolba, 1999). However, it is clear that the perception of gross inequality, both in the public eye and in the academic journals, persists.

While it is absolutely clear that women have had to battle for equality in the workplace, demand it into law, then fight against prejudice and bias unceasingly; it is also clear that women in California's K-12 public school system are now enjoying unprecedented success in obtaining the top "in school" administrative position, that of the principalship. This research finds that almost universally women are obtaining the principal position in record numbers while continually holding onto their historic strongholds. Arguing that a change of paradigm for sexual stratification is needed, this research utilizes rational choice theory to argue that the economic model is changing what superintendent's desire in the attributes of a school's principal. Sexual politics theory, or more broadly conceived as conflict theory, which served for so long as the theoretical tool illuminating the bias and discrimination women faced in advancing into school administration, has ceased to account for what is happening in schools. Women hold the majority of principal positions in the State and are increasing their proportional share in every "favorable" assignment. A rising economic model that emphasizes preferences that favor women has replaced the blatant sex discrimination of the past.

Scope

The research uses the California Department of Education's Professional Assignment Information Form (PAIF) in conjunction with the National Center for Education Statistics (NCES) datum from 2001-02 through the 2008-09 school years.

This datum looks at the total number of K-12 principals differentiated by sex to assess the gender gap. The research addresses three main areas:

i. *Equity*: The first and overarching question that motivated the research involved equity issues. Specifically the question was asked, are women gaining increased representation as principals in California's K-12 school system? Further, is the number of women principals equitable with the proportion of female teachers, the pool from which principals are drawn, in the school system?

ii. *Attributes*: Based on the literature as articulated below in Chapter II, women do not become principals of the more high-status schools. To be even more specific, according to the literature, women only obtain the schools men do not want. The study found that these claims were not accurate in this data. The research examined sex across two categories, (1) school variables and (2) principal characteristics as follows:

I. School Variables

a. Level:

i. Primary school

ii. Intermediate school

iii. High School

b. Locale

i. Large city
ii. Medium/Small city
iii. Large city suburb
iv. Medium/Small city suburb
v. Towns
vi. Rural areas

c. Size
    i. Small
    ii. Medium/Small
    iii. Medium/Large
    iv. Large

d. Title 1
    i. Eligible
    ii. Ineligible

e. Economy, as described by Free and Reduced Lunch Participation
    i. Poor
    ii. Middle Class
    iii. Rich

f. API Scores
    i. Low Achieving
    ii. Medium Achieving

iii. High Achieving

g. Pupil-Teacher Ratio

i. Low

ii. Medium/Low

iii. Medium/High

iv. High

II. Principal Characteristics

h. Education Level

i. Doctorate Degree

ii. Master's + 30

iii. Master's

iv. Bachelor's + 30

v. Bachelor's

i. Ethnicity

i. American Indian or Alaska Native

ii. Asian

iii. Pacific Islander

iv. Filipino

v. Hispanic or Latino

vi. African American

vii. White

j. Years in the District

i. Low Years

ii. Medium/Low Years

iii. Medium/High Years

iv. High Years

k. Years in Teaching

i. Low Years

ii. Medium/Low Years

iii. Medium/High Years

iv. High Years

iii. *Theory*: The study began by employing a holistic exploratory research approach in order to test the data before making conclusions of what was happening to principals. Once the pertinent information was known and patterns were identified, rational choice theory was used to illuminate and explain what was happening in the data. The theory led to the realization that a new paradigm was needed in order to accurately account for what is happening in the principalship.

The use of the PAIF data gives a clear picture of the number of principals who are women and answers the most basic question of advancement and sex. Then combining this data with the NCES data, it was possible to tell in which districts and

schools these principals are working. This information is important to answer lingering questions regarding women moving into school administration and the kind of schools where women are becoming principals. Often the relevant literature says that women are continuing to experience discrimination that relegates them to the unfavorable schools, schools where men do not want to be the principal (McGee, 2010; Roser et al., 2009; Stuckey, 2012). Other data suggest that women are being made principals primarily in the elementary school level while men are still the overwhelming majority at the more prestigious middle school and high school levels (Gotwalt & Towns, 1986; Keigher, 2009). This work showed those claims to not be accurate in the State of California.

This work argues that a new paradigm is needed to address what is happening in educational administration. In the past, when researchers theorized on why women were experiencing discrimination, they overwhelmingly relied on theories that were based in inequality and power struggle. The vast majority of work in this field for the last 50 years has been driven by conflict, or more specifically, the theory of sexual politics. While the theory was accurate in the past to assess the problems women faced, many of those battles have been won and are no longer faced by the upcoming generation of female teachers and administrators. The continued use of sexual politics theory has necessitated that researchers often have to constrict their findings very narrowly in order to have the theory fit the findings. It is common in the research to have large sections of the findings not fit with the theory. This constrains much of the research and fails to give a clear

picture of what is really happening. Rational choice theory generally allows accounting for all of the findings of the study and offers direction for possible additional studies.

This research definitively answers the bold query of whether or not women are finding equality in educational administration. It firmly shows that women account for 60.0% of all principal positions and that women are gaining total proportion in the more desirable schools in nine of the eleven variables studied. Specifically, women are increasing the fastest in the high schools, the rich schools, the high achieving schools, the schools with low pupil-teacher ratios, the suburbs and small towns, and in small schools all while having equal or less education. Two variables, "years in the district" and "years teaching", showed that women had more years than men in holding the position of principal, which will be shown to be accurately accounted for utilizing a rational choice approach.

Study Overview

The study is broken down into five chapters. Chapter I provides an overview of the study and introduces the variables and logic behind employing rational choice theory. Chapter II starts by giving an overview of the role women have played in education since the beginning of this nation. Next follows a breakdown of the theories that have shaped the study and a review of the current literature regarding the contributions women have made in educational administration. The chapter concludes with a review of the current knowledge base regarding sex discrimination

and school administration. Chapter III is a breakdown of the methods that were employed in the study beginning with obtaining the data, the combining of the different datasets, the cleaning and looping of data, and the verification process used. The chapter ends with a statement of the hypotheses that have driven the study. Chapter IV presents the results of the analysis with accompanying tables and charts. Chapter V is the discussion of the findings with summary conclusions. This summary chapter also makes recommendations for future work utilizing rational choice theory to examine educational administration.

# CHAPTER II

# RELATED LITERATURE

This chapter will serve as the foundation for the entire study. It begins with a brief look at the history of women in education, noting the primary factors that played a part in the changing opportunities of women in U.S. history. It then turns to an outline of the theoretical paradigms that historically shaped research in sex segregation and will explain why a new paradigm is needed. The chapter will conclude with a review of the literature that serves as the backdrop of the current study.

## History of U.S. Women in Education

This section begins with a very brief overview of the history of women's opportunity for education in the United States. It is important to address the changes that have taken place in the opportunities that women have had to be educated if we are to understand the current state of affairs. While this section is not meant to be a complete and in-depth look at all U.S. women's history in education, it will be used to show how the market approach of rational choice theory can help explain why changes are happening for women. At this point in the paper a thorough explanation of rational choice theory will not be given (it will be given in the *Theoretical* section below) but a brief definition is needed. Rational choice theory is based in the idea that individuals act out of a desire to maximize

their own preferences, after weighing the cost, thus acting *rationally*. From the late nineteenth century, when women rarely received formal education, to the present day, when women earn the majority of higher education degrees, there have been significant and on-going changes (Yen, 2011). Of particular interest, relevant to this study, is the importance of the often-cited historic reasons that women received education. These include the desire to build a nation, the Christian values they embraced and the rising distinction of the middle class, were all based on rational decisions intended to maximize preferences for themselves and for others in this new world.

Following the Revolutionary War, the nation was focused on the building of a nation (Nash, 2005). Both sexes saw education as a way to form the infant country into the "Divinely appointed land" so many saw it to be (Nidiffer, 2000). Women saw education as their way to help the nation progress by training their children and rearing them with correct principles. Women of the early republic strove to educate their children "with great ardor, whether or not formal education was available" (Nash, p. 29). Academies, colleges, seminaries and institutions sprang up all over the country.

Much of this desire for education was fostered by widely held Christian beliefs that guided the foundational thinking of much of the nation. Bible reading and early religious education was common among the northern colonies, particularly for Protestants and Calvinist (Kaestle, 1983). The belief that learning would bring a person closer to God was widely held. And, as religious vigor spread,

the importance of schooling, particularly in reading skills honed to read and understand the Bible, also spread for "all of God's creations." In fact, as Nash points out, learning itself was viewed as a religious duty for both men and women (p. 55). This duty to be educated to be better able to serve God helped drive much of the inclusion of women into education.

Similarly, education was also valued as a way in which individuals could come to understand God. One female student in 1824 put it succinctly concerning education, "God has not bestowed a greater privilege, it is the comfort of life" (Nash, 2005, p.93). This quote highlights the historic belief that intellectual capacity was one way that God provides pleasure in humans (Nash, 2005). The belief was that God gave humans intellect as a source of pleasure, and that pleasure was available to both women as well as men in their pursuit of ever more education and intellect.

It is clear that a belief in God was attached to educational attainment for both women and men. Kaestle (1983) points out that in the early 1800's the aim of many religious and educational institutions were united in the "goal (of) producing adults who would be minimally literate, who would have a chance at religious salvation, and who would act according to the morality the schools taught" (p.31-32). Religion and schools were closely aligned in purpose and direction.

Perhaps the strongest draw of allowing women to receive more education came from the blooming of the growing middle class. Scholars have shown that from the early years of the new republic, the middle class believed that the elites used education as an "accomplishment" while the middle class would seek

education to "put it to better and infinitely more practical and democratic use" (Nash, p. 69). The growing middle class was able to see the value of education and began to send their children to school instead of demanding them to work (Nidiffer, 2000). By the last years of the nineteenth century and early part of the twentieth century, the middle class had fully embraced education and the prestige it afforded (VanOverbeke, 2008, p. 15). The middle class saw education as a tool to secure freedom and a better way to provide for themselves and their families.

When these decisions are viewed from a modern perspective, the beginning of rational choice theory in action begins to emerge. Without further study into the literature of the time, it is impossible to know. However, it seems highly plausible that decisions were based on a cost analysis of weighing out educational costs and the reduced income that children could provide against the desire to secure future income and security by educating children.

The movement towards nation building, the inherent Christian values of the early nation's inhabitants and the rising distinction of the middle class all played a role in allowing women to seek more education in the United States. This in turn, created a need for more individuals who could teach and administer schools, opening the door for women to begin to move into the profession of educating youth as well as educational administration. Yet, most of the opportunities for change for women can be linked to five key historical eras: the Revolutionary War, the Women's Suffrage Movement, The Great Depression, World War II and the Women's Rights Movement from the 1960's to 1980's. These five key eras in the nation's

history correctly account for the major ups and downs of women's employment opportunities in general, but even more specifically to women's employment opportunities in education.

The Revolutionary War opened the nation to the growth of Christianity and the middle class. During this time women gained more and more rights to be educated and to act as schoolteachers and, in some cases, administrators (Nidiffer, 2000). Women saw their opportunities to be educated grow with each passing year. Great female leaders and educators such as Catharine Beecher, Mary Lyon and Emma Willard developed and fostered the growth of female education (Nash, 2005). As the nation grew, some of the greatest growth in women's institutions occurred. The growing prosperity of the new nation rewarded women by allowing them time to spend in seeking education. As a result, the Revolutionary War era yielded increased female enrollment in many educational institutions.

The Civil War was the next key era. The early years of the war opened opportunities for women, inducing many families to send daughters off to school for safety. However, the prolonged war would eventually hurt every aspect of life, including educational opportunity, particularly in the South. Many schools were destroyed and the loss of life was felt widely within homes and on campuses. In a process that began in the 1840's, even before the war, men began to opt out of teaching, creating a vacuum within the education field into which women began to move (Nash, 2005). This process accelerated after the war, as women were seen as a readily available and as a relatively inexpensive replacement work force (Blount,

1998, p. 93). Because of this, women began taking a more prominent role in education and educational leadership. The relative cost to employ a woman was far less than to employ a man, as men were scarce in the post Civil War era, due to the nation losing more men than in any other war before or since.

If the progress of women's educational rights can be classified as "slow and steady" in the Revolutionary War period, then the accelerating in the post Civil War era, the Women's Suffrage Movement, which began in the late nineteenth century, can be described as a torrent of change! From 1870 to the early 1900's, the number of women attending institutions of higher learning increased dramatically (Zimbardo & Duncan, 2012; Nash, 2005). Spurred on by the Women's Suffrage Movement, in which women demanded and pushed for their rights under the law (including the right to vote), women saw increases both in educational opportunities and in work positions in the schools. Women during this time were ever more active in education and the booming economy.

Blount refers to the years of 1910 to 1930 as the "golden age" of women educational administrators (1989). During this time, women worked in education as both teachers and administrators. Riding the wave of the Suffrage Movement, a time when the preferences of women changed and women acted to secure a larger share of that preference, women accounted for 11% of all superintendents nationally (Blount, 1989).

The Great Depression leading, up to the World War II era, would again alter the state of affairs for women in educational administration. As Nash teaches,

"During the Depression, preference for jobs was given to men, assuming that they needed to support families and that women didn't" (Personal interaction, May 17, 2014). During the Depression, schools learned to function as "the schools of scarcity and pervasive uncertainty" (Tyack, 1984, p.4). During this time of trial, men overwhelmingly took jobs wherever they could get them. In many cases, this meant back into the schools.

World War II abruptly reversed that trend when men went off to fight in large numbers. Simultaneously, the shortage of men now meant great opportunities opening up for women substituting for men in the factories for the duration of the fighting. While women were needed to go into the work force during the war and enjoyed being able to attend schools that had previously been men-only, the end of the war saw men returning and an accompanying change to the social order of pre-war times. The large number of returning men resulted in women being encouraged, and, in some cases, forced to leave their employment and the classroom (see Brown, 1984, Nidiffer & Bashaw, 2001, Blount, 1998). The rally cry was to employ the veterans throughout the nation and men began to govern schools in a very different era, a time of optimism and plenty (Tyack, 1984). The GI Bill, an act of legislation that made education affordable for veterans by paying for school and offering a monthly stipend, changed the way higher education worked. More men attended higher learning institution than ever before, simply pushing women out.

The end of World War II brought major social changes as well. Women were encouraged to return home and assume the role of wives and mothers. Single

women, who had long been the backbone of teaching, were now seen as "feminizing the classroom", as lesbians, or unnatural and a danger to children (Blount, 1998). From 1950 to 1970, the proportion of women in higher education and the number of school administrators plunged. By 1970, women accounted for less than 4% of superintendents and only 4% of all principalships (Blount, 1998, p.111). As late as 1972, the UCEA reported that 98% of educational administration faculties were male (Blount, 1998, p. 122).

The Women's Rights' Movement of the 1960's began a major change brought about through the legal system. While women used acts of civil disobedience to express their disapproval of the way women were treated, the real changes were a result of legal and legislative actions (Blount, 1998, p. 134). As early as 1963 with the Equal Pay Act and in 1964 with Title VII, women's rights were expanded. By the time Title IX of the Education Amendment was passed in 1972, women were beginning to see real change in their legal rights, even if the actual rights were slow in coming. Women were gaining legal rights for equality, while still having to battle against bias and discrimination in nearly every aspect of the labor force. However, legal rights laid the foundation of real change that would eventually be enjoyed by women years later.

To put this time into perspective from a rational choice point of view, women mobilized because the cost of remaining quiet became too great. In order to maximize their preferences, they had to demand change. It was during this time that sexual politics theory was developed to explain why women were experiencing

discrimination and not being treated fairly. The great imbalance women faced resulted in a tide of change that sought to correct social injustice and the sometimes-blatant biases that women faced.

Today women deal with far less discrimination and enjoy greater mobility in every aspect of education and the job market because of those women who fought for equal rights. Because of the paradigm of sexual politics theory, women understood that discrimination was based on conflict and men's struggle to maintain power. While many feminists would argue that the changes came too slowly and that there is still discrimination, some data are showing that perhaps women are now on an equal footing with men. In fact, it is quite clear that women are gaining education at a faster rate than men. Zimbardo and Duncan (2012) explained it this way,

> Girls outperform boys now at every level, from elementary school through graduate school. By eighth grade, for instance, only 20 percent of boys are proficient in writing and 24 percent proficient in reading. Young men's SAT scores, meanwhile, in 2011 were the worst they've been in 40 years. According to the National Center for Education Statistics, boys are 30 percent more likely than girls to drop out of both high school and college. … It is predicted that women will earn 60 percent of bachelor's, 63 percent of master's and 54 percent of doctorate degrees by 2016. Two-thirds of students in special education remedial programs are guys (p. 12).

The changing environment for women over time is also made more complex with the changing nature of the principal position. The position of principal is not a static state; it is a constantly evolving and changing post. As Rousmaniere explains, the principal position has changed a lot since the founding of this country (2013). The title of principal has meant many things over the years: head teacher, building manager, custodian, and supervisor. Because of this ever-changing state, it is difficult to make absolute comparisons over time, as so often the position has changed. It is with this bit of understanding that bold sweeping statements regarding the state of affairs for women in the principal position must be balanced against. This understanding of change in the title and meaning of the word "principal" leaves one to be cautious in asserting any grand change or design regarding females in the principalship.

However, it is clear that women today are enjoying equality in gaining education. This study is needed to show what is happening with women in educational administration responsibilities and opportunities. This study will reflect the changing environment of women in educational administration and the need for a new paradigm, a paradigm based in market methodology.

## Theoretical Framework

The foundation of any academic research is centered in the theory that frames the study. Due to historic norms, set forth in the previous section, women

were underrepresented in school administration and experienced sexual segregation previous to the modern era. Scholars and researchers used theory to elucidate the phenomena. As a result, sexual politics theory emerged as the best tool, or paradigm, to explain the segregation, bias, and unfair treatment women received. For more than a generation, sexual politics theory controversially illuminated, rattled, upset, stirred up, and successfully accounted for what was happening among women in society in general and specifically in school administration. The findings from this study, which began as an exploratory research study, show that while the sexual politics frame appropriately accounted for what was happening in schools from the 1960's to early 2000's, the context of rational choice theory now best serves to explain what is happening in schools. This section begins with an overview of sexual politics theory and then proceed to an explanation as to why this study utilized exploratory research methods. It then gives a breakdown of rational choice theory which acts as the paradigm behind this study. The chapter concludes with a look at the literature regarding female school administrators.

## Foundation of Sexual Politics

In studying sexual segregation, four major theoretical perspectives or frames have historically been used: 1) socio-biology, 2) socialization, 3) cultural-historical, and 4) sexual politics (Collins et al, 1993; Connell referred to the fourth frame as 'political conflict'. (1990)). These four frames have shaped the way in which sex

segregation is viewed and have had substantial impact on the study of sex segregation. While an in depth description of each of these frames is beyond the scope of this paper, it is vital to understand the different perspectives to appreciate why feminist researchers have been led to rely heavily upon the sexual politics theory. This section gives a brief summary of each of those frames and show why the sexual politics frame rose to become the dominant paradigm.

The first of the four frames is sociobiological. Edward O. Wilson, a renowned Harvard professor, is considered the primary central figure of sociobiological theory as defined within his book, *On Human Nature* (1975). Professor Wilson brought the theory into discussion while readily acknowledging that his work was based on Scott's and Hockett's work from the 1940's. Wilson later explained sociobiological theory "as the systematic study of the biological basis of all forms of social behavior, including sexual and parental behavior, in all kinds of organisms, including man" (1975). Simply put, Wilson believed that all social behavior could be traced back to the inherited genes and evolutionary processes that transformed humans into what they are today. Sociobiology argues that social interactions, processes, and actions are driven by the biological need to preserve our own genetic profile.

Sociobiology is concerned with the evolution of the human species and often ties the conclusions and practices back to Darwin's notions of evolution. As a result, they are often occupied with the desire to account for human behavior by looking at evolutionary selection. Interestingly, in 1976 Gary Becker, a researcher that helped

shape rational choice theory, observed that the economic model could help explain one of sociobiology's questions regarding altruisms (1976 b).

Sociobiologists use genetic make-ups to argue that certain traits and characteristics account for behavior, both in animals and in humans, and that women are more nurturing and caring by biological make-up. Women are therefore less fit to compete with men for jobs in the job market. They see women as less needed in the workforce and more needed in the homes rearing children as a result of evolution.

Marxist and far-left-leaning sociologists, led by Harvard professors Lewontint and Gould, were outraged over sociobiology and the lack of "political understanding" they saw in the theory. These researchers contended that only by understanding the politics of the social world could human behavior be understood. An intriguing and colorful academic fight erupted between the two schools of thought, where the detractors "(caused) an earthquake of highly public denunciation, spreading from the Harvard epicenter" (Gross, 2004). Wilson replied to the early *Political* protesters by saying, "(sociobiology) threatens to transform the assumptions about human nature made by some Marxist philosophers into testable hypotheses"(1978). In return, the Marxist presented Wilson's ideas, "as an ideologue supporting the status quo as an inevitable consequence of human nature" (Segerstråle, 2000). Ultimately, sexual politics theory would be embraced by the academic world while sociobiology was relegated to only a small group of researchers.

The next foundational frame is that of the socialization theory. Socialization is the process of learning and passing on the norms, customs, and ideologies of one's particular society. Early researchers in this field perceived children as entering the world as a "blank slates" and thus learning to function in the world from social institutions such as parents, family, extended family, peers, religion, legal systems, mass media, and other influences. While most researchers now believe that children are not "blank slates" but have unique attributes and characteristics from birth, socialization still accounts for much of how individuals are formed (Pinker, 2003). This particular theory is driven by names such as Kohlberg, Moreland and Levine, Clausen, and Mead and has long been a source of sociological research and theory. Plainly put, socialization suggests that the social institutions shape a child into harmonizing into what the society says the individual should become. This is the *nurture* side of the classic *nurture versus nature* debate. Most researchers utilize this theory in conjunction with other theories.

Sexual politics theorists argue that the socialization theory is important and acknowledge the role of sex, but this does not help individuals adjust to those social institutions in a manner that would allow change. They argue that socialization sees sex roles as static or learned and does not incorporate politics into the argument. However, many socialization theorists are increasingly using methods of sexual politics and are blurring the line between the two theories (Esptein & War, 2011).

The third frame is the cultural-historical frame. This frame notes how specialized organizational positions shape a stratified structure. The cultural side

deals with the importance of symbols, language, values, beliefs, and norms to a society. The historical side deals with the historical formation of the social organizations and how that impacts the development of future social structures.

Sexual politics theory itself has its roots in 1970 with the work of Kate Millett, a literary critic who published her seminal work critiquing the view of sex as "natural rather than political" in her book *Sexual Politics* (1970). Millett's work has been credited with sparking the second wave of feminism and being the first book of academic feminist literary criticism (Gallop, 1992). As Clough (1994) points out,

> *Sexual Politics* is an awkward book. After all, it not only treats as a matter of politics what long had been taken to be a matter of nature, thereby forcing a hybrid of the sexual and the political. It also proposes to do so by means of a criticism… (p. 474).

Millet articulated the power struggle inherent in the conflicts as a result of sexual segregation. From her work, the sexual politics frame, conflict power frame, or second wave feminism would emerge. Again quoting Clough,

> Of course, it would be some years after the publication of *Sexual Politics*, before feminist theorists would become deeply engaged in the epistemological and methodological questions that characterized debates in many academic disciplines throughout the 1970's and 1980's. (p. 473)

In current sexual stratification work, sexual politics continues to be utilized by a handful of faithful followers (Stuckey, 2012). While the theory does not command much space in the journals of today, the paradigm of sexual politics continues to resonate with modern researchers. In this paper, "paradigm" or "paradigm shift" are used freely as they were in Thomas Kuhn's (1970) renowned book, *The Structure of Scientific Revolutions*. A paradigm is meant as a "model or theory; … often guiding, consciously or unconsciously, our thinking about such things as organizations, leadership, and policy" (Boyd, 1992). This paradigm of conflict has dominated the theoretical landscape. Many researchers shape their arguments with this theory in mind. Within the work of researchers in the field of education are the work of Ortiz, 1982; Blackmore, 1989; Marshall, 1999; Cooper, Fusarelli, & Carella 2000; Tallerico, 2000; Crosby-Hillier, 2012; Feimster, 2012; Stuckey, 2012; and many more. It is plain to see that across the last 40 years, the ideas of sexual politics theory have shaped much of the way in which sex discrimination is explained. The research employing sexual politics in educational administration will be further elaborated on below in the section entitled *Prior Work in the Field*.

The modern take on sexual politics theory is that women continue to see subtle inequality in their work, rights, and personal lives though they acknowledge greater freedom. As can be observed in the introduction of this paper, a perception of inequality is still very much alive today. In fact, the author got the distinct impression that some of the researchers perhaps appear to feel that if inequality is

not observed, then you have not looked hard enough. This argument has become harder to justify as researchers continually return findings that do not hold with the expected outcomes sexual politics theory would predict.

For many years there has been a significant push in the literature to rethink sex segregation and the paradigm of conflict/sexual politics. As Brunner put it, "Thus, it appears that the traditional discourse needs to be reconsidered, expanded, and changed" (2002). The concern raised by many researchers has been that traditional literature does not address the complexities of the role of women in leadership. For years, researchers have refined and cultivated theories to address sex segregation while building on the conflict tradition. While a full list and examination of these alternative theories is outside the context and intent of this research, three alternative theories will be mentioned to show what work theorists have done in order to adjust sexual politics theory. These three theories are postmodernist theory, standpoint theory, and intersectionality. The following paragraphs provide very brief overviews of these three alternative theories and only serve to point the reader towards work that could further enlighten the discussion.

Postmodernism is not easily defined into one phrase or sentence, as it is actually a mixture of several ideas. The term postmodernism is often applied when individuals are seeking to move beyond the established norms and beliefs of a time. For this reason postmodernism has been applied in art, engineering, philosophy, literature, and music. Jen-Francois Lyotard, first theorized the term postmodernism

in his book *The Postmodern Condition*, where he summarized postmodernism as above all maintaining "an incredulity toward metanarratives" (as quoted in Parpart & Marchand, 1995, p. 2). The "metanarratives", or grand theories, are not seen as truth, "but as privileged discourses that deny and silence competing dissident voices" (Connelly et al., 2000, p. 136).

Postmodernists reject the grand theories of the past, be they Marxist, symbolic, or structural functionalism, as being too broad and mistakenly believing in their own invincibility or dominance. The postmodernist embraces more specific, narrow theories that can explain precise phenomena. The philosophical attacks are famously articulated by names such as Michel Foucault and Jacques Derrida (Callinicos, 1990). Much of the postmodernist movement's work with women has focused on the lack of understanding regarding women of color that the theorist believes comes from basic sexual politics theory. Additionally, some scholars have attempted to move researchers away from the "niche" theories of postmodernism and back towards a reliance on the foundational theories, Callinicos (1990) being an excellent example of this argument.

The next theory that attempts to refine the sexual politics theory argument is feminist standpoint theory. Standpoint theory's most basic concept is that an individual's own perspectives are shaped by his or her experiences in social locations and social groups, thus from the *standpoint* in which one views their world. Standpoint theorists believe that society is hierarchically structured, with groups of people gaining privilege by oppressing other groups. Standpoint theorists

argue that research and thinking must begin from the lives of the oppressed. As Sandra Harding (1991) notes, "the understanding that [people] are oppressed, exploited, and dominated—not just made miserable by inevitable natural or social causes—reveals aspects of the social order that are difficult to see from the perspective of their oppressors' lives" (p. 126). In other words, a more comprehensive view of social conditions and relations is gained, as well as knowledge construction, when formative thinking takes perspective from the lives of the oppressed (John, 2011). Additionally Lenz (2004) points out that "the term standpoint refers not to a rigid or permanent stabilization of perspective, but rather to a fluid and dynamic negotiation of experience and point of view that can be temporarily stabilized in order to interrogate dominant ideologies" (p.98). The feminist standpoint theory is an excellent example of a refinement to the classic conflict/sexual politics theory that continues to be rooted in the foundation of conflict, which this study seeks to address.

The final theory this section discusses is intersectionality theory. Intersectionality arose out of the writings of women of color during the 1960's and 1970's. These women saw that while general feminist theories sought to explain what women were going through, they did it from the perspective of a white woman. These women desired to explain, analyze, and understand how women faced challenges across multiple identities (Crenshaw, 1989). In the traditional sense, intersectionality theory avoids "essentializing" a single analytical category of identity by attending to other intertwined categories (Samuels & Ross-Sheriff,

2008). Intersectionality enables the researcher to stretch their thinking about gender and feminism to include the impact of context and to pay attention to interlocking oppressions and privileges across various contexts. Researchers utilizing intersectionality believe that sex alone cannot be used as a variable in a study. They see sex as just one of many variables that must be combined in order to truly understand what is happening to individuals and to society. Scholars using intersectionality see the need to deeply understand all of the possible components that go into an individual in order to examine and learn from that individual.

Having looked at three of the theories that have taken sexual politics theory into account and then critiqued, augmented and/or finessed the theory into alternative models, it can be seen that the theory of sexual politics is not static or inactive. Often the theory has been used as a foundational model that has impacted the way in which researchers look at that which they study. It is clear that sexual politics continues to shape and define the paradigm of those working on research involving sex stratification. Throughout this study sexual politics theory will be referred to as a paradigm, a general way of thinking about sex stratification. While one of the three highlighted "refining theories" may address an issue in a slightly different way than the classic sexual politics theory, the foundational ideas remain the same and will serve as a broad "sexual politics" paradigm for which this study will contrast rational choice theory.

Exploratory Research

This research began with the basic assumption that sexual politics theory was not accurately accounting for what was currently happening in educational administration. While having several suppositions of what was contributing to the shift in the position of women in educational leadership, it felt premature and even impetuous or brash, in light of the historical significance of sexual politics theory to proclaim a theory before finding out if indeed there was a change in the women's circumstances in educational administration. Therefore, the decision was made to employ an exploratory research form in order to account for the reason women are attaining or continue to not attain principal positions in California K-12 schools. This subsection begins with defining what exploratory research is and then shows how the method is being used across the social and hard sciences today.

L. R. Franklin from the Department of Philosophy at Columbia University relates the following delightful quote: "The physicist George Darwin, a son of Charles, reportedly said that every once in a while one should carry out a crazy experiment, like blowing a trumpet in the tulips each morning. Nothing was likely to happen, but if something did, it would be quite a breakthrough" (as quoted in Franklin, 2005; p. 889). Many scholars see the rise of exploratory research as a form of blowing a trumpet while standing in a bed of flowers, yet more and more scholars are seeing the value of exploratory research in the advancement of science. Typically, academic researchers strive to be theory-directed. But a growing body of research is today being done as exploratory research, research that is theory-

informed but led by a desire to address a particular problem or to shed light on an important issue.

Perhaps this argument can best be illustrated with a simple comparison (thanks to Doug Mitchell for help in developing this approach). Generally, a budding researcher will come upon a theory that he or she is sure has the answer to some grand question. Then, with this theory in hand, the researcher will go in search of a dataset or scenario where that grand theory can be observed and studied. Then, with data in hand and backed by the theory, the researcher will make a grand assertion. This, of course, leads to high regard and a tenure-track position at a well-respected institution.

However, what if a budding researcher came across a dataset that, on an initial hunch or a very vague and preliminary feeling, might allude to or imply insight into facts regarding a particular subject, but the facts are not yet discovered? And what if, with data in hand, ferreting out the *facts* hidden within the data led to a change in direction of long accepted theories that have perhaps morphed or matured into a whole new direction with regard to that particular subject? Because the facts had yet to be discovered, a theory could not be inserted. This scenario would require the researcher to turn toward an exploratory research method.

This little comparison of approach is exactly what has happened in this research. Having come across a dataset that allows for the addressing of the issue of sex stratification within California's K-12 system, facts have been ferreted out of the data that have led the researcher to suggest a maturing of accepted theory into a

whole new paradigm. By testing the data against a wide array of possible theoretical ideas, a high level of confidence has evolved in the findings of this research and in the subsequent conclusions.

This bold method has been the source of renewed interest of late. Researchers in the fields of biology, management, mathematics, philosophy, psychology, and sociology have all gained vocal proponents of the value of exploratory research. These theorists have found that just because a study is not theory-directed, it will not lack theory. As Waters, a scholar from the school of philosophy suggests in his "theory-informed" terminology, theory is very much a part of exploratory research (2007). Waters goes on to point out how three biologists, Burian, Elliott, and O'Malley, have found that when approaching research from an exploratory direction, it opens up whole new possibilities. Waters well articulates the point, "The distinction between exploratory and theory-driven experiments centers *not on whether* an experiment depends on theory, but *on the way(s)* in which it depends on theory" (p. 3, italics added). He goes on to point out that the distinction between exploratory and theory-driven experimentation "is not necessarily sharp."

Another aspect of exploratory research's potential is found in the capability to discover new insights. Rao, speaking to those in the field of management and social sciences, concluded that exploratory research brings "New findings that could help a researcher in finding new explanations and interpretations" of existing theories (Rao, 2008; p. 28). Rao also sees exploratory research as a way to

"examine, evaluate and review theories for new investigations" (p. 23). Steinle, a German physic theorist who coined the term "exploratory experimentation" described it this way: "The aim of exploratory experiments is to generate significant findings about phenomena without appealing to a theory about these phenomena for the purpose of focusing experimental attention on a limited range of possible findings" (1997). It is exactly this removal of "limits" that is at the heart of this research.

The use of this method is possible because of the advancements in technology that allow researchers to perform many more tasks than they could ever have in earlier times. This fact is particularly true in the study of mathematics where common calculators are capable of handling advanced equations, to say nothing of the sophistication of computer programs and software which are allowing scholars in the field of mathematics to multiply their efforts quantitatively as never before. As Elgar pointed out:

> "The way we do experiments has changed. No longer do we necessarily form null hypotheses, design experiments to test them and derive answers to challenge them. In the new, high throughput world, we can perform thousands of experiments at once, provide millions of possible answers and then start asking questions" (Elgar 2002, p.4).

Borwein, a fellow mathematics scholar, argues that exploratory experimentation "is leading to a reassessment of what is viewed as a legitimate experiment in which a "local model" or theory is not a prerequisite" (2009). He then

outlines the various online tools students have at their fingertips and gives three examples of math problems that demonstrate how the need to base research on theory or proofs' in mathematics is virtually obsolete. His conclusion:

> The students of 2010 live in an information-rich, judgment-poor world in which the explosion of information, and of tools, is not going to diminish. So we have to teach judgment (not just obsessive concern with plagiarism) when it comes to using what is already possible digitally. This means mastering the sorts of tools I have illustrated. (2009).

Borwein, in quoting Franklin, believes that part of this judgment will hang on learning how to use "wide" methods. Franklin, in discussing the use of the exploratory experiments in addressing DNA microarray experiments, says,

> I argue that exploratory experimentation—experimentation that is not guided by hypothesis (or theory; I will use these terms interchangeably)—has a broader and more systematic role in scientific inquiry than is commonly recognized. I focus on the availability of 'wide', also known as 'high-throughput', instruments (those which allow the simultaneous measure of many features of an experimental system) and suggest that, with wide instrumentation, exploratory experimentation is more productive than it is otherwise (2005).

Franklin argues that exploratory experimentation, or the ability to expand the search into new directions and add new technology or new variables into the research, is beneficial to research. This widening of the methods of doing research adds richness to the work.

Upon investigating the dataset and finding that women were nearly universally gaining positions as principals across all the various variables and categories, many theories were considered to help explain and understand what the data were revealing. Social capital, human capital, path dependency, symbolic interactionism's micro-level social structure, as well as other conflict and feminist theories were considered and studied. No other theory had the power to both explain and illuminate the data like rational choice theory. The next section explains rational choice theory and shows why it is such a powerful tool.

## Rational Choice Theory

Rational choice theory (RCT) is a social science micro-level model created to explain human behavior. The approach has long been the dominant paradigm in economics, with the foundational assumptions of free market trade dating back to Adam Smith in 1776. Yet in recent decades it has become more widely used in other disciplines such as sociology, political science, anthropology, and education. This subsection begins by giving a brief historical outline, followed by a concise overview of the theory with the terminology and basic assumptions inherent within the theory. From that foundation, the arguments will be presented for the importance

of viewing the theory widely as an overarching paradigm in which to view sex stratification in the principalship.

While the essential elements of RCT are not new, and while it is always dangerous to attempt to put an exact establishment date on a theory (especially one that has its roots established in the 1700's), Homans (1961) is credited with first coining the phrase "rational choice theory." Though his initial theory would later be discredited and rejected, even by Homans, he set the foundation for modern RCT outside the walls of economics. Many credit Becker (1976) with being the first economist to employ RCT to explain social problems and behaviors (see Friedman, 1987; Coleman, 1990; Green and Shapiro, 1996; Green, 2002; Boudon, 2009). Becker took economics from studying only broad economic trends to more general social issues[1] and opened the way for social scientists to explore many aspects of human behavior employing economic principles (Hersey, 2014). However, it was not until Coleman, in 1988, that social economics truly experienced a true awakening that caused widespread awareness of RCT as a social science tool. In 1992, Becker would receive the Nobel Economic Science Prize for his work and would deliver his Nobel Lecture, *The Economic Way of Looking at Life*. As Boyd observed, "Since 1980, most English-speaking nations have experienced a sea change in how people think about educational policy and the management of schools" (1992). Boyd goes on to describe how the economic paradigm was won by

[1] Becker's work covered many areas of common life, including illuminating motivations about such aspects of everyday life as marriage, crime, addiction, racial discrimination, birthrates, and even baseball. He died May 3, 2014 at the age of 83.

the demise of communism, the rapid acceleration of democracy, and the worldwide free market. Boyd almost prophetically predicts the rise of the school choice movement, the market method of school administrators becoming managers of organizational management, and the unilateral acceptance of high stake test scores that have their roots in Reagan era policies that will be eventually carried out four presidential terms later.

In a relatively short period of time, RCT (and the market economy approach) has grown into a major contributing theory that is covered in nearly every economics and social science course of higher education. As Klaus von Beyme observed, rational choice has been the "great recent success story in political science" (1997, p. 525). In a remarkably short time, von Beyme writes, rational choice has "conquered many U. S. Departments and is now spreading through Europe." (1997, p. 525. as quoted in Somit & Peterson, 1999). A recent search using Google Scholar found over 8,300 articles contained the phrase “rational choice theory” published from 2012 through 2013 alone.

As would be expected, with RCT coming from the school of economics, much of the terminology comes from what would be expected in an economics study. Terms such as choice, cost-benefit, consumption, income, and constraint all seem like they would be more at home on the floor of the stock market, rather than in a social science study, but each are an important part of RCT. The discussion begins with the two words that make up the theory’s name.

Following the model employed by both Green (2002) and Boudon (2009), the breakdown begins by explaining what "choice" means in RCT. RCT is based on the primary premise that the choices made by consumers and sellers are the choices that best help them achieve their individual objectives, taking into effect all relevant factors that are beyond their control (Green, 2002). Essentially, rational choice theory states that people seek to maximize their own preferences under existing circumstances.

An example of the main axioms of choice within rational choice theory may help to further clarify the role of choice. As this study is concerned with principals, the example will be centered on the hiring of a principal and will use language similar to that found in Green (2002). For simplicity's sake, the example will center on the relationship of the superintendent and the potential principal (a more comprehensive breakdown of the principal hiring process in California can be found in Chapter III in the *Hypotheses* section):

1. The superintendent (consumer) faces a known set of *alternative choices.* In this case it would be all the possible candidates for the position.
2. For any pair of alternatives individuals (A and B, say), the superintendent either prefers A to B, prefers B to A, or is indifferent between A and B. This is known as the *axiom of completeness.*

3. These preferences are transitive. That is, if a superintendent prefers A to B and B to C, then logically, A is preferred to C. If there is indifference between A and B, and indifference between B and C, then the same logic results in indifference between A and C.

4. After carefully weighing the attributes of the individual candidates, the superintendent will choose the most preferred alternative. If the superintendent is indifferent between two or more alternatives that are preferred to all others, he or she will choose one of those alternatives -- with the specific choice from among them remaining indeterminate.

What does it mean to say that a choice is "*rational*?" In the strictest, or most narrow way, "rational" usually means behavior that falls in line with the above axioms. Put another way, in rational choice theory "rational" means that an agent's choices reflect the most preferred feasible alternative implied by preferences that are complete and transitive. The "rational" choice must be based in some way on an actual reason.

This leads to the terms "*preferences*" and "*constraints.*" Rational choice analyses generally begin with the premise that an individual or agent, or group of agents, is [are] maximizing utility – that is, choosing the preferred alternative. Constraint in a consumer choice problem is the "*budget constraint*, which says that

the consumer cannot spend more than her income" (Green, 2002, italics in original). Scott put it well:

> "Individuals are seen as motivated by the wants and goals that express their preferences. They act within specific, given constraints and on the basis of the information that they have about the conditions under which they are acting. At its simplest, the relationship between *preferences and constraints* can be seen in the purely technical terms of the relationship of a means to an end. As it is not possible for individuals to achieve all of the various things that they want, they must also make choices in relation to both their goals and the means for attaining these goals. RCT holds that individuals must anticipate the outcomes of alternative courses of action and calculate that which will be best for them. Rational individuals choose the alternative that is likely to give them the greatest satisfaction." (2000, p. 128)

The "greatest satisfaction," as quoted in Scott, is expressed in RCT as a function of utility. The utility maximization proposition holds that individuals will do what is best for them. They will act in their own best interest utilizing a cost-benefit paradigm (Boyd, Crowson & Van Geel, 1994). According to RCT, if benefits outweigh cost, the individual is likely to make the decision to act in order to continue receiving the benefits. If cost outweighs benefit, the individual will seek other courses of action (Ballantine & Spade, 2007).

Rational choice theories usually represent preferences with a *utility function*. Often in the literature this is a mathematical function that assigns a numerical value to each possible alternative facing the decision maker. Typically utility would be expressed as a $\mathcal{U}$ and written in a format such as $\mathcal{U}= \mathcal{U}$(x,y), where the function $\mathcal{U}(\cdot,\cdot)$ is assigned a number (utility) to any given set of values for x and y. The function is not restricted to being just between two choices and can be expressed as any number of choices, though most literature will break down the choices leaving just two options. This limiting to two options is in line with most rational thinking, as humans tend to simplify their choices down to two options prior to making a choice.

The function $\mathcal{U}(\cdot,\cdot)$ is normally assumed to have certain properties. First, it is generally assumed that *more is preferred to less* – so that $\mathcal{U}$ rises with increases in x and with increases in y. Put another way, this is to say that marginal utility is positive – where the term "marginal utility" is the change in utility associated with a small increase in the quantity of a good consumed. The second property of $\mathcal{U}(\cdot,\cdot)$ is that of *diminishing marginal utility*, which means that the (positive) marginal utility of each good gets smaller and smaller the more of the good that is being consumed in the first place (Green, 2002). An example of this is how the first bite of sushi is always the best. By the time dinner is finished, the satisfaction one receives from the last of the fresh salmon roll is significantly less.

While the strictest forms of RCT would hold that individuals would *only* act out of self-interest, a broader approach suggests that there may be more to the inherent interest of individuals. A simple example of this idea comes from the rational decision of parents to put off their individual wants in order to accommodate the needs of their children. In this example, the benefit of securing a strong relationship, or perhaps securing success for the next generation, outweighs the strictly individual desire of the parent. Becker wrote:

> "Unlike Marxian analysis, the economic approach I refer to does not assume that individuals are motivated solely by selfishness or material gain. It is a *method* of analysis, not an assumption about particular motivations. Along with others, I have tried to pry economists away from narrow assumptions about self-interest. Behavior is driven by a much richer set of values and preferences" (italics in original, p.1).

The above quote from Becker becomes especially important for this study as there is no way of knowing the desires and preferences of individual superintendents. Frank (1990, p. 54) addressees this issue as follows:

> "The standard economic model of rational choice assumes that consumers maximize well-defined utility functions. When questions arise about what goes into these functions (that is, questions about what people really care about), most economists quickly defer to

> psychologists, sociologists, and philosophers. As a practical matter, however, economists seldom consult outside sources for guidance on how to portray people's tastes. Rather, *they are content to assume that the consumer's overriding objective is the consumption of goods, services, and leisure – in short, the pursuit of material self-interest.* Economists also assume *that the consumers act efficiently in the pursuit of their objectives*" (1990, p. 54, emphasis added).

The current study will be left to make the same assumptions that economists make; that the consumers (ie., superintendents) are acting efficiently in the pursuit of their objectives. Further, researchers employing rational choice theory will generally assume that equilibrium outcomes in the model are adequate representations of what actually happens in the real world. Put a different way, RCT holds that the results experienced in the experiment would represent the actual findings.

Winston Churchill is reported to have said, "It has been said that democracy is the worst form of government except all the others that have been tried." (quoted in Green, 2002). This quote seems to express the feelings of so many scholars when it comes to discussing RCT, even those who use and defend RCT. Scott worded it by saying that, "rationality is not the only answer, but it is the best answer for why something is happening thus far" (2000). Becker (1997), Green (2002), and Ballantine & Spade (2007) all share a common "best answer so far" mentality

regarding rational choice theory. Peter Abell (1992) confrontationally asked if rational choice theory could truly be regarded as a "rational choice of theory"? His reply was that:

> RCT appears to provide a point of departure. For these sorts of reasons, it should be accorded pride of place in our thinking ... Furthermore, there is little evidence of any serious competitor ... RCT is indeed a rational choice of theory – it is at the moment our least worst choice of framework (1992, p. 203).

Even a theory as celebrated as rational choice theory has its vigorous detractors within the study of economics and inside the other social sciences as well. Opponents of the theory often argue about the vague and general nature of the theory. Others see ideological motivations with the theory. Criticisms of rational choice theory generally fall into one of three categories: (1) an attack around the idea of "rationality", (2) a breakdown of the practicality of the theory and (3) a view of the theoretical basis of the theory. The next section of this paper will address these three criticisms of rational choice theory and offer justification for why RCT continues to thrive.

Criticism number one involves a vigorous debate over the understanding of being "rational". As stated earlier in this section, "rational" is used in RCT, and this paper, to mean the actual choices that an agent makes when comparing alternative choices. These choices will reflect the preferences of the individual as they seek to

maximize utility. The criticism here lies in the very simple questions, "What if someone chooses something irrationally" or "Are all choices rational"? The criticism is founded in the idea that individuals may choose things that go against their own self-interest. The argument will be answered in one of two ways. First, these questions can give way to a deeper understanding of what preferences lay before the individual and the way individuals go about attaining those preferences. This is the more straightforward way of addressing the concern and does not require further explanation.

The second way to address irrational choices comes from looking at the rationality of choosing an irrational choice. Put another way, individuals will rationally choose to not maximize their utility at times. A good example of explaining rationally choosing irrational choices comes from the economist Frank (1990):

> Cornell University has two sets of faculty tennis courts, one outdoor and the other indoor. Membership in the outdoor facility is available for a fixed fee per season. There is no additional charge based on actual court use. The indoor facility, by contrast, has not only a seasonal fee, but also a $12 per hour charge for court time. The higher charges of the indoor facility reflect the additional costs of heat, electricity, and building maintenance. The indoor facility opens in early October, a time when the Ithaca weather can be anything from bright sunshine and mild temperatures to blowing

sleet and snow. The outdoor courts remain open, weather permitting, until early November. During good weather, almost everyone prefers to plan on the outdoor courts, which are nestled in one of Ithaca's scenic gorges.

Demand on the indoor facility is intense, and people who want to play regularly must commit themselves to buy a specific hour each week. Having done so, they must pay for the hour whether they use it or not.

Here is the problem: You are committed to an indoor court at 3:00pm on Saturday, October 20, the only hour you are free to play that day. It is a warm, sunny afternoon. Where should you play, indoors or out?

I find that surprisingly many of my noneconomist partners balk when I say that playing on the outdoor courts is the only sensible thing to do. "But we've already paid for the indoor court," they invariably complain. I ask, "if both courts cost the same, which would you choose?" They immediately respond "outdoors." I then explain that both courts do cost the same – because our fee for the hour is going to be $12 no matter which place we play – indeed, no matter whether we play at all. The $12 is a sunk cost, and should have no effect on our decision. The alternative, however, is to waste an opportunity to play outdoors, which we all agree is

> something even more valuable. True enough, it is bad to be wasteful, but *something* is going to be wasted, no matter which place we play.
>
> Eventually, most people come around to the notion that it is more sensible to abandon the indoor court, even though paid for, and play outdoors on sunny fall days. The rational choice model says unequivocally that is what we should do. (p. 53-54)

The above quote is a great example of what economists call "sunk cost," but it is also a good example of how individuals will rationally choose to make irrational choices. Frank goes on in his article to outline how often individuals will seek to maximize their utility while continually making choices that do not help them. Another possible explanation to why individuals' will chose not to maximize utility comes from personal preferences, or taste of individuals. Not all individuals will seek the same preferences simply because individuals have different taste. A third possible explanation comes in errors in perception. As McFadden et al (2000) point out, "most cognitive anomalies operate through errors in perception that arise from the way information is stored, retrieved, and processed…." Simply put, sometimes individuals will have errors in their senses that will lead them to make a wrong choice. While the argument that irrational choices are made because of error will not sit well with all critics, it does offer plausible explanation as to why irrational choices may occur.

The second major criticism of rational choice theory comes in the argument of practicality (Green, 2002). Practical criticisms say that rational choice theorists are not asking the right kinds of questions. Those who oppose on the basis of theoretical criticism usually aim their analysis at the assumptions of the rational choice approach. These critics may aim their criticism at suggesting that the theory does not adequately account for the study. Another form of practical criticisms suggests that the theory does not answer the question being raised by the research. While critics may protest boldly, the theory continues to find proponents and those who see the theory explaining and illuminating the human behavior.

The third criticism that will be herein discussed is the criticism on a theoretical basis. A commonly held reaction of economists to criticisms about assumptions is to quote a famed paper by Friedman (1953):

> "This widely held view [that one can evaluate a theory by the conformity of its assumptions to reality] is fundamentally wrong and productive of much mischief....
>
> In so far as a theory can be said to have "assumptions" at all, and in so far as their "realism" can be judged independently of the validity of predictions, the relation between the significance of a theory and the "realism" of its assumptions is almost the opposite of that suggested by the view under criticism. Truly important and significant hypotheses will be found to have wildly inaccurate descriptive representations of reality, and, in general, the more significant the theory, the more unrealistic the

> assumptions (in this sense). The reason is simple. A hypothesis is important if it "explains" much by little, that is, if it abstracts the common and crucial elements from the mass of complex and detailed circumstances surrounding the phenomena to be explained and permits valid predictions on the basis of them alone. To be important, therefore, a hypothesis must be descriptively false in its assumptions; it takes account of, and accounts for, none of the many other attendant circumstances, since its very success shows them to be irrelevant for the phenomena to be explained.
>
> To put this point less paradoxically, the relevant question to ask about the "assumptions" of a theory is not whether they are descriptively "realistic," for they never are, but whether they are sufficiently good approximations for the purpose in hand. And this question can be answered only be seeing whether the theory works, which means whether it yields sufficiently accurate predictions. The two supposedly independent tests thus reduce to one test" (pp. 14-15).

Simply quoting Friedman is not meant as absolute truth in forwarding the argument that all theories require a bit of leeway and that a momentary suspense of realism is well put. All theory expects to explain phenomena through a particular lens that may not be as easily observed by all individuals. However, the

effectiveness of the theory is found in the way in which it explains and predicts future observations and outcomes.

While many have argued and debated with Friedman, the simple reality is that RCT has become the dominant paradigm of economics for a reason-- the tool has value in assessing human behavior. The inclusion of RCT into many of the social sciences is proof that other scholars see the value in applying the assumptions and models of RCT to account for social phenomena. Stigler and Becker insightfully note:

> What we assert is not that we are clever enough to make illuminating applications of utility-maximizing theory to all important phenomena – not even our entire generation of economists is clever enough to do that. Rather, we assert that this traditional approach of the economist offers guidance in tackling these problems – and that no other approach of remotely comparable generality and power is available. (1977, p. 76)

This study will utilize rational choice theory broadly as an overarching paradigm in which to view sex stratification in the principalship. While no mathematical manipulation or proof is possible, rational choice theory will be used to explain how superintendents are choosing principals, regardless of the sex of the principal. In its most simplified form, therefore, rationality is simply employed as a way of connecting individuals to their actions, establishing an analytic base from which it is possible to commence in making claims about the world. Advocates of

this simple or wide version of RCT include Boudon (e.g., 1996), Esser (e.g.,1999), and Hedstrom (2005). Pamela Oliver, a "prominent social movement scholar" (Opp, 2013), offers a strong case for modern RCT:

> "Rational choice" sociologists have studied the effects of decisions motivated by principles like altruism, adaptive learning, conformity, ideology and identity-maintenance. Much of the work in this tradition focuses not on individuals, but on collectivities, and is concerned with how the structure of relations among individuals affects both choices and the consequences of choices . . . At the same time, I believe that work done in the broad rational choice tradition has made huge contributions to understanding complex social processes. I am particularly excited by the ongoing formal work on collective action that continues to offer new insights (2009).

Rational choice theory is the overarching, or the broad foundation, theory of more specific theories such as game theory, coalition bargaining, social choice function and social capital, to name just a few. Herfeld suggests that the various manifestations of rational choice theory could be better understood as a "family of theoretical approaches, which can be subsumed under the heading of 'rational choice analysis'"(2013, p. 119). Scholars have thus applied and adapted the rational choice paradigm in a variety of different ways, but its advocates converge in their commitment to theorize from micro-processes to macro-structures, emphasizing the role of rational action, choice within constraints, and calculations taking into

account for the projected actions of others (Driscoll & Krook, 2008). It appears widely held that micro-actions can be aggregated to collective macro-actions.

RCT is very capable of uncovering trends in the data. Opp correctly points out that the wide version of RCT allows that beliefs may be wrong, that altruism is a possible human motivation, and that individuals do what they think is best for them in the given situation (2013). The theory does not hold that there is not bias happening at the individual level, as it most certainly will still be happening, but it allows for the researcher to be able to assess trends in the data. The key to the wide view of RCT is that motives of individuals are not as important as the actual outcomes. Therefore, as this data does not allow for assessing motivations, but allows insight into the actual numbers of what is happening in schools, rational choice theory is a wonderful theoretical fit.

The current study will be illuminated by RCT in order to identify the trends in the data. Sexual politics theory asserts that the variable of sex will account for seeing the difference in who is getting principal positions and where those positions are located. This study concludes that superintendents are being motivated by a desire to maximize utility and are hiring principals that help to maximize the goals of the marketplace. Further, this study contends that RCT is an appropriate lens by which to explain sex stratification throughout all time, not just in the last several years when women have enjoyed more equality. The argument herein given is that rational choice theory would account for any sex stratification era if the possible choices could be accounted for properly.

In the highly charged political arena that is now the public school system, there are several possible reasons why organizations would seek certain kinds of principals regardless of their gender. Much has been written of the great changes that have come to schools since No Child Left Behind (NCLB) was enacted. Today schools are more like the marketplace than ever before. Test scores, student achievement, and cooperative learning set the standard for those deemed good schools. In short, schools are now judged largely by the same criteria business has always been judged, on competitive marketing, return on investment, and in how well they meet the expectations of their clientele. In Chapter V, this study suggests possible rational reasons why the paradigm has shifted towards a market approach and gives suggestions of additional research that can be done to further test this study's findings in the future.

Prior Work in the Field

This section of the paper looks at the previous research that has taken place in the field by examining the relationship of sex and school administration. As discussed previously, historically men have overwhelmingly dominated in public administration, particularly at the secondary level (Mertz, 2006). But as this research is concerned with the current state of women as school principals, a review of literature in the field is needed. In the previous sentence the words, "school principals" were used, instead of the more general title of "school administrator". As the research specifically looks at the school principal, this is the research that is the

most important; however, there is very little actual research done on the school principal compared to that which has been done on the superintendent or on teachers in general.

One researcher put it well, "it is as if the principal did not exist at all" (Rousmaniere, 2006, p. 12). In some ways this "lack of existence" provides for exciting possibilities for the research that can be done, but it limits some of the conclusions that can be drawn and necessitates the use of research performed on superintendents, lead teachers and other professionals outside of education in order to paint an accurate picture. To be sure, when taken as a whole, research on women in educational leadership across the various levels presents a rich research base that is "quite well articulated" (Grogan & Shakeshaft, 2011, p. 2). In proceeding though the remainder of the paper, please note when the word "principal" is used and that of the more generic "administrator".

Most modern educational administration researchers believe that there is still a significant gap between the hiring of administrators who are men versus women, see Blount, 1998; Brunner & Grogan, 2007; Dana & Bourisaw, 2006; Draulans, 2003; Eckman, 2004; Marshall & Young, 2013; Schmuck, 2006; Crosby-Hillier, 2012; Stuckey, 2012 just to name a few. The vast majority of research in this field has relied on conflict theorist theories, which necessitate political power struggles. Particularly, these researchers frame their work in the theory of sexual politics, as was discussed in the theoretical section of this paper. Using this framework, they have found that the historical foundation of men dominating school

administration has continued to be the norm. These researchers do not see the discrimination as being totalitarian but rather as subversive. These researchers see women as being protected legally to serve in educational administration but unable to break through the glass ceiling that limits women's progression further into the upper levels of higher educational administration (Hill and Ragland, 1995; Crosby-Hillier, 2012; Stuckey, 2012). These researchers find, in large part, that women are now getting more jobs as administrators but that they continue to experience discrimination in two ways: (1) The schools they administer and (2) the qualifications that are needed to obtain the leadership positions. This section begins with a breakdown of the various forms of discrimination that women encounter with the actual schools they lead or, put another way, the schools that they are actually hired to lead.

## School Level

The first form of discrimination women face comes from a historical foundation. The first women principals led schools composed of women teachers. However, women serving as elementary school principals declined from 62% in 1905 to 55% in 1928, reaching a low of about 20% in 1972 (Shakeshaft, 1989). Women never had more than a small minority of high school level principalships. Only about 6% of the secondary school principals in 1905 were women, and by the early 1970's this had dropped to about 1% (Tyack & Hansot, 1982). Gotwalt and

Towns found that women occupied 55% of elementary schools, 12% of junior high schools, and 6% of high schools during the 1930's (1986).

In the modern age, this tradition has continued. In 1988, Riehl and Byrd concluded that women make up almost half of the elementary school principals nationally while holding less than 10% at the high school level (1997). In addition, Roser, Brown and Kelsey found that in 2006-2007, women principals in Texas held 73.5% of elementary positions, 41.3% of junior high positions, and 29.8% of high school positions (2009). Roser et al found that the level of the school was significant in allowing the researchers to predict the sex of the principal. Another recent study by McGee (2010) in Florida revealed a similar pattern of distribution, indicating females are the majority at the elementary level and the minority at the secondary level. Crosby-Hillier found that female principals in Ontario Canada accounted for only 28% in the secondary schools while representing 48.3% of the elementary schools (2012). Ortiz found that women of minority background could only hope to become principals in the elementary schools except for "extraordinary circumstances" (1982). These findings would support the idea that women principals are more prevalent in the elementary school level. Plainly put, women are likely to be principals of elementary schools but not high schools. It is also readily seen here in the data that women continue to move into the principal chair at an increased rate. While researchers are pleased to see the progress, they continue to see school level as a "cautionary footnote to an optimistic tale" (Riehl & Byrd, 1997).

School Location and Socioeconomic Status

The second form of bias that researchers have uncovered is in the location of the schools that women are able to lead. The belief is that urban districts, with their higher proportion of poor students and unsupportive parents, are of lower prestige than the rural or suburban schools (Blount, 1998; Cooper et al., 2000). Hollingworth and Dude, while conducting an over-arching analysis of 30 years of Iowa state records, found that women are gaining ground in the urban setting while continuing to not be found in the rural schools (2009). They found that male principals continue to outnumber women 6:1 in rural districts, but in urban schools the rate is closer to 1:1. Roser et al found that, while not significant, women were not gaining rural districts at the same rate as men (2009). Researchers at the district level have found that women are similarly blocked out of the superintendence position in the more favorable rural districts while continuing to gain in the big cities (Cooper et al., 2000; Glass & Franceschini, 2007; Kowalski et al., 2011). However, a more recent study of Superintendents in California revealed that women are now gaining the suburban and rural districts at a significantly higher rate than men (Stuckey, 2012).

A related issue of school location is the socioeconomic makeup of the school. Researchers in the past held that women only obtain schools in the poorer areas where parental support is not evident. In a class action lawsuit filed on behalf of California students in *Williams v. State of California* (2000), it was charged that the State needed to address inequalities in its public schools (Stuckey, 2012). Williams,

with the backing of the ACLU, charged that less effective teachers are in place in the poorest neighborhoods. In a settlement that was announced in 2004, the State gave $1 billion to buy books, hire teachers, and provide other programs for some of the poorest urban areas of the state (aclunc.org). The argument often put forward is that women are relegated to the poorest schools where funding is limited (Powers, 2004; Stuckey, 2012).

## School Size

The size of the school is the third bias that a review of the literature has revealed. Roser et al found that women are not in the smallest schools, nor the largest schools (2009). Their findings revealed that women are getting placed as principals in the middle-school size. They found that men hold the majority of positions at campuses that have from 0-500 students while women hold the majority of positions at campuses with populations that have from 501-1,000 students. Men also hold the majority of positions at campuses with populations of 1,001+ students. The size of the school as related to gender had a relationship that was significant, and the strength of the relationship was seen as moderately strong. Roser et al acknowledge that there is no other literature on the topic of gender and campus size, but see their findings as further proof of gender discrimination. The authors conclude that women are kept out of the largest districts because of the prestige they afford, while being kept out of the easier small schools. They argue

that either way women are experiencing discrimination when it comes to school size.

### Student Achievement at the School

The next bias that has been put forward by researchers is that women only go to the poor performing schools or districts. This argument goes hand-in-hand with the location of the school. The poorest areas have the lowest scores on standards test (Hochschild, 2003). It is on this basis that feminist researchers would expect to find that women are given the chance to lead in schools that have the lowest scores (Powers, 2004; Stuckey, 2012). However, the findings in this area have failed to produce results that go with this theory. Repeatedly, women are shown to be the leaders of the highest scoring schools (Reis et al., 1999; Roser et al. 2009; Stuckey, 2012). While the findings do not go with the theory, often the argument is made that women are kept out of the best performing schools.

### Leader's Characteristics

The proceeding outlined school characteristics that have been studied. This section discusses some of the findings of researchers that apply directly to the leader. This work highlights three of the most heralded personal aspects of discrimination that women meet. These include the suppositions that females (1) need more education and (2) need more work experience to be hired but (3) receive less pay than men. These assertions have been present in feminist work for many years. One of the first works where this breakdown and assertion came forward

was in the work of Martin & Voorhies (1975). The authors take an anthropological journey through ancient societies to show how men have systematically lowered women in the Western societies. The book acts as a guide to look at how women have methodically been discriminated against. The book is an intriguing look into various societies that have women as dominate, whether as providers, warriors, farmers, hunters and/or politicians. Researchers such as Blount, Coleman, Grogan, Nidiffer, Shakeshaft, and many more have long chronicled the injustices that women face when they go up in competition with men. Interestingly, more recent research is showing mixed results as women continue to see leadership opportunities in education.

There is ambiguity in the education needed in order to get educational administration jobs. In 1988, Riehl & Byrd (1997) found that the requirements of education and work experience are higher for women than for men. Other researchers found that women hold more advanced degrees than their male counterparts (Brunner & Grogan, 2007; Glass et al., 2000; Grogan & Shakeshaft, 2011). Yet, Stuckey (2012), Roser et al (2009), and Viadero (2009) all found that women are now on par with men and that in many cases men had more education than their female counterparts.

The second personal characteristic that is addressed here is the often cited need for women to have more years of experience within the profession to gain educational leadership roles. This conclusion has been reached by Ortiz (1982), Cooper (2000) and Tallerico (2000). Yet again, there is also an oppositional voice

here present. Grogan and Shakeshaft (2011), Guramatunhu-Mudiwa & Bolt (2012), Viadero (2009) and Roser et al. (2009) and Stuckey (2012) all gave findings that did not support the belief that women had to have more years of experience in education in order to move up the ranks.

When it comes to pay, thanks in large part to legislation, women now appear to be on par with men. This finding is specifically addressed by Coleman (2000) and by Hollingworth & Dude (2009). Yet, Kulich et al found that men get bigger bonuses and that those bonuses are tied less to performance than those given to women (2011). Money is also tied to the level the principal is assigned. In California's public school model, high schools pay more than middle schools, and middle schools pay more than primary schools. Therefore, if there is bias in the level that female principals are allowed to gain, then pay would also be impacted.

These three areas of research suggest that there is still much to be learned about the opportunity of women to move into the role of principal. Further, it highlights the well-argued position of many researchers today: "It is complicated" (Grogan and Shakeshaft, 2011). Researchers are finding that many of the hurdles that earlier women faced are now being passed with ease. Some, such as White et al., suggest that the sex discrimination of the past has been challenged but not eliminated (2007). Others frame the argument a bit differently. They see men as still getting the majority of the leadership positions yet see change coming stronger than ever for women (Coleman, 2001). Others hold that there continues to be unintentional biases in the way in which women are advancing (Nelson, Berrey &

Nielsen, 2008). And there is perhaps a different group that believes that bias still exists even though they cannot accurately account for it (Stuckey, 2012).

It is very rare to find researchers who believe that sex discrimination has ended. However, there are a few who have findings that have led to a hopeful future. One such article is a Guramatunhu-Mudiwa & Bolt work that found that women and men principals were both judged equally by the teachers they worked with (2012). These teachers reported the leadership style of the principals as the ultimate decider in why they viewed the leader as they did. Another finding comes from historically feminist scholars Grogan and Shakeshaft (2011). These scholars are forced to conclude that in large measure the inequalities of the past have been resolved and that the specific leadership style of the principal is now of more importance. While concluding that women lead in different ways than men, they also conclude that men are capable of leading in this apparently feminine way.

With a clear understanding of the prior work in the field regarding women in educational administration, current research can now be examined. This research approaches sex in educational leadership from a very different position. Utilizing a rational choice theory, the data are examined to answer the question of whether women are equitably becoming school principals while also providing reasons behind the appointments. The next chapter will outline the data used in the study.

# CHAPTER III

# METHODS

This chapter defines the data used in the study. It first describes how the raw data was collected from both the California Department of Education and from the National Center of Educational Statistics. Next, how the data was combined, cleaned, and then looped in order to identify and separate new principals from returning principals. Finally, the measures and procedures used to evaluate the data to ferret out information critically important to the study results are outlined, followed by a listing of the hypotheses that drove the study.

## Data

This study uses data from two governmental sources: the California Department of Education (CDE) and the National Center of Educational Statistics (NCES). The CDE is an agency within the government of California that oversees public educational institutions and is charged with overseeing State funding and accountability testing (cde.gov). The NCES is the primary federal entity for collecting and analyzing data related to education (nces.ed.gov). The primary raw data set used by both of these sources originated from the California Basic Educational Data Base System (CBEDS), specifically from the Professional Assignment Information Form (PAIF). PAIF gathers in-depth education statistics collected annually by the CDE from the 1997-98 through the 2011-12 school years.

This statistical data are collected for every teacher, administrator and pupil services staff member in the state's public K-12 system. It provides specific occupational demographic information (e.g., sex, race/ethnicity, education level, years of service, etc.). The PAIF data are available on-line through the State's CDE website, within the Data & Statistics tab.

The second data set added to the study comes from the National Center of Educational Statistics' (NCES), Common Core Data (CCD). The CCD data provide further school characteristics that are not available from the PAIF files (e.g., school ethnicity breakdowns, students on Title I, teacher student ratios, and school location). Combining results from the state and federal studies, based on the PAIF dataset, with results from the second dataset provided by CCD, a study much more comprehensive in scope results. It will be shown that this approach yields a much clearer picture relative to all schools generally as well as the principals that head these organizations.

A secondary data file from the CDE is also used in the study to provide Academic Performance Index (API) scores. The API scores are the cornerstones of California's Public School Accountability Act of 1999. This score measures the academic performance and growth of schools, targeting a variety of academic measures. The data are available through the State's CDE website, under the Testing & Accountability tab.

This study uses the PAIF data from the years 2001-02 to 2008-09. Originally, it was believed that the PAIF data could be used until the last year they are available,

that of the 2011-12 school year. However, the data from the 2009-2010 PAIF files experienced a large amount of inaccuracies as the state made the transition to the new California Longitudinal Pupil Achievement Data System (CALPADS). Consequently, these files were removed from the website (see CDE, 2012). Additionally, it was also discovered that the rate of errors in the 2010-11 and 2011-12 school years was nearly double that of the other years. While this high error rate in the last two years of available data was troubling, it became even more apparent in the analysis step of this study that the two years needed to be removed, as will be explained in greater detail in the next section.

Preparation and Cleaning

The first step in the study involved downloading of all of the files. Each of the three files is large, having more than 350,000 records, and requires significant trimming and cleaning in order to be usable. The purpose of the cleaning and trimming is to identify the principals and retain their individual characteristics while simultaneously removing the non-principals, part-time principals, and duplicated data on the remaining principals. This section will explain the process of obtaining the data, preparing it and getting it ready for analysis. In addition, a list of obtained variables (e.g., sex, ethnicity, education level, years in the district, API scores, etc.) will be created to show how the three individual data files contributed to the combined overall study dataset.

## PAIF Files

The PAIF data are compiled by individual school districts in many different ways and have historically had a large rate of errors because the CDE does not regulate the annual collection and compilation of these statistics. While the schools are required to meet the deadline for submission, the CDE provides no additional help to complete the task.

Prior to 2008, the PAIF form did not include names, social security numbers or credential numbers of personnel. Individual identifiers were only added to the PAIF form if a school had an unreasonably high rate of errors or was delinquent in submitting the data (personal communication with Randy Bonnell, Administrator, Data Reporting Office of California Department of Education, August 2, 2013). As a result, individuals could not be tracked over time using only the PAIF data files.

The data for the PAIF form are divided by the state into two separate forms for each year[2]: a file named PAIF and a file named ASSIGN. The PAIF file initially had over 360,000 cases (lines representing individuals) and 40+ variables per case. The ASSIGN file has over 900,000 cases; often individuals will have multiple assignments, with over 15 variables per case. The exact number of cases and number of variables fluctuate slightly over the years as the State changes the variables they use and as the number of individuals change. Key is to making sure that the individual principals stay linked to the school they administer.

[2] This is true except for the 2001-02 year file when the descriptive variables were left in one file.

This was accomplished by using the unique 14-digit County-District-School (CDS) code assigned to each school as an administrative tool by the CDE to identify individual schools. The first two digits identify the county, the next five digits identify the school district, and the last seven digits identify the school.

In addition to the CDS code, each record has an individual record identifier that is unique to that individual for that year's report. By linking the CDS code, then attaching the individual ID in a concatenation string, a unique id was produced that allowed for the combining of the two data files.

Once the two files were combined in one SPSS-IBM statistical software (SPSS) file around the unique ID, the data were trimmed to include only the individuals that were coded as principals, 0301. This resulted in the first look at the number of individual principals in the state. As can be seen in Table 3.1, the raw number of principals across the 10 years of the study results in a total of 82,039.

Table 3.1 - Data Cleaning
PAIF Data
2001/2002 thru 2011/2012

| Year* | Raw # PR | CDS Duplicates | Percent of Duplicates | Remaining # PR | ASN_PCT ne 100 | Percent of ne 100% | 100% PR W/out Repeats |
|---|---|---|---|---|---|---|---|
| 01 | 7686 | 441 | 5.74% | 7245 | 507 | 7.00% | 6738 |
| 02 | 7748 | 428 | 5.52% | 7320 | 476 | 6.50% | 6844 |
| 03 | 7804 | 457 | 5.86% | 7347 | 421 | 5.73% | 6926 |
| 04 | 8460 | 942 | 11.13% | 7518 | 842 | 11.20% | 6676 |
| 05 | 8088 | 417 | 5.16% | 7671 | 113 | 1.47% | 7558 |
| 06 | 8265 | 461 | 5.58% | 7804 | 456 | 5.84% | 7348 |
| 07 | 8405 | 515 | 6.13% | 7890 | 464 | 5.88% | 7426 |
| 08 | 8407 | 484 | 5.76% | 7922 | 414 | 5.23% | 7508 |
| 10 | 8523 | 945 | 11.09% | 7578 | 953 | 12.58% | 6625 |
| 11 | 8653 | 788 | 9.11% | 7865 | 966 | 12.28% | 6899 |
| **Total** | **82039** | **5878** | **7.16%** | **76160** | **5612** | **7.37%** | **70548** |

* = First Year in the School Year (e.g., 2001-02 is labeled 01)

From this starting point the SPSS file was cleansed of duplicate schools. Because each school has a unique identifying code, extra occurrences of the same CDS codes were deleted. While there may have been sound reasons a school reported more than one individual as a 0301 principal (e.g., co-principals or outgoing and incoming principals), without having a personal identifier such as a name or social security number, the data could not account for the duplicate in the file. As a result, duplicate CDS codes resulted in removal of 5878 cases, or 7.165% of the total cases in the file (see Table 3.1).

The next step in cleaning the files came in principals that were coded 0301, yet were not 100% of the time in that assignment. Again, while it is reasonable to see why a district would have assigned the title of principal to various individuals, it caused problems when accounting for principals based on individual variables. As a

result of removing principals that did not serve 100% of the time, 5612 cases, or 7.371 %, were removed (see Table 3.1).

Removal of the CDS duplications (5,878 cases) and removal of the principals that did not serve 100% of the time (5,612 cases) resulted in losing a significant amount of data (11,490 cases). It is therefore appropriate to discuss this discarded information in a bit more detail. As explained earlier, there are valid reasons why a school would report a principal either more than once or break down assignments by percentage of time spent. Further compounding these valid reasons for discarding information are the data entry errors that invariably accompany almost any data set. Complicating everything is the fact that there is no personal identifier in the data that allows for the tracking of individuals over time. Consequently, it was necessary to remove the duplications, the principals that did not serve 100% of the time and the suspected data entry errors that surfaced when the data did not readily "clean", indicating erroneous data from data entry mistakes.

In an effort to show that the removal of this data did not affect the findings and conclusions of this study, an independent-samples t-test was conducted to compare the proportion of female and male principals in the raw data and in the cleaned data sets. The analysis was conducted on the 2007-08 data file because it was one of the two median years in the not equaling 100% percentages and was just one spot removed from being the median in the duplicate CDS category. No data years were median years in both categories. There was not a significant difference in the scores for raw (M=1.4101, SD=.49187) and cleaned (M=1.4077, SD=.49144)

data sets; t(15790)= .302, p = .763. These results suggest that the raw data being removed do not have an effect on the proportion of female and male principals. Specifically, the results suggest that the removal of the duplicate CDS codes and those principals that did not serve 100% time did not affect the results of this study.

The PAIF file acted as the base file for all of the analysis in this study. The table below (Table 3.2) lists the variables kept from the PAIF and ASSIGN files used in the study. These particular individual characteristic variables form the baseline of the study.

Table 3.2 - PAIF Variable List

| Variable | Variable Description |
|---|---|
| CDS code | County, district, school code |
| rec_id | Record Identification Number |
| YrData | Data Year |
| assign_code | Assignment Code |
| Gender | Gender |
| Ethnicity | Ethnicity |
| ed_level | PR Education Level |
| yrs_teach | PR Yrs Teaching |
| yrs_dist | PR Yr in District |

## NCES File

With the PAIF data now combined and clean, the analysis required the addition of the NCES to the PAIF data. Using the Data and Tools tab of the NCES website, it was possible to access the Elementary/Secondary Information System (ELSi) table generator. The ELSi table generator is "a quick and easy tool for obtaining basic statistical data" (nces.ed.gov, 2014). The table generator allows the user to create custom tables and charts using data from the Common Core of Data

(CCD) and the Private School Survey (PSS) that can be saved as an Excel file with the common ".xls" file extension. This file was then downloaded into Excel, where the extra title, source and date statement lines were removed and then uploaded into the SPSS software program. A list of variables used from the NCES data is found in Table 3.3.

The NCES data did not contain pre-made CDS codes in the file, which are necessary in order to match the PAIF data to the NCES data. To create this code two variables needed to be combined: StateAgencyID and StateSchoolID. Caution was needed at this stage because half of the NCES data was missing the '0' placeholder in front of the StateAgencyID. By utilizing the concatenation function within the SPSS data program, a zero was added to the NCES StateAgencyID, allowing it to be easily combined. Once the two variables were combined, a CDS code was then produced for each of the cases within the NCES file. This allowed the PAIF file, as the primary file, to be synthesized with the new information in the NCES file to create a more comprehensive file for analysis.

| Table 3.3 - NCES Variable List | |
|---|---|
| Variable | Variable Description |
| Level_school | SCHOOL LEVEL |
| Locale_School | LOCALE |
| TOTALSTUDENTSSCHO | TOTAL STUDENTS (SCHOOL) |
| TitleIEligibleSchool | TITLE 1 ELIGIBLE SCHOOL |
| FREELUNCHELIGIBLES( | FREE LUNCH ELIGIBLE (SCHOOL) |
| REDUCEDPRICELUNCH | REDUCED-PRICE LUNCH ELIGIBLE (SCHOOL) |
| FREEANDREDUCEDLUN | FREE AND REDUCED LUNCH (SCHOOL) |
| PUPILTEACHERRATIOS( | PUPIL/TEACHER RATIO (SCHOOL) |
| FTETEACHERSSCHOOL | FTE TEACHERS (SCHOOL) |
| SchoolName | SCHOOL NAME |
| SCHOOLNAMEBYSURVE | SCHOOL NAME- BY SURVEY YEAR (SCHOOL) |
| COUNTYNAMESCHOOL | COUNTY NAME (SCHOOL) |
| LOCATIONCITYSCHOOL | LOCATION CITY (SCHOOL) |
| LOCATIONZIPSCHOOL | LOCATION ZIP (SCHOOL) |
| SCHOOLTYPEMOST | SCHOOL TYPE- MOST RECENT YEAR (SCHOOL) |
| AGENCYTYPEMOSTREC | AGENCY TYPE- MOST RECENT YEAR (DISTRICT) |
| SCHOOLIDNCESASSIGI | SCHOOL ID- NCES ASSIGNED (SCHOOL) |
| AGENCYIDNCESDISTRI | AGENCY ID- NCES (DISTRICT) |
| STATESCHOOLIDSCHO | STATE SCHOOL ID (SCHOOL) |
| STATEAGENCYIDSCHO | STATE AGENCY ID (SCHOOL) |
| AMERICANINDIANALAS | AMERICAN INDIAN/ ALASKAN NATIVE STUDENTS (SCHOOL) |
| ASIANPACIFICISLANDE | ASIAN/ PACIFIC ISLANDER STUDENTS (SCHOOL)(*) |
| BLACKSTUDENTSSCHO | BLACK STUDENTS (SCHOOL) |
| HISPANICSTUDENTSS( | HISPANIC STUDENTS (SCHOOL) |
| WHITESTUDENTSSCHO | WHITE STUDENTS (SCHOOL) |

## API Files

The next step in the study was to add the API data from the CDE. These data, available through the State's CDE website in the Testing & Accountability tab, are divided into two files, the yearly Base API and the yearly Growth API. The Base API reports the school's API test results for the current year. The Growth API represents the API goals for the coming year. Each file contains data for over 10,000 individual schools and districts, with 148 variables in the Growth file and 158 variables in the Base file. Each year varies slightly in the exact number of variables (these specific numbers come from the 2006-07 files).

The API files contain a number of variables that differ slightly from year to year. This study isolated and retained certain variables from the Base API data that were relevant to the current analysis; Table 3.4 lists these variables.

Table 3.4 - Variable List

| Variable | Variable Description |
|---|---|
| api_students | Number of Students who took test |
| apiBase | Base API Score |
| st_rank | Statewide Rank |
| pct_wh | Percentage of Students that are White |
| not_hsg | Parents not High School Graduate % |
| hsg | Parents are HSG % |
| some_col | Parents have some College % |
| col_grad | Parents are College Graduates % |
| grad_sch | Parents have Graduate Level Schooling % |
| avg_ed | Average Parent Education Level |
| api_targ | API Target from Previous Year |

The Growth API files then provided Target API scores from the previous year against which to evaluate the Base API results in this analysis. Both API files have the school's unique CDS code which allows the merging of the two files together with our PAIF and NCES data to create a new data set, called Principals, which now lists individual principals, their schools, and their test results and goals.

## Determining New Principals

Once all of the variables from the PAIF, NCES and API datasets were merged into one file, it was necessary to identify which principals were new to their positions and which were returning. Identification of changed principals was needed to allow for better understanding of what was happening among all

principals. From this data, the characteristics of the new principals and what was happening when there was a change in the school's top administrator could be seen.

To identify the new principals, this study needed to compare sequential data years for each school, looking for changes in specific variables which identified principals. Stated plainly, for a given school (i.e. CDS code), a change in principal was indicated by observing a change in key variables that identified the principal (0301 code) from year to year. The exact process of identifying the new principals required a reformat of the data to, first, allow the comparison of sequential years, and, second, to isolate the variables that would indicate a change of principal. The reformatting of data was a six-step process as outlined below.

The first step required exporting the data out of SPSS and reading it into the Statistical Analysis System (SAS) software in order to run loops. Looping is the statistical process that enables one to repeat a computation for various values of parameters across one line of data (Wicklin, 2011). Further, looping allows for the viewing of data across several descriptive variables, in a particular order, to assign a new variable based on the findings of those descriptive variables. In the case of this study, the individual principal is held, while the variables of gender, ethnicity, level of education, years in the district and years of teaching are compared to identify changes.

The SPSS software is not reliable when running loops of large amounts of data and often results in data error (ats.ucla.edu, 2014). Jennifer Stuckey encountered this problem in her use of SPSS in her study of Superintendents. This

required her to hand check her results to verify the findings (2012). Although SPSS has added a new program (entitled Python) in an attempt to remedy this error in data analysis, it was deemed prudent in this study to convert to SAS statistical software, version 9.2, to avoid potential problems.

The second step was adding a Data Year Variable to each year of the data. The data year provided a way to track the data origination year throughout the analysis. This variable is needed to combine any two years and to mark which of the two years is the latter when combining them in the next step.

The third and fourth steps of the process involve combining data. Step three merged two consecutive years together into one file. Step four sorted the cases by CDS code and removed the cases that do not have a match between the two years. Not having a matching CDS code can be the result of several factors. It can mean that in one of the two years there may have been an error resulting in missing data. Not having a matching CDS code can also be caused by schools being closed, thus removing the CDS code from one of the years. Still another reason for not having a matching CDS code comes when a school changes CDS codes because of changes regulated by the California Department of Education (CDE). These "new" schools can be created for a number of reasons, such as turnover in administration or forced administration and teacher relocations due to poor API scores. Not having a matching CDS code can also come from simple data error. As can be seen in Table 3.5, the process could not identify an average of 9.86% of the principals per year.

Table 3.5 - Looping Result
Principal's Status
2001-02 thru 2011-12

| Year | Returning | Percent | Change | Percent | U-I | Percent | Total PR |
|---|---|---|---|---|---|---|---|
| 02 | 4584 | 66.98% | 1802 | 26.33% | 458 | 6.69% | 6844 |
| 03 | 4010 | 57.90% | 2429 | 35.07% | 487 | 7.03% | 6926 |
| 04 | 4334 | 64.92% | 1789 | 26.80% | 553 | 8.28% | 6676 |
| 05 | 4334 | 57.34% | 1789 | 23.67% | 1435 | 18.99% | 7558 |
| 06 | 4481 | 60.98% | 2269 | 30.88% | 598 | 8.14% | 7348 |
| 07 | 4584 | 61.73% | 2257 | 30.39% | 585 | 7.88% | 7426 |
| 08 | 4616 | 61.48% | 2301 | 30.65% | 591 | 7.87% | 7508 |
| 10 | 296 | 4.47% | 5620 | 84.83% | 709 | 10.70% | 6625 |
| 11 | 3211 | 46.54% | 2782 | 40.32% | 906 | 13.13% | 6899 |
| **Total** | **34450** | **53.59%** | **23038** | **36.55%** | **6322** | **9.86%** | **63810** |

The fifth step in the process condensed the variable list to critical variables that would clearly identify a change in principal: sex, ethnicity, education level, years in the district, and years teaching. The order in which these variables were evaluated was designed to identify the most obvious changes without misidentifying any principal. By marking the principals early, the software was able to move through the process more quickly.

With formatting completed, the data were used to identify schools in which the principal was changed. Without having individual identification information, such as a name, social security number or birth date, it was only possible to identify principals at each school for each year using background information such as tenure years, level of education and other information unique to individuals. By tracking this background information from one year to another, it was possible to identify when a principal changed at any given school. Because this data only registered

when there was a change in the principal position, the label used was "changed" not "new". It was impossible to tell if the principal was new to that school or new to the principal position.

Utilizing the SAS program, cases were matched using the CDS code variable. Once the CDS code identified multiple cases as the same school, the Data Year variables were organized to allow comparison of the same school from one year to the next. First, the software was used to identify if sex had changed between the first year analyzed and the next sequential year. If sex had changed, the software assigned a '1' to the data and then moved on to the next CDS code. If the sex was the same, then the software moved to the ethnicity variable.

Again, if there was a change, a '1' was assigned to that principal for that year. If the gender and ethnicity were the same, the software continued to education level of the principal during the two years being compared for the given school. As education level can only increase or remain the same, a filter was set to add a '1' if a change occurred. The next variable evaluated was years in the district, which can only increase by a factor of one if a principal remained a given school. Therefore, if the "years in the district" variable did not increase by one, the software assigned a '1' to the school being evaluated.

The final variable was "years in teaching". Similar to "years in the district", the "years teaching" could only increase by a factor of one. Therefore, if this variable either increased or decreased more than one, the software assigned a '1'. As the 2010-11 school year data is actually two years after the 2008-09 data year, for that

one year of data, the expected change was two years for a software assignment of a '1'. If all five of these variables showed no change during the consecutive years being compared for the same school, then the software marked that principal with a '0', indicating there was no change in principalship over the years being compared. Following this method, the study analyzed data from the 2002-03 school year through the 2008-09 year to determine changes in principalship.

The final step was to export the data back into the SPSS software, for which Table 3.5 gives a breakdown of the status of the principals. In analyzing this data, it was obvious that missing the 2009-10 school year data significantly affected the findings. The number of returning principals in the 2010-11 year comes in at only 4.47%, which is clearly not comparable to the results over each of the other years. These findings occurred even with the accommodation of the coding, which allowed a two year increase in the "years in the district" and the "years in teaching". Also of note is that both the 2010-11 and 2011-12 school year's data had significantly higher amounts and percentages of missing data as a result of the missing year's information[3].

[3] Additionally, the 2005-06 year had a higher than average missing data percentage; but this is expected if one considers that the 2004-05 school year data had a higher than average duplicate of CDS codes and non-100% assignment percentage.

Table 3.5 - Looping Result
Principal's Status
2001-02 thru 2011-12

| Year | Returning | Percent | Change | Percent | U-I | Percent | Total PR |
|---|---|---|---|---|---|---|---|
| 02 | 4584 | 66.98% | 1802 | 26.33% | 458 | 6.69% | 6844 |
| 03 | 4010 | 57.90% | 2429 | 35.07% | 487 | 7.03% | 6926 |
| 04 | 4334 | 64.92% | 1789 | 26.80% | 553 | 8.28% | 6676 |
| 05 | 4334 | 57.34% | 1789 | 23.67% | 1435 | 18.99% | 7558 |
| 06 | 4481 | 60.98% | 2269 | 30.88% | 598 | 8.14% | 7348 |
| 07 | 4584 | 61.73% | 2257 | 30.39% | 585 | 7.88% | 7426 |
| 08 | 4616 | 61.48% | 2301 | 30.65% | 591 | 7.87% | 7508 |
| 10 | 296 | 4.47% | 5620 | 84.83% | 709 | 10.70% | 6625 |
| 11 | 3211 | 46.54% | 2782 | 40.32% | 906 | 13.13% | 6899 |
| **Total** | **34450** | **53.59%** | **23038** | **36.55%** | **6322** | **9.86%** | **63810** |

As a result of the missing year's data, the significant discrepancy in the findings led to the conclusion that it would be best to remove the 2010-11 and 2011-12 years from the analysis. Thus, this study will cover the school years of 2001-00 thru 2008-09. As can be seen in Table 3.6, the removal of the 2010-11 and 2011-12 years stabilizes the average percentages in the "cleaned" categories. The percentage of removed cases due to CDS duplicates goes from 7.16% to 6.39% and the percentage of removed cases from the Assignment percentage not being equal to 100% goes from 7.37% to 6.08%. Additionally, the omission of the 2010-11 and 2011-12 years significantly impacted the overall average percentage of change in principles, moving from 9.86% down to 9.27% as shown in Table 3.7.

Table 3.6 - Data Cleaning 2
PAIF Data
2001/2002 thru 2008/2009

| Year* | Raw # PR | CDS Duplicates | Percent of Duplicates | Remaining # PR | ASN_PCT ne 100 | Percent of ne 100% | 100% PR W/out Repeats |
|---|---|---|---|---|---|---|---|
| 01 | 7686 | 441 | 5.74% | 7245 | 507 | 7.00% | 6738 |
| 02 | 7748 | 428 | 5.52% | 7320 | 476 | 6.50% | 6844 |
| 03 | 7804 | 457 | 5.86% | 7347 | 421 | 5.73% | 6926 |
| 04 | 8460 | 942 | 11.13% | 7518 | 842 | 11.20% | 6676 |
| 05 | 8088 | 417 | 5.16% | 7671 | 113 | 1.47% | 7558 |
| 06 | 8265 | 461 | 5.58% | 7804 | 456 | 5.84% | 7348 |
| 07 | 8405 | 515 | 6.13% | 7890 | 464 | 5.88% | 7426 |
| 08 | 8407 | 484 | 5.76% | 7922 | 414 | 5.23% | 7508 |
| **Total** | **64863** | **4145** | **6.39%** | **60717** | **3693** | **6.08%** | **57024** |

* = First Year in the School Year (e.g., 2001-02 is labeled 01)

Table 3.7 - Looping Result
Principal's Status
2001-02 thru 2008-09

| Year | Returning | Percent | Change | Percent | U-I | Percent | Total PR |
|---|---|---|---|---|---|---|---|
| 02 | 4584 | 66.98% | 1802 | 26.3% | 458 | 6.69% | 6844 |
| 03 | 4010 | 57.90% | 2429 | 35.1% | 487 | 7.03% | 6926 |
| 04 | 4334 | 64.92% | 1789 | 26.8% | 553 | 8.28% | 6676 |
| 05 | 4334 | 57.34% | 1789 | 23.7% | 1435 | 18.99% | 7558 |
| 06 | 4481 | 60.98% | 2269 | 30.9% | 598 | 8.14% | 7348 |
| 07 | 4584 | 61.73% | 2257 | 30.4% | 585 | 7.88% | 7426 |
| 08 | 4616 | 61.48% | 2301 | 30.6% | 591 | 7.87% | 7508 |
| **Total** | **30943** | **61.62%** | **14636** | **29.1%** | **4707** | **9.27%** | **50286** |

Once the data were analyzed and initial findings were postulated, the accuracy of the calculations to evaluate changes in principalship was verified using the following procedure. Biannually the CDE releases the California School Directory, which is a published review of all the public K-12 schools in the state listing the name of the school, the location and type, school characteristics and the name of the principal. As each year of the data contains over 7,000 principals, it was

not feasible to crosscheck every principal. Therefore, utilizing Excel's random number generator, 100 random principals were selected from the Directory and crosschecked against the generated variable of change that resulted in the data analysis of this study. This process was completed using three published Directories available through the University of California-Riverside's Rivera Library Directories: 2004, 2006 and 2008.

Each of the 100 randomly selected cases was coded for type of status and for whether or not the statistical looping correctly accounted for a change. Where a 'missing' status was identified, the number was skipped, as it could not be determined if the model was correct or not. Table 3.8 is a breakdown of the findings of the verification of the looping. The table shows what kind of principal the random number ended up being and the percentage of correct. As can be seen, the looping process was deemed accurate in every circumstance.

Table 3.8 - Looping Verification
Total Reviewed
2001-02 thru 2008-09

| Year of Published Data | # Looked up | # Returning | # Changed | # U-I | % Correct |
|---|---|---|---|---|---|
| 2004 | 100 | 74 | 21 | 5 | 100.0 |
| 2006 | 100 | 63 | 29 | 8 | 100.0 |
| 2008 | 100 | 62 | 20 | 18 | 100.0 |

Measures and Procedures

This study is primarily interested in knowing whether or not women are obtaining the principal position in schools. Further, if women are obtaining the principal position, under what circumstance are they obtaining the position? The very nature of these questions guides the study to look at the numbers of principals in a very deliberate manner; this is, what do the numbers say under the particular applied variables? To answer this question, the study uses logistic regression and linear models of analysis of variance (ANOVA). Utilizing SPSS, version 22 for the evaluation section, it shows that the study effectively answers the hypotheses questions. A brief explanation of these statistical techniques follows, after which a few words of explanation are offered in regards to the procedures used to perform the variable analysis.

The statistical analysis starts by utilizing a logistics regression model within the SPSS software. With the study's dependent variable (DV) being dichotomous, meaning there are only two possible outcomes of sex, sex was coded binomially with Female =0 and Male = 1. Using an "Enter" method approach, as outlined by Field (2009), where all the independent variables are entered at the same time by the software, the particular variables can be examined by how they interact with one another. This allows for the data to be analyzed all together for how they impact the dependent variable of sex.

The contribution to the model is measured by model chi-square, which is a statistical measure of the fit between the dependent and independent variables,

much like $R^2$ in linear regression. The overall measure of how well the model fits is given by the likelihood value. A model that fits the data well will have a small likelihood value while a perfect model would have a likelihood value of zero. The significance test for the model chi-square is our statistical evidence of the presence of a relationship between the dependent variable and the combination of the independent variables. The model chi-square is the difference between the model with no IV and what the model being tested. It yields the model and the significance of the model.

The next statistical measure used is analysis of variance (ANOVA). ANOVA is an ideal statistical measure to use in this study, as it is a set of univariate statistical techniques for comparing the means from experiments with a minimum of three or more treatment conditions or groups (Kinnear & Gray, 2011). In the one-way ANOVA, the total variance is divided into treatment and error components, which are compared by means of an F ratio. ANOVA is particularly helpful, in comparison to logistic regression that gives a very similar test, because ANOVA can output the results to a cross-tab table that lists the observed number of individuals as well as producing an expected number.

As the expected number is crucial to understanding this research, the following outlines how that figure is reached. The expected number is obtained by first multiplying the number of observations in the row (row total) by the number of observations in the column (column total). That number is then divided by the total number of observations (grand total) and yields the expected number for each

column. This process is run by SPSS, which allows a clear and immediate assessment of whether or not female principals are outpacing male principals, staying the same or falling behind.

This study reports the findings of the analysis by employing tables and charts that are created using Excel software from the SPSS outputs. Once the chart is constructed, trend lines are created to represent the slope and strength of the regression lines. Comparisons are then made between the regression line of the actual principals versus that of the overall number of principals in that particular category. Additionally, the findings are reported using the correlation coefficient squared, or $R^2$, to assess the strength of the relationship. $R^2$, or coefficient of determination, is used in simple regression analysis to report the proportion of the variance of the target, or dependent variable, that is accounted for by the regression upon another variable (Kinnear & Gray, 2011). While not allowing direct conclusions about causality, the $R^2$ is a measure of the amount of variability in one variable that is shared by the other.

This next section discusses a few of the procedures that the study employed. The total number of the principals reported in Table 3.7 is 50,286. This number represents the total number of principals after cleaning (removing the duplicate CDS codes and principals that were not employed 100% time) and looping the data (identifying the cleaned principals as either returning, changed, or unidentifiable). However, in each of these files, there were individual principals that were missing certain variables that resulted in a fluctuating absolute total number of principals.

For example, over the seven study years where the status of the principal could be identified, there were 594 individual cases (principals) that were missing the sex variable (see Table 3.9). This reduced the principal total to 49,692 when the analysis for gender was performed. It is clear that the 2004-05 data file, with the high CDS duplicates and principals not equaling 100%, had significantly more problems than the other years with missing data. The decision was made to learn as much as possible about the principals available rather than remove the principals that lacked variables. As a result, some totals will fluctuate over the course of the study.

Table 3.9 - Total Principals versus Total Sex Identified Principals
2002-3 thru 2008-09

| Year | Total PR | Sex Identified PR | Number Missing Sex | % Missing |
|---|---|---|---|---|
| 02 | 6844 | 6834 | 10 | 0.146% |
| 03 | 6926 | 6896 | 30 | 0.433% |
| 04 | 6676 | 6661 | 15 | 0.225% |
| 05 | 7558 | 7130 | 428 | 5.663% |
| 06 | 7348 | 7302 | 46 | 0.626% |
| 07 | 7426 | 7415 | 11 | 0.148% |
| 08 | 7508 | 7454 | 54 | 0.719% |
| **Total** | **50286** | **49692** | **594** | **1.137%** |

Additionally, tables throughout the study have been truncated in order to present the data that is of the most use while still allowing for the table to be readable and fit the size limitations of the paper. As the study has many tables, the choice was made to make the tables user-friendly at the expense of not sharing all of the data. Table 3.10 (which will be used later on in the study as Table 4.5) is an example of the tables used in the study. Notice that only the female data figures are

used, the assumption being made that the opposite proportion would give the male data figures.

Table 3.10 - Changed Principals: Gender by Primary School Level (Level 1)

| Year | Total Changed Primary PR | Female Primary PR | Female Expected Primary | Female Difference | Change F ∝ | All Primary F ∝ | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 1208 | 802 | 697.7 | 104.3 | 0.664 | 0.671 | 0.000 |
| 03-04 | 1633 | 1088 | 967.3 | 120.7 | 0.666 | 0.679 | 0.000 |
| 04-05 | 1171 | 771 | 690.9 | 80.1 | 0.658 | 0.677 | 0.000 |
| 05-06 | 1103 | 722 | 650.9 | 71.1 | 0.655 | 0.679 | 0.000 |
| 06-07 | 1453 | 959 | 847.8 | 111.2 | 0.660 | 0.681 | 0.000 |
| 07-08 | 1237 | 842 | 742.9 | 99.1 | 0.681 | 0.677 | 0.000 |
| 08-09 | 1470 | 995 | 880.2 | 114.8 | 0.677 | 0.686 | 0.000 |

Pink = Overrepresented

Each of the tables in Chapter IV follows a pattern similar to that shown in Table 3.10. The color pink is used throughout the study to highlight one of two things. First, the data highlighted indicates female principals, when comparing female data with male data (with blue occasionally used to indicate male data for clarity). Second, pink is also used to highlight study findings when female principals are determined to be overrepresented in any one category.

Each table will use specific words and symbols to explain what data were being used. This study uses proportion to represent the change in the ratio of females and males, as opposed to using percentage. While the two terms describe essentially the same idea, proportions are reported between 0 and 1 while percentages are reported between 0 and 100. This study uses the symbol $\propto$ to

represent proportionality. Additionally, every time the word "changed" is used, the figure represented was arrived at by using a subset of the data where only the changed principals for that particular year were used. Therefore, in Table 3.10, the subset of changed principals was used to get the total changed principals number.

That same subset was used for each of the categories listed, except for the "All Primary F" where the complete data set, after cleaning and looping, of that year was used. An example will help to explain this point more clearly. Table 3.10 gets the all of the figures from a subset of changed principals except for the figure "All Primary F", which was gained by using all three groups (returning, changed, and unidentifiable principals). The "all female" figure in each table will be the proportion of female principals by that particular category. In Table 3.10 for example, that "all" group would be all female primary level principals.

Hypotheses

As described in Chapter I and II, this study utilizes rational choice theory to argue that school boards, superintendents, and selection committees are acting in such a way as to provide the best-qualified individual to lead each school. While bias and discrimination may exist in individuals, rational choice theory explains how both individuals and organizations will balance costs against benefits resulting in actions that will maximize perceived advantages. In short, rational choice motivates individuals to act in their own best interest to secure the best option available. On the other hand, sexual politics theory stipulates that bias primarily

motivates individuals and that women experience bias that denies them advancement to positions of power and authority. It further suggests that if women are gaining positions of authority (in this study that position would be the principalship), then those positions would only be in areas that men do not want (women would only become principals in areas of lower status, poorer schools or challenging environments (Stuckey, 2012)).

It is important to note that in California, most often the process of hiring a new principal begins with the superintendent leading the search. After interviewing candidates, either personally or by committee, the superintendent will make a recommendation to the school board. Most often, it can be assumed that the superintendent and the school board both have compatible goals and preferences for the school district, since it is the school board that hires the superintendent. Assuming this to be true, the individual recommended by the superintendent will most likely be hired as the new principal of the school. It is conceivable that in some cases principals could be hired directly by the school board independent of the superintendent. As this data has no way of identifying the particular method of hiring for each district, it will be assumed that the superintendent hires the principal.

In analyzing the data described in detail in this chapter, this study tests the following hypotheses from the perspective of rational choice theory. The hypotheses are:

Overall

H1: Women will gain a higher proportion of principal positions across all levels.

H1a: Women will make up the majority proportion of changed principals as a result of gaining a higher proportion of principals.

H1b: Women will retain their positions as principals.

Level

H2: Women will increase proportion at all levels of schools.

H2a: Women will continue to hold the majority of principal positions at the primary level and will be increasing or maintaining their proportion.

H2b: Women will be increasing the proportion of principals at the middle school level.

H2c: Women will be increasing the proportion of principals at the high school level.

Locale

H3: Women will gain proportion in favorable schools while losing proportion in less desirable schools.

H3a: Women will lose proportion in large city schools (Locale 1) as they gain proportion in the other locales.

H3b: Women will increase in proportion in mid-sized city schools (Locale 2).

H3c: Women will increase in proportion in large suburbs schools (Locale 3).

H3d: Women will increase in proportion in mid-sized and small suburbs schools (Locale 4).

H3e: Women will increase in proportion in town schools (Locale 5).

H3f: Women will increase in proportion in rural area schools (Locale 6).

Size

H4: Women will increase in proportion of principals across all sizes of schools.

H4a: Women will increase in the proportion of principals at the small schools (Size 1).

H4b: Women will increase in the proportion of principals at the medium-small schools (Size 2).

H4c: Women will increase in the proportion of principals at the medium-large schools (Size 3).

H4d: Women will increase in the proportion of principals at the large schools (Size 4).

## Title 1

After running the logistic regression models, Title 1 was found to be not significant. This means that the results of the analysis would be unreliable. For this reason the variable was not studied after the logistic regression and no hypothesis was needed.

## Free and Reduced Lunch – Economy

H5: Women will gain proportion of principals in the more favorable economy schools.

H5a: Women will maintain or lose proportion in the less favorable poor schools.

H5b: Women will increase or maintain their proportion in the somewhat favorable middle class schools.

H5c: Women will increase proportion of principals in the Rich Schools.

API Score

H6: There will be no inherent bias in the achievement characteristics of the schools in which women are principals.

H6a: Women will maintain or lose proportion in the low performing schools.

H6b: Women will increase or maintain proportion in the medium performing schools.

H6c: Women will be gaining proportion in the high performing schools.

Pupil-Teacher Ratios

H7: There will be no inherent bias in the pupil-teacher characteristics of the schools in which women are principals.

H7a: Women will gain proportion in the favorable low pupil-teacher ratio schools.

H7b: Women will gain proportion in the favorable medium/low pupil-teacher ratio schools.

H7c: Women will maintain or lose proportion in the less favorable medium/high pupil-teacher ratio schools.

H7d: Women will maintain or lose proportion in the unfavorable high pupil-teacher ratio schools.

Principal's Education Level

H8: There will be no inherent bias as women hold equal to or lower education level than men in the principalship.

H8a: Women will have equal to or less Doctorate degrees than men.

H8b: Women will have equal to or less Master's+30 degrees than men.

H8c: Women will have equal to or less Master's degrees than men.

H8d: Women will have equal to or less Bachelor's+30 degrees than men.

H8e: Women will have equal to or less Bachelor's degrees than men.

Principal's Ethnicity

Ethnicity is presented in the study in an attempt to be thorough and accurate across all the major variables. However, as will be further explained in Chapter IV, there will be no hypothesis or in-depth analysis of the variable.

Principal's Years in the District

H9: Female principals will have an equal to or lower number of years in the district than men.

H9a: Women will gain proportion in the favorable low district years.

H9b: Women will maintain or gain proportion in the favorable medium/low district years.

H9c: Women will maintain or lose proportion in the less favorable medium/high district years.

H9d: Women will maintain or lose proportion in the unfavorable high district years.

Principal's Years in Teaching

H10: Female principals will have an equal to or lower number of years in teaching than men.

H10a: Women will gain proportion in the favorable low teaching years.

H10b: Women will maintain or gain proportion in the favorable medium/low teaching years.

H10c: Women will maintain or lose proportion in the less favorable medium/high teaching years.

H10d: Women will maintain or lose proportion in the unfavorable high teaching years.

# CHAPTER IV

# RESULTS

The purpose of this chapter is to give a detailed review of the results of the statistical analysis. The chapter begins with a review of the logistic regression model, which was executed in order to compare all the independent variables at once. The logistic regression results are interpreted and allow for an understanding of the data before proceeding to the individual independent variables. The chapter then reviews each of the study's variables in relation to sex and is divided into sections by variable, with an introduction to each variable, followed by the results of the analysis for each particular category within the variable. Each section ends with a brief overview of the results. The analysis in this chapter is deliberately kept brief, with the focus on the results of the hypothesis testing. A full analysis of the most pertinent data is given in Chapter V.

## Logistic Regression

The first statistical test used in the study begins with the use of logistic regression. The dependent variable is sex with Female =0 and Male = 1. The study utilizes an Enter Method model that applies all the independent variables (School Level, School Locale, School Size, Title 1, Economy, API, Pupil-Teacher Ratio, Principal's Education, Principal's Ethnicity, Principal's Years in District, and Principal's Years in Teaching) at the same time. As opposed to using a Step-Wise

Method where variables are introduced one at a time and then compared, the Enter Method gives results across all the variables at one time. What follows are the results of that analysis.

Table LR4.1 essentially gives the null hypothesis for this model. This table presents the study as if there were no variables to compare and entitles it "Block 0". With no variables to compare the software picks the dependent variable (sex) that is most likely to occur. In this case, that is "Female" with an average percentile of 60.2%. The classification table shows that this method of blankly picking an outcome of "Female" results in correctly identifying 60.2% of the cases. Of course, this Block 0 would identify 100% percent of the females correctly, but would pick zero percent of the males correctly. This table is important to understand as it provides a baseline for the statistical model. The overall percentage figure of 60.2 is that starting figure to compare the model's figure against.

Table LR4.1 - Block 0: Beginning Block

**Classification Table[a,b]**

| Observed | | | Predicted | | |
|---|---|---|---|---|---|
| | | | Gender | | Percentage Correct |
| | | | F | M | |
| Step 0 | Gender | F | 26232 | 0 | 100 |
| | | M | 17339 | 0 | 0 |
| | Overall Percentage | | | | 60.2 |

a. Constant is included in the model.

b. The cut value is .500

Table LR4.2 is the Classification Table for the model of this study and is entitled Block 1. This table shows that with the 11 independent variables applied, the model correctly identifies sex 65.3 percent of the time. This percentage is 5.1 percent higher than the Block 0 model. Additionally, the model correctly identifies 85.1% of the female principals and 35.5% of the male principals. With an increased prediction rate of 5.1% the model is successful in helping to identify the sex of the principals. A 5% increase in prediction is considered strong in most studies.

Table LR4.2 - Block 1: Method = Enter

**Classification Table[a]**

| Observed | | | Predicted | | |
|---|---|---|---|---|---|
| | | | Gender | | Percentage Correct |
| | | | F | M | |
| Step 1 | Gender | F | 22313 | 3919 | 85.1 |
| | | M | 11186 | 6153 | 35.5 |
| | Overall Percentage | | | | 65.3 |

a. The cut value is .500

Table LR4.3 is the Omnibus Tests of Model Coefficients. This test is the first results with predictors of the model. With using an Enter Method there is only one Step or Block, so the results are the same for the Step, Block, and Model. This table has the chi-square statistic, the degrees of freedom for the model, and its significance level. The value given in the Sig. column is the probability of obtaining the chi-square statistic given that the null hypothesis is true. In other words, this is the probability of obtaining this chi-square statistic (3888.688) if there is in fact no effect of the independent variables, taken together, on the dependent variable. This

is, of course, the p-value, which is compared to a critical value, perhaps .05 or .01 to determine if the overall model is statistically significant. In this case, the model is statistically significant because the p-value is less than 0.000.

Table LR4.3 - Block 1: Method = Enter

**Omnibus Tests of Model Coefficients**

| | | Chi-square | df | Sig. |
|---|---|---|---|---|
| Step 1 | Step | 3888.688 | 23 | 0.000 |
| | Block | 3888.688 | 23 | 0.000 |
| | Model | 3888.688 | 23 | 0.000 |

Table LR4.4 is the Model Summary figures for Block 1. The Cox & Snell R Square and Nagelkerke R Square are two pseudo R-squares that attempt to evaluate the variance explained (www.ats.ucla.edu). Logistic regression does not have an equivalent to the R-squared (the proportion of variance explained by the predictors), that is found in ordinary least squared (OLS) regression; however, both of these figures are attempts at expressing the same information as the R-square. The Cox & Snell R Square is low at 0.085, which suggests that the variables do not explain the variance very well. The Nagelkerke R Square shows that 11.5% of the variance can be explained by the predictor variables, which is considered a fair result. As both of these tests are only approximations, it is best to consider these findings as additional indicators that the model is predicting sex.

Table LR4.4 - Block 1: Method = Enter

**Model Summary**

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|---|---|---|---|
| 1 | 54685.633[a] | 0.085 | 0.115 |

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Table LR4.5 is the Hosmer and Lemeshow Test. This test has historically been seen as a harsher, more accurate, test of statistical analysis as it can only be used on data that has more than 400 observations. In this test, the fact that the Sig (0.122) is not significant is a good thing and means that the model is predicting sex. This test offers further evidence that the model is predicting the sex of the principal.

Table LR4.5 - Block 1: Method = Enter

**Hosmer and Lemeshow Test**

| Step | Chi-square | df | Sig. |
|---|---|---|---|
| 1 | 12.717 | 8 | 0.122 |

Perhaps the most important table of the logistic regression is the Variables in the Equation Table (Table LR4.6). The table gives statistical measurements for each variable examined in the study. Often in this study the text will refer to the 11 independent variables. However, in Table LR4.6 there are 26 variables listed as well as the constant. These 26 lines come from the individual breakdown of the variables that have multiple variables within the variable group (School Level,

Ethnicity, and Locale). The table gives the following values: B (the values for the logistic regression equation), S.E. (the standard errors associated with the coefficients), Wald (Wald chi-square value), df (degrees of freedom for each of the tests of the coefficients), Sig. (the significance value), and the Exp (B) (the odds ratios for the predictors or the exponentiation of the coefficients).

Table LR4.6 - Block 1: Method = Enter

**Variables in the Equation**

| | | B | S.E. | Wald | df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|---|
| Step 1[a] | ed_level | 0.036 | 0.013 | 7.972 | 1 | 0.005 | 1.036 |
| | yrs_teach | -0.009 | 0.001 | 38.657 | 1 | 0.000 | 0.991 |
| | yrs_dist | -0.005 | 0.001 | 13.069 | 1 | 0.000 | 0.995 |
| | Economy | 0.038 | 0.021 | 3.286 | 1 | 0.070 | 1.038 |
| | PupilTeacherNumber | 0.063 | 0.015 | 18.587 | 1 | 0.000 | 1.065 |
| | API_Ranks | -0.057 | 0.02 | 8.276 | 1 | 0.004 | 0.944 |
| | Size | 0.138 | 0.017 | 65.74 | 1 | 0.000 | 1.147 |
| | Ethnicity | | | 432.726 | 7 | 0.000 | |
| | Ethnicity(1) | 0.1 | 0.111 | 0.81 | 1 | 0.368 | 1.105 |
| | Ethnicity(2) | -0.057 | 0.137 | 0.175 | 1 | 0.676 | 0.944 |
| | Ethnicity(3) | -0.082 | 0.061 | 1.823 | 1 | 0.177 | 0.922 |
| | Ethnicity(4) | -0.126 | 0.275 | 0.209 | 1 | 0.648 | 0.882 |
| | Ethnicity(5) | 0.003 | 0.136 | 0.001 | 1 | 0.982 | 1.003 |
| | Ethnicity(6) | 0.277 | 0.029 | 88.871 | 1 | 0.000 | 1.319 |
| | Ethnicity(7) | -0.731 | 0.044 | 271.311 | 1 | 0.000 | 0.481 |
| | Level_school | | | 1180.8 | 3 | 0.000 | |
| | Level_school(1) | -0.446 | 0.09 | 24.465 | 1 | 0.000 | 0.64 |
| | Level_school(2) | 0.253 | 0.093 | 7.392 | 1 | 0.007 | 1.287 |
| | Level_school(3) | 0.765 | 0.095 | 64.188 | 1 | 0.000 | 2.149 |
| | Locale_Mixed_Method | | | 308.691 | 5 | 0.000 | |
| | Locale_Mixed_Method(1) | -0.613 | 0.044 | 194.959 | 1 | 0.000 | 0.542 |
| | Locale_Mixed_Method(2) | -0.442 | 0.043 | 105.685 | 1 | 0.000 | 0.643 |
| | Locale_Mixed_Method(3) | -0.499 | 0.041 | 150.822 | 1 | 0.000 | 0.607 |
| | Locale_Mixed_Method(4) | -0.181 | 0.049 | 13.691 | 1 | 0.000 | 0.834 |
| | Locale_Mixed_Method(5) | -0.058 | 0.06 | 0.946 | 1 | 0.331 | 0.943 |
| | Title_1_School | 0.02 | 0.028 | 0.484 | 1 | 0.487 | 1.02 |
| | Constant | -0.16 | 0.119 | 1.826 | 1 | 0.177 | 0.852 |

a. Variable(s) entered on step 1: ed_level, yrs_teach, yrs_dist, Economy, PupilTeacherNumber, API_Ranks, Size, Ethnicity, Level_school, Locale_Mixed_Method, Title_1_School.

While all of the values reveal information, the Sig., B, and Exp(B) give results that are most helpful in understanding the data for this study. An examination of

the Sig. column shows that most of the independent variables return a significant result, which means the results of the test did not occur simply because of chance. Of the 11 major variable groups only Title 1 (0.487) returns an insignificant[4] finding. Additionally, six of the sub-variables returned insignificant results while the parent variable returned significant results. The six sub-variables with insignificant results are: Locale 5 (Rural), Ethnicity 1 (American Indian or Alaska Native), Ethnicity 2 (Asian), Ethnicity 3 (Pacific Islander), Ethnicity 4 (Filipino), and Ethnicity 5 (Hispanic or Latino). Of these sub-variables, five of the six sub-variables have an extremely low number of cases in the data. The small case size would explain the insignificant findings of the small sub-variables, as a shift in minor way would result in major change to the sample population. However, the Hispanic or Latino ethnic group is the second largest ethnic category in the study (7,074 principals in the combined, 2CombinedPR, dataset), being twice as large as the third largest category (African American, not Hispanic) and nearly seven times larger than the fourth largest group (Asian). This finding suggests an interesting dynamic is at play with the "Hispanic or Latino" ethnic category and further highlights the importance of studies around this particular ethnicity among principals in California.

The "B" value is the values for the logistic regression equation for predicting the dependent variable from the independent variable. They are in log-odd units. The prediction equation is expressed as log(p/1-p) = b0 + b1*x1 +b2*x2… b25*x25

[4] The Economy variable has a significance level of 0.070, which is just slightly above the historic significance cut-off point of 0.05. But as the equation is so close to the cut-off point, this study will treat the finding as being significant.

where p is the probability of being a male. These estimates tell about the relationship between the independent variables and the dependent variable, where the dependent variable is on the logit scale. These estimates tell the amount of increase (or decrease, if the sign of the coefficient is negative) in the predicted log odds of sex = 1 that would be predicted by a 1 unit increase (or decrease) in the predictor, holding all other predictors constant (www.ats.ucla.edu). As the dependent variable is sex in this study, and a single unit increase in sex is not possible (the principals are either female or male), a positive number would indicate that for every one-unit increase in the independent variable, sex would move towards being male (Male=1), while a negative sign would indicate an increase towards being female (Female=0).

Because these coefficients (B) are in log-odds units, they are difficult to interpret, so it is helpful to look at the odds ratios, or Exp(B). The "Exp" refers to the exponential value of B. Exp(B) is the change in the odds ratio associated with a one-unit change in the predictor variable. When Exp(B) is less than 1, increasing values of the variable correspond to decreasing odds of the event's occurrence. When Exp(B) is greater than 1, increasing values of the variable correspond to increasing odds of the event's occurrence.

The odds ratio is a measure of association between an exposure and an outcome and the *odds* that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure. When a logistic regression is calculated, the regression coefficient is the estimated

increase in the log odds of the *outcome per unit increase* in the value of the *exposure.* In other words, the exponential function of the regression coefficient is the odds ratio associated with a one-unit increase in the exposure (Szumilas, 2010).

As stated earlier, Exp(B) is the change in the odds ratio associated with a one-unit change in the predictor variable. When Exp(B) is less than 1, increasing values of the variable correspond to decreasing odds of the event's occurrence. When Exp(B) is greater than 1, increasing values of the variable correspond to increasing odds of the event's occurrence. Thus the Exp(B) for this study would mean that a value less than 1 would mean that the odd are toward women, while a value of more than one would mean that the odds are towards men.

Table LR4.7 gives an individual breakdown of each of the variables and what the odds ratio reveals for that individual variable. Where a variable is the major variable and has sub-variables that are listed (Ethnicity, Level of School, and School Locale), the major variable will only have the significance figure, as the odds ratio is not computed. The explanation will describe what the odds ratio means in the study.

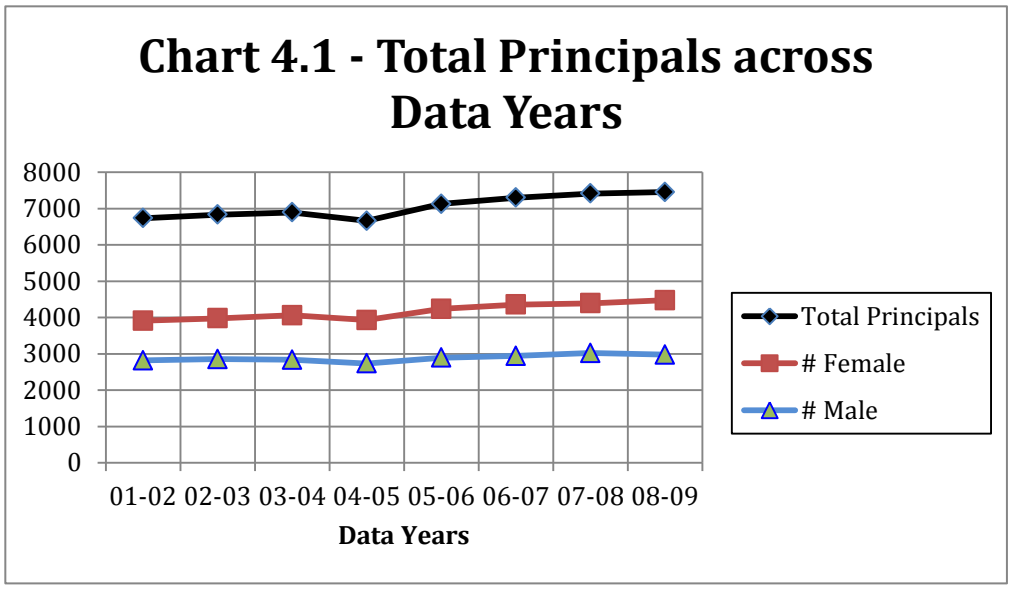
| Table LR4.7 - Odds Ratio | | | |
|---|---|---|---|
| Variable | Sig. | Exp(B) | Explanation |
| ed_level | 0.005 | 1.036 | As the ed_level has the highest education coded as 1, the odds are that female principals have more education than their male counterparts. |
| yrs_teach | 0.000 | 0.991 | Odds are that females have more years in teaching than males. |
| yrs_dist | 0.000 | 0.995 | Odds are that females have more years in district than males. |
| Economy | 0.070 | 1.038 | Odds are that males are found in the richer schools |
| PupilTeacher Number | 0.000 | 1.065 | Males have the schools with higher Pupil/Teacher Ratios |
| API_Ranks | 0.004 | 0.944 | Females have the schools with lower API Ranks |
| Size | 0.000 | 1.147 | Males have the larger schools |
| Ethnicity | 0.000 | | Ethnicity is a significant indicator |
| Ethnicity(1) | 0.368 | 1.105 | Findings are not significant, does not allow for analysis |
| Ethnicity(2) | 0.676 | 0.944 | Findings are not significant, does not allow for analysis |
| Ethnicity(3) | 0.177 | 0.922 | Findings are not significant, does not allow for analysis |
| Ethnicity(4) | 0.648 | 0.882 | Findings are not significant, does not allow for analysis |
| Ethnicity(5) | 0.982 | 1.003 | Findings are not significant, does not allow for analysis |
| Ethnicity(6) | 0.000 | 1.319 | The odds are higher for a African American to be male. |
| Ethnicity(7) | 0.000 | 0.481 | The odds are higher for a White principal to be female. |
| Level_school | 0.000 | | School level is a significant indicator |
| Level_school (1) | 0.000 | 0.64 | Females have a higher odds of being in the Primary Level. |
| Level_school (2) | 0.007 | 1.287 | Males have a higher odds of being in the Middle School Level. |
| Level_school (3) | 0.000 | 2.149 | Males have a higher odds of being in the High School Level. |
| Locale_Mixed _Method | 0.000 | | Locale is a significant indicator |
| Locale_Mixed _Method(1) | 0.000 | 0.542 | The odds are higher for a female to be in the Large City Schools. |
| Locale_Mixed _Method(2) | 0.000 | 0.643 | The odds are higher for a female to be in the Small/Medium sized City Schools. |
| Locale_Mixed _Method(3) | 0.000 | 0.607 | The odds are higher for a female to be in the Large Surburbs Schools. |
| Locale_Mixed _Method(4) | 0.000 | 0.834 | The odds are higher for a female to be in the Small/Medium Suburb Schools. |
| Locale_Mixed _Method(5) | 0.331 | 0.943 | Findings are not significant, does not allow for analysis |
| Title_1_ School | 0.487 | 1.02 | Findings are not significant, does not allow for analysis |

After analyzing the data using the logistic regression, the data shows that 10 of the 11 main variables are significantly related to sex. While the logistic

regression can show how the variables impact sex and help to predict the sex of a new principal in relation to those variables, it is now necessary to look at each variable individually using analysis of variance (ANOVA) to garner further information.

Absolute Number of Female Principals

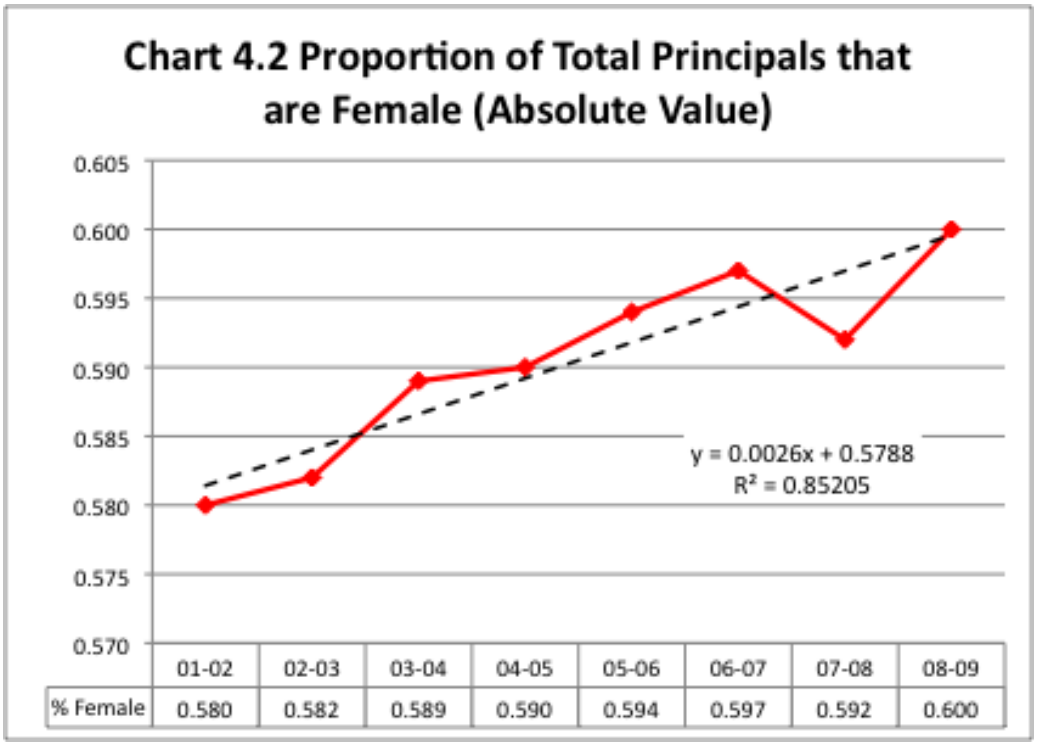
The individual variable analysis begins with the raw overall numbers of all principals in California between the school years of 2001-02 thru 2008-09 to establish the actual number of female principals. As seen in Chart 4.1, the total number of principals in California consistently increases over the course of the study, with one small exception during the 2004-05 year. This small decrease in 2004-05 may result from the high amount of duplication and missing data found in that year's file, rather than from an actual decrease in principals. The overall picture demonstrates a steadily growing workforce consistent with normal population growth and the growing economy of the era, just prior to the recession that began at the end of 2007.




Over the eight-year span of this study, female principals increased by 2.0% (see Table 4.1). In line with these cumulative results, women in the principalship increased individually by year as well, with one exception in which they dropped by 0.005% during the 2007-08 year. This 2007-08 drop in female principals is interesting and impossible to account for using this data alone. Regardless of the small decrease in the 2007-08 school year, the overall growth of women in principalship positions indicates that women gained in proportion over men for the eight years studied.

| Table 4.1- Overall Proportion of Principals | | | | | |
|---|---|---|---|---|---|
| **Year** | **Total Principals** | **# Female** | **∝ Female** | **# Male** | **∝ Male** |
| 01-02 | 6738 | 3911 | 0.580 | 2819 | 0.420 |
| 02-03 | 6834 | 3979 | 0.582 | 2855 | 0.418 |
| 03-04 | 6896 | 4060 | 0.589 | 2836 | 0.411 |
| 04-05 | 6661 | 3928 | 0.590 | 2733 | 0.410 |
| 05-06 | 7130 | 4238 | 0.594 | 2892 | 0.406 |
| 06-07 | 7302 | 4359 | 0.597 | 2942 | 0.403 |
| 07-08 | 7415 | 4392 | 0.592 | 3023 | 0.408 |
| 08-09 | 7454 | 4476 | 0.600 | 2978 | 0.400 |
| **Total** | **56430** | **33343** | **0.591** | **23078** | **0.410** |

Chart 4.2 shows the proportion of female principals over the course of this study (the red diamonds with a red line) and allows analysis using a regression fit (black dash line). The $R^2$ is a robust 0.85205, meaning that the data are close to being absolutely linear and that the data therefore accurately indicate future trends. While the $R^2$ is impressive, the slope of the line is a mere 0.0026, indicating that the increase is relatively slow and gradual over the course of the study. Hereafter, the $R^2$ plot and slope will be referred to as the "Absolute" value. Hypothesis H1 stated: Women will gain a higher proportion of principal positions across all levels. The regression analysis displayed in Chart 4.2 proves that the H1 hypothesis is correct.




Having proven H1 to be true, the analysis now turns to the overall numbers of principals across work status. As explained earlier, "changed" in this study identifies only a change in the principal position at the school, not whether or not the principal is new to the school or new to being a principal. Three status possibilities exist: , Changed, Returning, or Unidentifiable. Unidentifiable refers to the data missing for various reasons, as outlined in chapter III. Table 4.2 shows the work status distribution of the principals by sex in the data files. As seen in the table, the average proportion of Changed principals that were female is 0.591, compared to 0.409 for men over the data years. The average proportion of female Returning principals is 0.597 over the data years compared to 0.403 for men. The

average proportion of the Unidentifiable principals is 0.564 for women and 0.436 for men. The is no significant gender difference in the composition of the three principal status groups (Changed, Returning, or Unidentifiable).

Table 4.2 - Status of Principals by Sex

| Year | # of Changed Principals | # F | ∝ F | # M | ∝ M |
|---|---|---|---|---|---|
| 02-03 | 1792 | 1035 | 0.578 | 757 | 0.422 |
| 03-04 | 2404 | 1424 | 0.592 | 980 | 0.408 |
| 04-05 | 1778 | 1049 | 0.590 | 729 | 0.410 |
| 05-06 | 1654 | 976 | 0.590 | 678 | 0.410 |
| 06-07 | 2264 | 1321 | 0.583 | 943 | 0.417 |
| 07-08 | 2253 | 1353 | 0.601 | 900 | 0.399 |
| 08-09 | 2258 | 1352 | 0.599 | 906 | 0.401 |
| Total | 14403 | 8510 | 0.591 | 5893 | 0.409 |
| **Year** | **# of Returning Principals** | **# F** | **∝ F** | **# M** | **∝ M** |
| 02-03 | 4584 | 2718 | 0.593 | 1866 | 0.407 |
| 03-04 | 4010 | 2370 | 0.591 | 1640 | 0.409 |
| 04-05 | 4334 | 2575 | 0.594 | 1759 | 0.406 |
| 05-06 | 4071 | 2436 | 0.598 | 1635 | 0.402 |
| 06-07 | 4481 | 2716 | 0.606 | 1765 | 0.394 |
| 07-08 | 4583 | 2717 | 0.593 | 1866 | 0.407 |
| 08-09 | 4616 | 2792 | 0.605 | 1824 | 0.395 |
| Total | 30679 | 18324 | 0.597 | 12355 | 0.403 |
| **Year** | **# of U-I Principals** | **# F** | **∝ F** | **# M** | **∝ M** |
| 02-03 | 458 | 226 | 0.493 | 232 | 0.507 |
| 03-04 | 482 | 266 | 0.552 | 216 | 0.448 |
| 04-05 | 549 | 304 | 0.554 | 245 | 0.446 |
| 05-06 | 1405 | 826 | 0.588 | 579 | 0.412 |
| 06-07 | 557 | 322 | 0.578 | 234 | 0.420 |
| 07-08 | 579 | 322 | 0.556 | 257 | 0.444 |
| 08-09 | 580 | 332 | 0.572 | 248 | 0.428 |
| Total | 4610 | 2598 | 0.564 | 2011 | 0.436 |
| **Grand Total** | **49692** | **29432** | **0.592** | **20259** | **0.40769** |

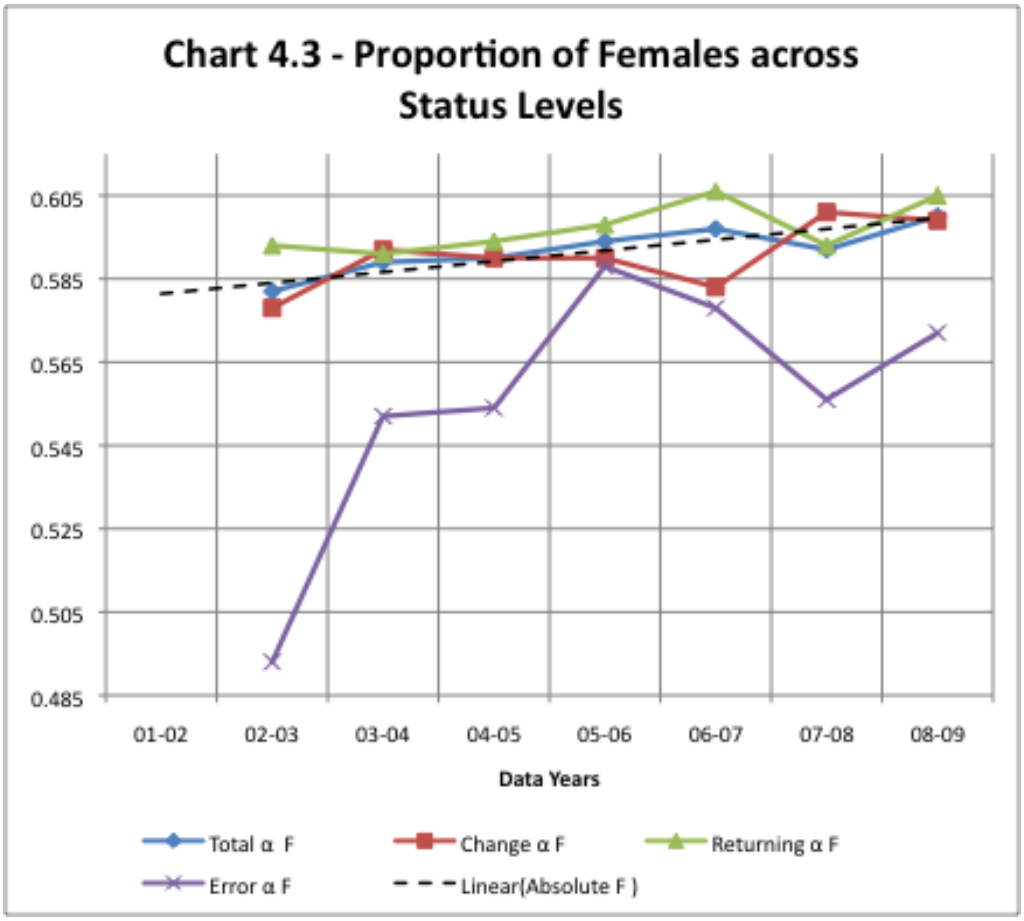
Further, when the ANOVA is run on the basic number of changed and returning principals by sex, women are overrepresented in every year in the returning status and are overrepresented in three of the seven years in the changed principals, see table 4.3. Hypothesis H1a stated: Women will make up the majority proportion of changed principals as a result of gaining a higher proportion of principals. These results show H1a to be not supported. Hypothesis H1b stated: Women will retain their positions as principals longer than their male counterparts. The data show this hypothesis is supported.

Table 4.3 - Actual Verses Expected Female Principals

| Year | Changed Female Principals | Expected Number of Female Principals | Difference | Returning Female Principals | Expected Returning Principals | Difference |
|---|---|---|---|---|---|---|
| 02-03 | 1035.0 | 1043.4 | -8.4 | 2718 | 2669.0 | 49.0 |
| 03-04 | 1424 | 1415.3 | 8.7 | 2370 | 2360.9 | 9.1 |
| 04-05 | 1049 | 1048.5 | 0.5 | 2575 | 2555.8 | 19.2 |
| 05-06 | 976 | 983.1 | -7.1 | 2436 | 2419.8 | 16.2 |
| 06-07 | 1321 | 1351.5 | -30.5 | 2716 | 2675.0 | 41.0 |
| 07-08 | 1353 | 1334.5 | 18.5 | 2717 | 2714.6 | 2.4 |
| 08-09 | 1352 | 1355.9 | -3.9 | 2792 | 2771.8 | 20.2 |

Pink =Overrepresented

Chart 4.3 gives a visual representation of the data displayed as proportions for principalships changed and for those returning across the study years. Again, regression analysis for the total proportion of females shows that women are retaining the principal position at a higher rate than the changed principal position, except in the 2007-08 year. These data are evidence that women are retaining their principal positions, while also holding the majority of changed principal positions. This is exactly the opposite finding one would expect if using sexual politics theory.




Level

Having established the overall pattern of women in the principal position in the State, this study then analyzes the women in principalships at the different school levels. The CDE divides school levels into four categories: primary schools, middle schools, high schools and other schools. The "other" category is broadly defined by the State, combining schools that have unique grade configurations (e.g., 2nd grade through 10th grade), schools that focus on specific niches (e.g., special needs schools), and schools that are special charter schools that are not further

defined. These discrepancies make a comparison between "other" schools and traditional schools impossible. For this reason, this study omits schools in the "other" category and focuses on the three traditional levels of schools: Primary Schools, defined as having a low grade range of Pre-K to 03 and a high grade range of Pre-K to 08; Middle Schools, defined as having a low grade range of 04-07 with a high grade of 04-09; and High Schools, defined as having a low grade range of 07-12 and high grade of 12.

Table 4.4 has a coded breakdown of the school level, total number of principals and average proportion of the data for each level. The last two columns were obtained by combining each of the data years into one master data set, called 2CombinedPR, and then sorting by the level variable.

Table 4.4 - School Level

| School Level | Coded | Frequency: All Years of Study | Proportion |
|---|---|---|---|
| Primary | 1 | 31384 | 0.642 |
| Middle | 2 | 7516 | 0.154 |
| High | 3 | 7528 | 0.154 |

The Pearson Chi-Square test was run for the variable of "school Level" by "Gender" and produced a result of 0.000 for each of the years. This would indicate that the locale and the gender of the principal are significantly related. What follows is a detailed analysis of each of the school level variables.

## Primary School Level

The historic bastion of women's principal positions is the Primary School where women hold a substantial majority in the principalship. As seen in table 4.4, women are overrepresented among the changed female principals. While the exact number that is reported as being the "Female Difference" is only applicable to the current year, the size of the "Difference" number gives an indication of the strength of the relationship. For example, in Table 4.5, the 02-03 "difference" was 104.3. Statistically, the expectation would be 104.3 less female principals that year based on the variable make-up of sex, resulting in women making up 0.664 of the total changed principals. However, the mere size of the "difference" is not the only factor; the size is attached to the total number of changed principals that year. Notice how the 2008-09 year has a smaller Difference number of 99.1, yet has a higher proportion of 0.681. The actual number can only be used to give a general sense of the strength of the relationship. Each of the file years returns a Pearson Chi-square of 0.000, meaning that the school level is significant in predicting the sex of the principal.

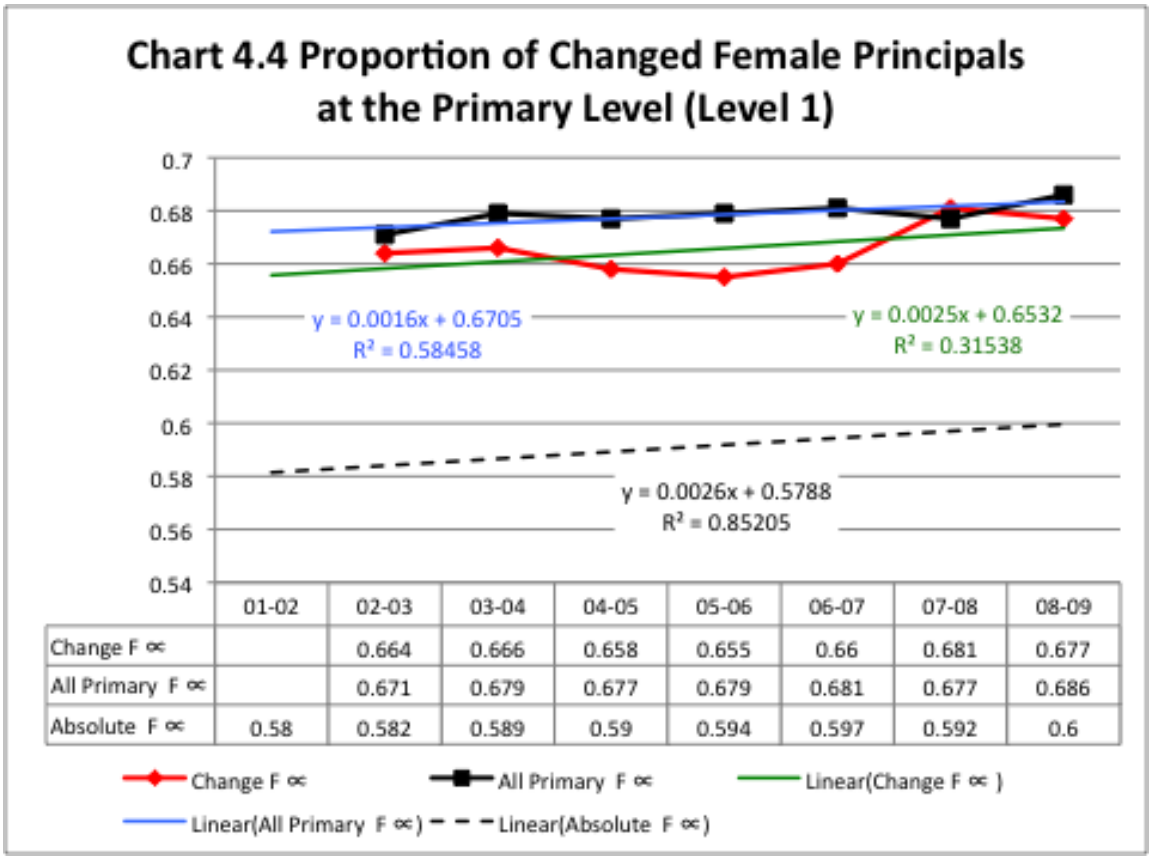
Table 4.5 - Changed Principals: Gender by Primary School Level (Level 1)

| Year | Total Changed Primary PR | Female Primary PR | Female Expected Primary | Female Difference | Change F ∝ | All Primary F ∝ | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 1208 | 802 | 697.7 | 104.3 | 0.664 | 0.671 | 0.000 |
| 03-04 | 1633 | 1088 | 967.3 | 120.7 | 0.666 | 0.679 | 0.000 |
| 04-05 | 1171 | 771 | 690.9 | 80.1 | 0.658 | 0.677 | 0.000 |
| 05-06 | 1103 | 722 | 650.9 | 71.1 | 0.655 | 0.679 | 0.000 |
| 06-07 | 1453 | 959 | 847.8 | 111.2 | 0.660 | 0.681 | 0.000 |
| 07-08 | 1237 | 842 | 742.9 | 99.1 | 0.681 | 0.677 | 0.000 |
| 08-09 | 1470 | 995 | 880.2 | 114.8 | 0.677 | 0.686 | 0.000 |

Pink = Overrepresented

Chart 4.4 gives a visual representation of the changed female proportion data and the all female primary level principals. The proportion of all female principals at the elementary level (the black line) then determines a regression fit line (blue line), indicating that proportion of changed female principals is increasing over time with an $R^2$ of 0.58458. The proportion of changed female principals at the elementary level (red line) then determines a regression fit (green line) that also indicates a positive correlation, with an $R^2$ of 0.31538. While the changed female Primary School principals are not as strongly correlated as the all female Primary School principals, the slope of the changed female principal's line is steeper, 0.0016 for all principals versus the 0.0025 for the changed principals. This indicates that the changed female Primary School principals are increasing their proportion of the total population at a faster rate. The black dashed line is the regression line of the absolute female proportion and is drawn to give a visual representation of where the absolute female proportion would be. These data demonstrate that, over the

eight years of this study, women at Primary Schools continue to hold the majority of principal positions and are increasing their majority. Hypothesis H2a states: Women will continue to hold the majority of principal positions at the primary level and will be increasing or maintaining their proportion. This hypothesis is confirmed.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| Change F ∝ | | 0.664 | 0.666 | 0.658 | 0.655 | 0.66 | 0.681 | 0.677 |
| All Primary F ∝ | | 0.671 | 0.679 | 0.677 | 0.679 | 0.681 | 0.677 | 0.686 |
| Absolute F ∝ | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

## Middle School Level

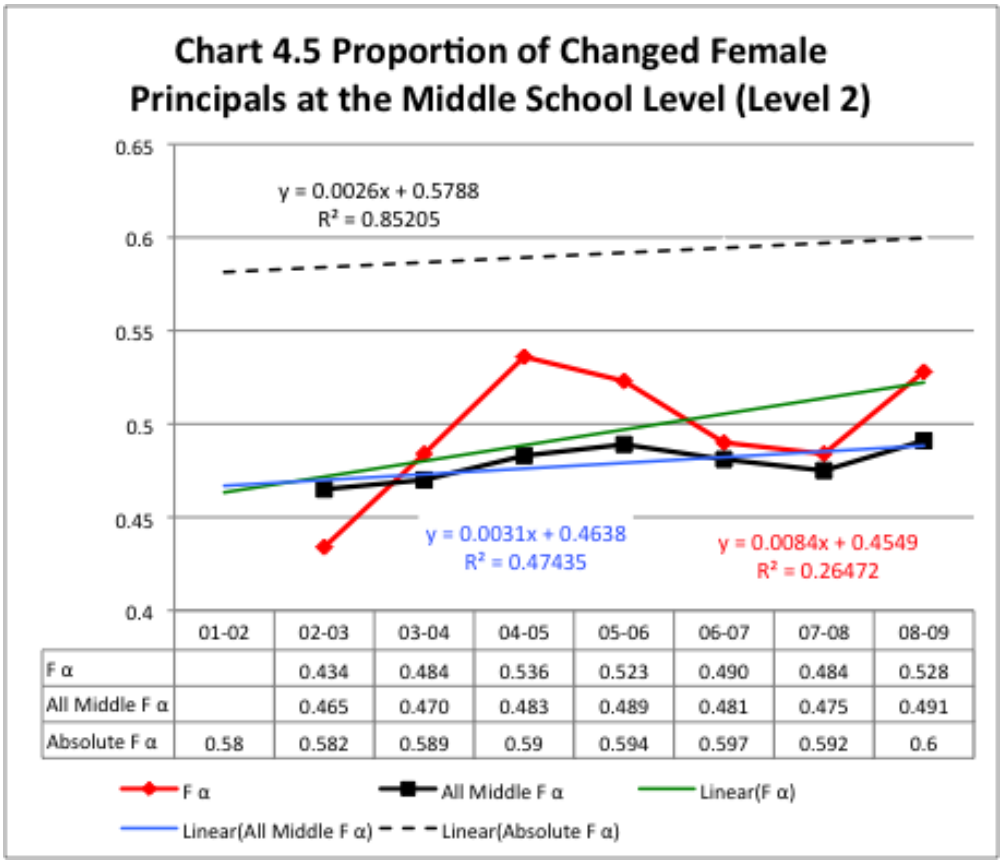
The next level examined is that of the middle school, as provided in Table 4.6 showing the results of the analysis of middle school data. While men still hold the

majority of principalships, the margin of male representation is dropping significantly. In 2002-03, men were overrepresented by 45.7 individuals, but by 2008-09, representation dropped to 25.9 individuals. The proportion of overall female middle school principals has gone from 0.465 during the 2002-03 school year to 0.491 in the 2008-09 school year, an increase of 0.026 over the seven years of the study (see Chart 4.5). Further, while the $R^2$ is a low 0.26472, the slope of the changed principals line is more than twice as steep as the overall principals. This indicates that changed females are continuing to get jobs in the middle schools at a higher rate than the existing female principals. Hypothesis H2b states: Women will be increasing the proportion of principals at the middle school level. H2b is proven to be correct.

Table 4.6 - Changed Principals: Gender by Middle School (Level 2)

| Year | Total Changed Middle PR | Female Middle PR | Female Expected Middle | Female Difference | Changed F o | All Middle F o | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 318 | 138 | 183.7 | -45.7 | 0.434 | 0.465 | 0.000 |
| 03-04 | 397 | 192 | 235.2 | -43.2 | 0.484 | 0.470 | 0.000 |
| 04-05 | 280 | 150 | 165.2 | -15.2 | 0.536 | 0.483 | 0.000 |
| 05-06 | 258 | 135 | 152.2 | -17.2 | 0.523 | 0.489 | 0.000 |
| 06-07 | 384 | 188 | 224.1 | -36.1 | 0.490 | 0.481 | 0.000 |
| 07-08 | 285 | 138 | 171.2 | -33.2 | 0.484 | 0.475 | 0.000 |
| 08-09 | 369 | 195 | 220.9 | -25.9 | 0.528 | 0.491 | 0.000 |

Pink = Overrepresented




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α | | 0.434 | 0.484 | 0.536 | 0.523 | 0.490 | 0.484 | 0.528 |
| All Middle F α | | 0.465 | 0.470 | 0.483 | 0.489 | 0.481 | 0.475 | 0.491 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

## High School Level

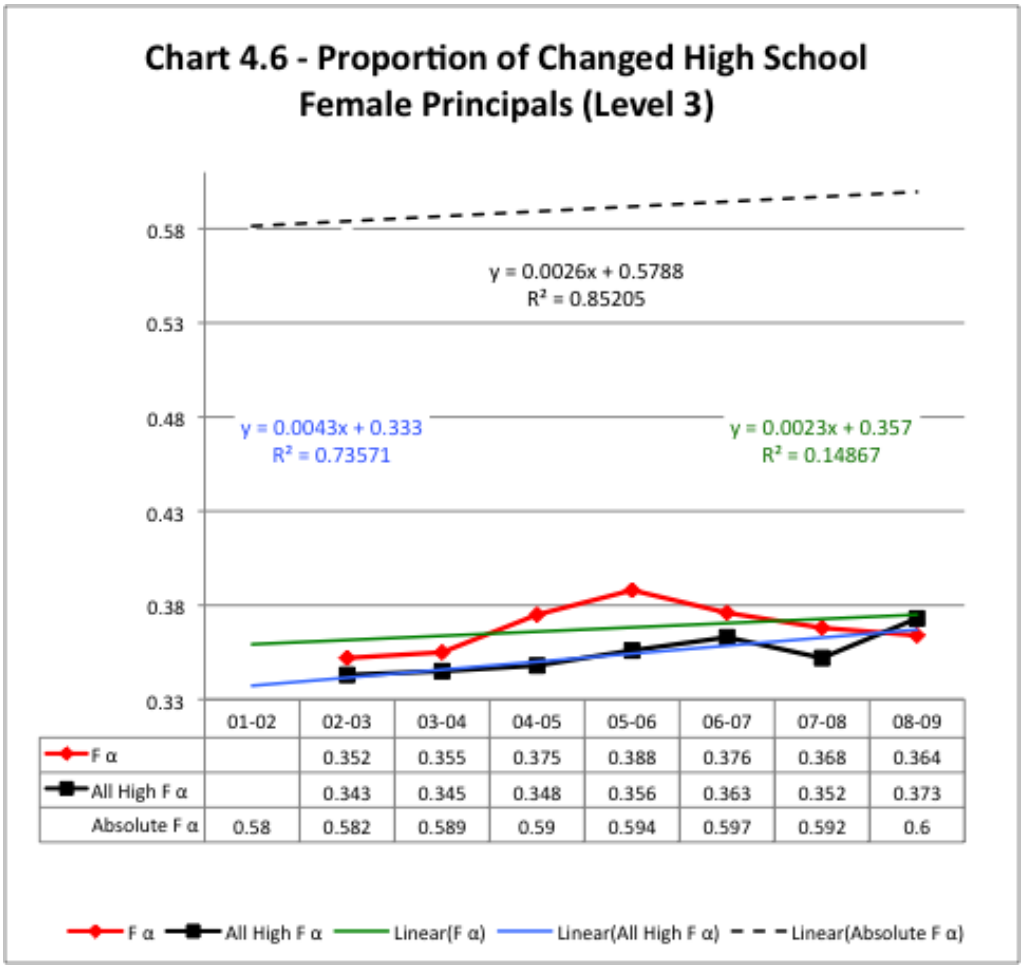
The high school level principalship has long been, and continues to be, controlled by men. However, the analysis shows that women are increasingly gaining positions as principals in high schools. Table 4.7 shows that men continue to be overrepresented at the high school level, while the proportion of women gaining positions increases. Chart 4.6 shows that women gained positions at a higher rate than the overall proportion of all female principals in every year except the last year of the study. While the $R^2$ of the changed female principals is a mere 0.14867, suggesting that being a female accounts for only a proportional gain of .15

of the change in high school principals, the $R^2$ for the overall high school female principals is a robust 0.73571. This suggests that women principals, while continuing to be hired at a lower proportion, retain their positions at a very high rate. The overall proportion of women at the high school level has increased from 0.343 in 2002-03 to 0.373 in 2008-09; women have gained 0.03 proportionally of the high school positions while overall only increasing 0.02 in all positions (see Chart 4.2). This finding shows that women are increasing in the high school principalship at a rate 1.5 times higher than the general increase. Hypothesis H2c states: Women will be increasing the proportion of principals at the high school level. H2c is confirmed.

Table 4.7 - Changed Principals: Gender by High School (Level 3)

| Year | Total High PR | Female High PR | Female Expected High | Female Difference | F α | All High F α | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 244 | 86 | 140.9 | -54.9 | 0.352 | 0.343 | 0.000 |
| 03-04 | 324 | 115 | 191.9 | -76.9 | 0.355 | 0.345 | 0.000 |
| 04-05 | 291 | 109 | 171.7 | -62.7 | 0.375 | 0.348 | 0.000 |
| 05-06 | 258 | 100 | 152.2 | -52.2 | 0.388 | 0.356 | 0.000 |
| 06-07 | 359 | 135 | 209.5 | -74.5 | 0.376 | 0.363 | 0.000 |
| 07-08 | 272 | 100 | 163.3 | -63.3 | 0.368 | 0.352 | 0.000 |
| 08-09 | 365 | 133 | 218.5 | -85.5 | 0.364 | 0.373 | 0.000 |

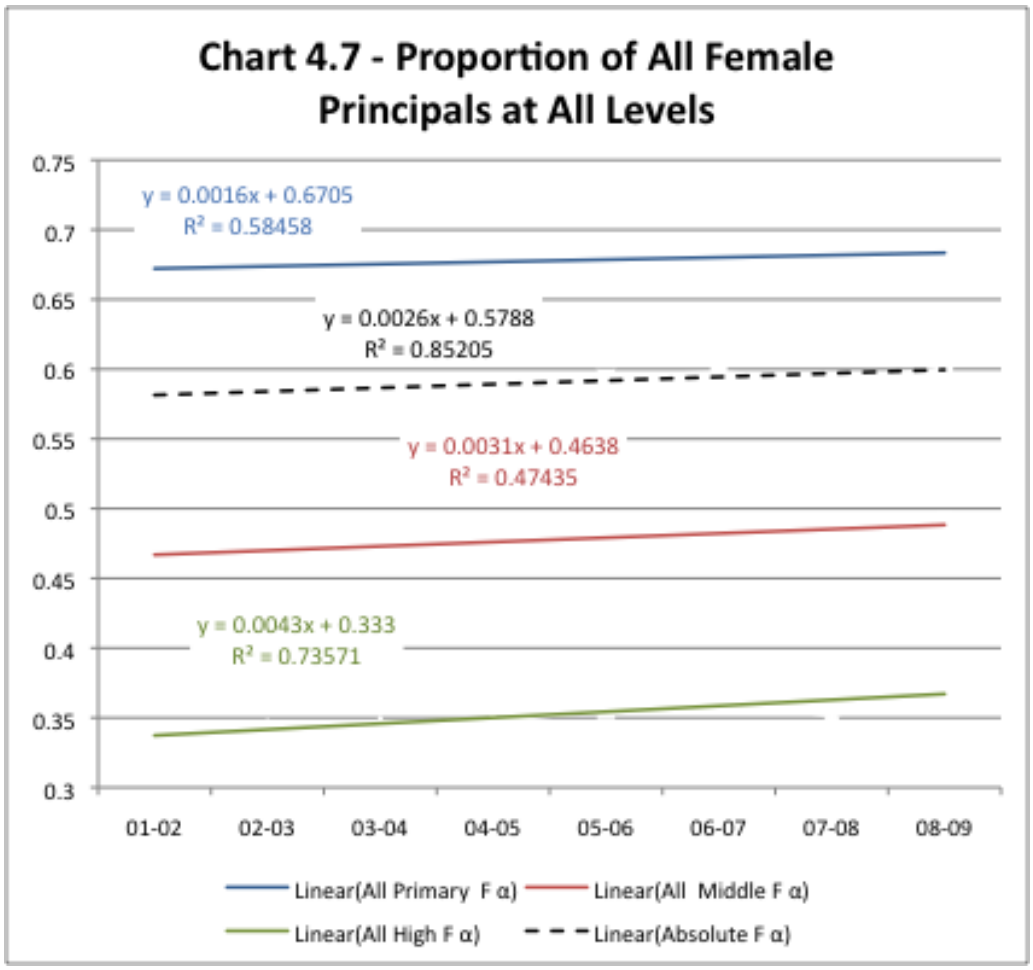
Pink = Overrepresented




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α | | 0.352 | 0.355 | 0.375 | 0.388 | 0.376 | 0.368 | 0.364 |
| All High F α | | 0.343 | 0.345 | 0.348 | 0.356 | 0.363 | 0.352 | 0.373 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

The results of all these analyses show that women are gaining principal positions across all levels of schools. The data verify to be true the H2 overall general level hypothesis that women will increase their proportion at all levels of schools. Chart 4.7 is a visual representation of the proportion of all female principals at all levels. It shows that women are gaining positions in the middle and high schools at the fastest rate, while also continuing to gain at the primary level.

This is exactly the opposite finding one would expect if using sexual politics theory. Chart 4.7 is used again in Chapter V.




Locale

"Locale" describes a school's location ranging from "large city" to "rural". The designation comes from the term 'locale codes' used in the National Center for Educational Statistics' (NCES) Common Core of Data (CCD) classification system

originally developed in the 1980's (nces.ed.gov. 2013). The codes are based on the physical location represented by an address that is matched against a geographic database maintained by the U. S. Census Bureau. As of 2014, the NCES website, www.NCES.org, clearly describes the following eight categories of "locale":

1 - Large City:

A central city of a Census Metropolitan Statistical Area (CMSA) or Metropolitan Statistical Area (MSA), with the city having a population greater than or equal to 250,000.

2 - Mid-size City:

A central city of a CMSA or MSA, with the city having a population less than 250,000.

3 - Urban Fringe of a Large City:

Any territory within a CMSA or MSA of a Large City and defined as urban by the Census Bureau.

4 - Urban Fringe of a Mid-size City:

Any territory within a CMSA or MSA of a Mid-size City and defined as urban by the Census Bureau.

5 - Large Town:

An incorporated place or Census-designated place with a population greater than or equal to 25,000 and located outside a CMSA or MSA.

6 - Small Town:

An incorporated place or Census-designated place with a population less than 25,000 and greater than or equal to 2,500 and located outside a CMSA or MSA.

7 - Rural, Outside MSA:

Any territory designated as rural by the Census Bureau that is outside a CMSA or MSA of a Large or Mid-size City.

8 - Rural, Inside MSA:

Any territory designated as rural by the Census Bureau that is within a CMSA or MSA of a Large or Mid-size City.

The NCES website (www.NCES.org) revised their locale code system in 2005-2006. The old "Metro-centric" system of coding (8 categories) was replaced by the "Urban-centric" system (12 categories, with the numbers designating size being used within the study data). The new coding (see Table 4.8):

11 - City, Large:

Territory inside an urbanized area and inside a principal city with population of 250,000 or more.

12 - City, Midsize:

Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000.

13 - City, Small:

Territory inside an urbanized area and inside a principal city with population less than 100,000.

21 - Suburb, Large:

Territory outside a principal city and inside an urbanized area with population of 250,000 or more.

22 - Suburb, Midsize:

Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000.

23 - Suburb, Small:

Territory outside a principal city and inside an urbanized area with population less than 100,000.

31 - Town, Fringe:

Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area.

32 - Town, Distant:

Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area.

33 - Town, Remote:

Territory inside an urban cluster that is more than 35 miles from an urbanized area.

41 - Rural, Fringe:

Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster.

42 - Rural, Distant:

Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster.

43 - Rural, Remote:

Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.

As this study has data from both the Metro-centric and Urban-centric models, it was necessary to combine the variables into corresponding categories. The NCES offered the following table for combining the categories (see Table 4.8).

Table 4.8 - NCES Corresponding Categories

| Corresponding Categories | Metro-centric | Urban-centric |
|---|---|---|
| City | 1, 2 | 11, 12, 13 |
| Suburb | 3, 4 | 21, 22, 23 |
| Town | 5, 6 | 31, 32, 33 |
| Rural | 7, 8 | 41, 42, 43 |

(NCES, 2014)

However, it was found that combining the locale into only four categories did not give enough detail and lumped the locations into too large of categories. This combining into just four categories does not allow for the difference of the type of city or suburb to be seen. Therefore, this study breaks down the locale variable into six categories, as adapted in similar research such as Hollingworth and Dude (2009), Roser et al. (2009) and Stuckey (2012). This categorizing, called Locale: Mixed Methods, divides the cities and suburbs into smaller categories based on size and allows for a more accurate categorization of locale to identify the role of women in the principalship (See Table 4.9).

Table 4.9 - Mixed Method Categories

| Locale: Mixed Method | Metro-centric | Urban-centric | Frequency: Across All Years | Proportion Average |
|---|---|---|---|---|
| 1 - Large City | 1 | 11 | 11536 | 0.236 |
| 2- Mid/Small City | 2 | 12, 13 | 9911 | 0.203 |
| 3- Large City Suburb | 3 | 21 | 16889 | 0.346 |
| 4- Mid/Small City Suburb | 4 | 22, 23 | 4370 | 0.089 |
| 5- Town | 5, 6 | 31, 32, 33 | 2165 | 0.044 |
| 6- Rural | 7, 8 | 41, 42, 43 | 3976 | 0.081 |

The Pearson Chi-Square test was run for the variable of "Locale" by "Gender" and produced a result of 0.000 for each of the years except for the 2006-07 year, which gave a 0.108. This indicates that the locale and the sex are significantly related. What follows is a detailed analysis of each of the school level variables.

## Large City (Locale 1)

Locale 1, or Large City, is the first variable that shows a decrease in the proportion of female principals from 0.68 in 2002-03 to 0.624 in 2008-09, a decrease of 0.056. As the large city schools are typically seen as undesirable schools, this decrease is actually a positive sign for women in that it shows women are no longer being assigned excessively to undesirable schools, but are returning to a more balanced representation in principalships in other more desirable locales. This decrease is even more significant when one considers that women have

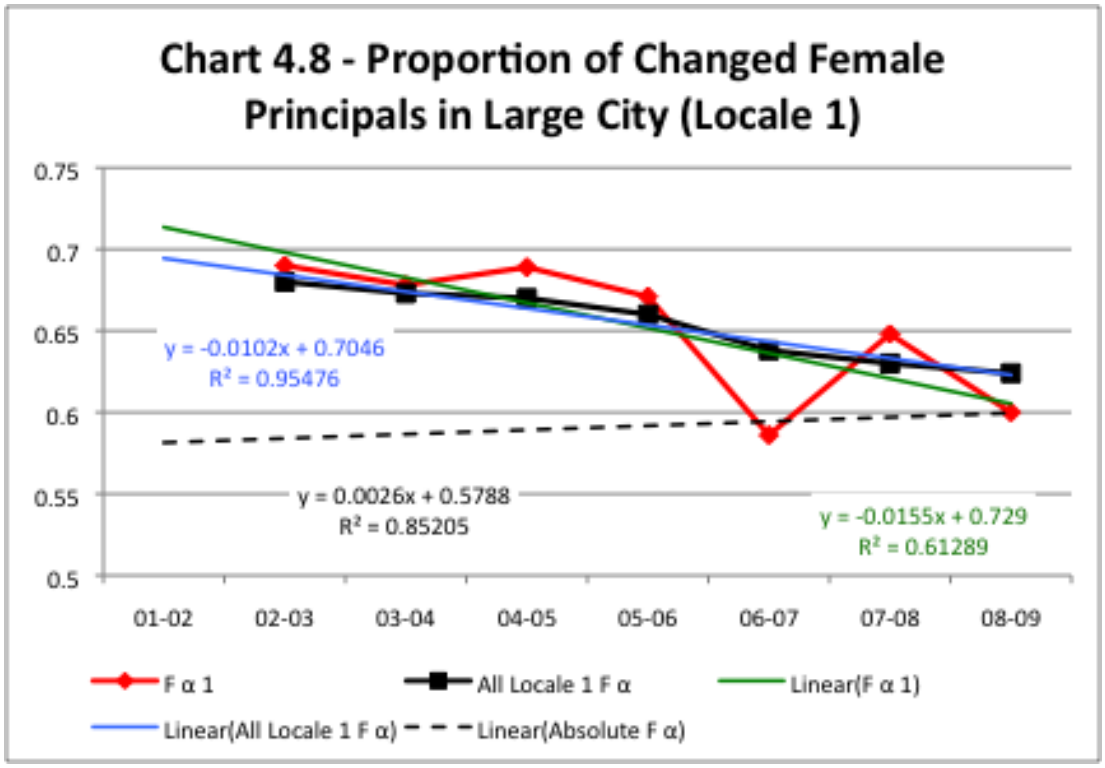
proportionally increased in all levels by 0.02 during the same time period. However, as shown in Table 4.10, the analysis still indicates that women continue to be overrepresented in the large city schools (49.4 individuals in 2002-03 to almost exactly even with the expectation in 2008-09)

Table 4.10 - Changed Principals: Gender by Large City (Locale 1)

| Year | Total CHANGED Locale 1 PR | Female 1 PR | Female Expected 1 | Female Difference | F ø 1 | All Locale 1 F ø | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 439 | 303 | 253.6 | 49.4 | 0.69 | 0.68 | 0.000 |
| 03-04 | 575 | 390 | 340.6 | 49.4 | 0.678 | 0.673 | 0.000 |
| 04-05 | 411 | 283 | 242.5 | 40.5 | 0.689 | 0.67 | 0.000 |
| 05-06 | 389 | 261 | 229.5 | 31.5 | 0.671 | 0.66 | 0.000 |
| 06-07 | 592 | 347 | 345.6 | 1.4 | 0.586 | 0.638 | 0.108 |
| 07-08 | 613 | 397 | 368.6 | 28.4 | 0.648 | 0.63 | 0.000 |
| 08-09 | 583 | 350 | 349.5 | 0.5 | 0.6 | 0.624 | 0.000 |

Pink = Overrepresented

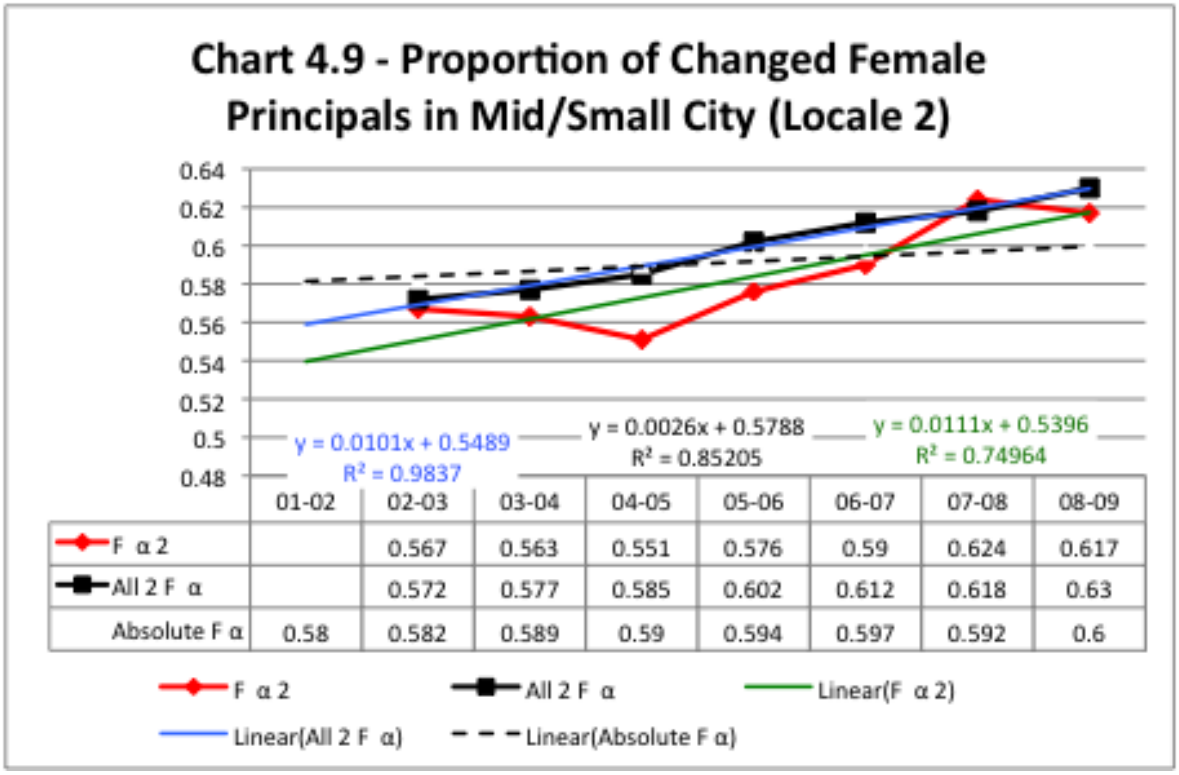
Chart 4.8 visually demonstrates the data for all female principals in locale 1 as well as the changed female principals for locale 1. First, the $R^2$ regression lines for both the changed principals and the overall principals are strong, 0.61289 for the changed and 0.95476 for the all female principals in Locale 1. The strong $R^2$ values indicate that being female accounts for a large proportion of the decrease in the proportion of female principals. Second, the slope of the line for the changed principals show one of the steepest angles found in this study, indicating that women are not only moving out of the large city schools, but that they are doing so at an exceptionally rapid pace. It is therefore concluded that hypothesis H3a, stating that women will lose proportion in large city schools (Locale 1) as they gain proportion in the other locales, is confirmed.




Mid/Small City (Locale 2)

Over the course of the study, women have now become the overrepresented group in the desirable mid/small city schools (see Table 4.11). The proportion of women in these schools went proportionally from 0.572 in 2002-03 to 0.63 in 2008-09, a proportional increase of 0.058. Chart 4.9 shows that the $R^2$ of both the overall women and the changed women in mid/small city schools are very healthy (0.9837 and 0.74964 respectively). The slope of the changed principals is slightly steeper than the overall principals, which suggests that women are still gaining in this area. Hypothesis H3b states: Women will increase in proportion in mid-sized city schools (Locale 2). The data confirms this hypothesis.

| Table 4.11 - Changed Principals: Gender by Mid/Small City (Locale 2) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Locale 2 PR | Female 2 PR | Female Expected 2 | Female Difference | F α 2 | All 2 F α | Pearson Chi-Square |
| 02-03 | 420 | 238 | 242.6 | -4.6 | 0.567 | 0.572 | 0.000 |
| 03-04 | 584 | 329 | 345.9 | -16.9 | 0.563 | 0.577 | 0.000 |
| 04-05 | 396 | 218 | 233.6 | -15.6 | 0.551 | 0.585 | 0.000 |
| 05-06 | 382 | 220 | 225.4 | -5.4 | 0.576 | 0.602 | 0.000 |
| 06-07 | 483 | 285 | 281.9 | 3.1 | 0.59 | 0.612 | 0.108 |
| 07-08 | 457 | 285 | 274.8 | 10.2 | 0.624 | 0.618 | 0.000 |
| 08-09 | 496 | 306 | 297.4 | 8.6 | 0.617 | 0.63 | 0.000 |
| | | | | | Pink = Overrepresented | | |



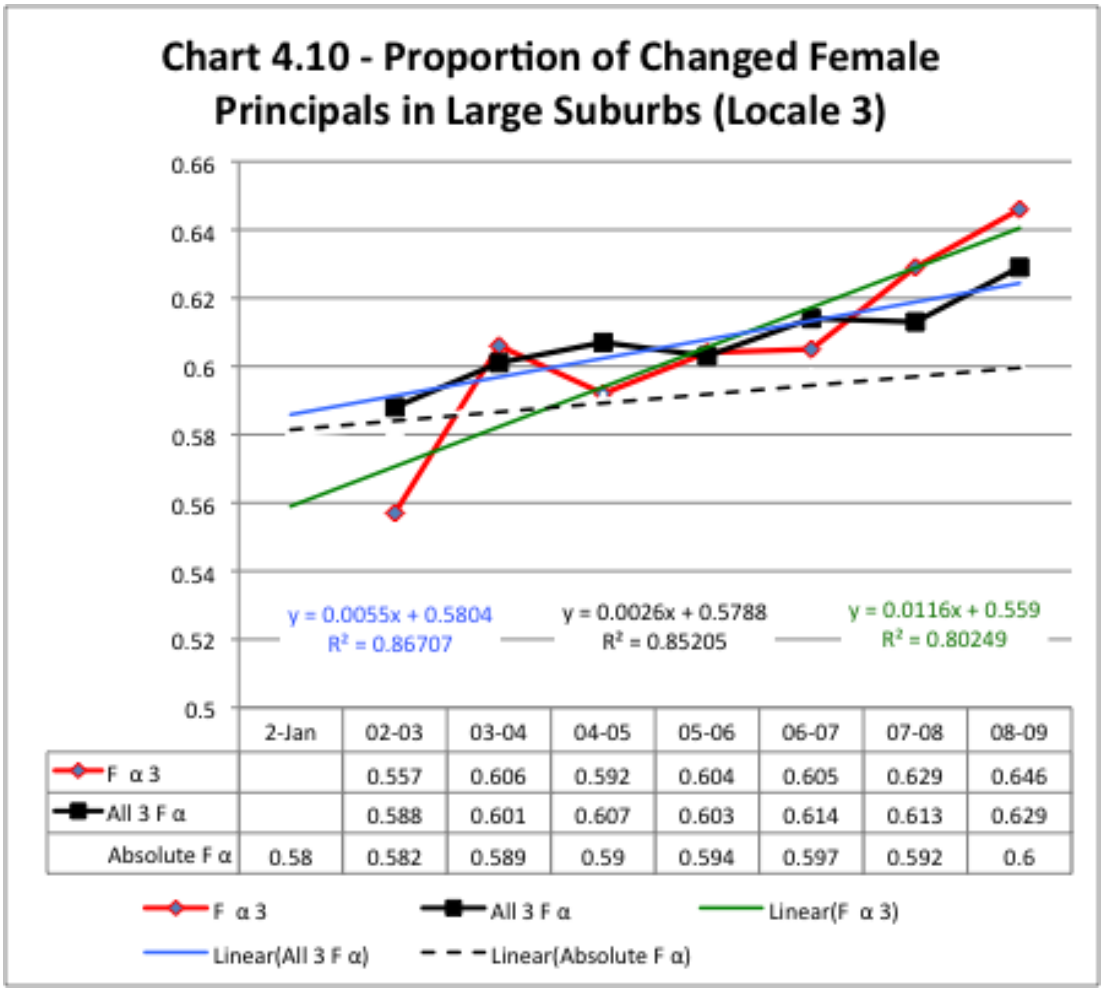
## Large City Suburb (Locale 3)

Table 4.12 shows that the proportion of female principals in the Large City Suburb continues to climb. The proportion goes from 0.588 in 2002-03 to 0.629 in 2008-09. Chart 4.10 shows that the fit line of changed female principals is twice as steep as the line for total female principals, 0.0055, for "all female principals" and the "absolute" line having a slope of 0.0026. This indicates strong growth for women in the large city suburbs. The correlation coefficient, or $R^2$, is very strong for both lines, at respectively 0.86707 and 0.80249. Hypothesis H3c states: Women will increase in proportion in large suburbs schools (Locale 3) and is confirmed by the data.

Table 4.12 - Changed Principals: Gender by Large City Suburb (Locale 3)

| Year | Total CHANGED Locale 3 PR | Female 3 PR | Female Expected 3 | Female Difference | F α 3 | All 3 F α | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 637 | 355 | 367.9 | -12.9 | 0.557 | 0.588 | 0.000 |
| 03-04 | 841 | 510 | 498.2 | 11.8 | 0.606 | 0.601 | 0.000 |
| 04-05 | 679 | 402 | 400.6 | 1.4 | 0.592 | 0.607 | 0.000 |
| 05-06 | 624 | 377 | 368.2 | 8.8 | 0.604 | 0.603 | 0.000 |
| 06-07 | 678 | 410 | 395.8 | 14.2 | 0.605 | 0.614 | 0.108 |
| 07-08 | 663 | 417 | 398.6 | 18.4 | 0.629 | 0.613 | 0.000 |
| 08-09 | 711 | 459 | 426.3 | 32.7 | 0.646 | 0.629 | 0.000 |

Pink = Overrepresented




Mid/Small City Suburb (Locale 4)

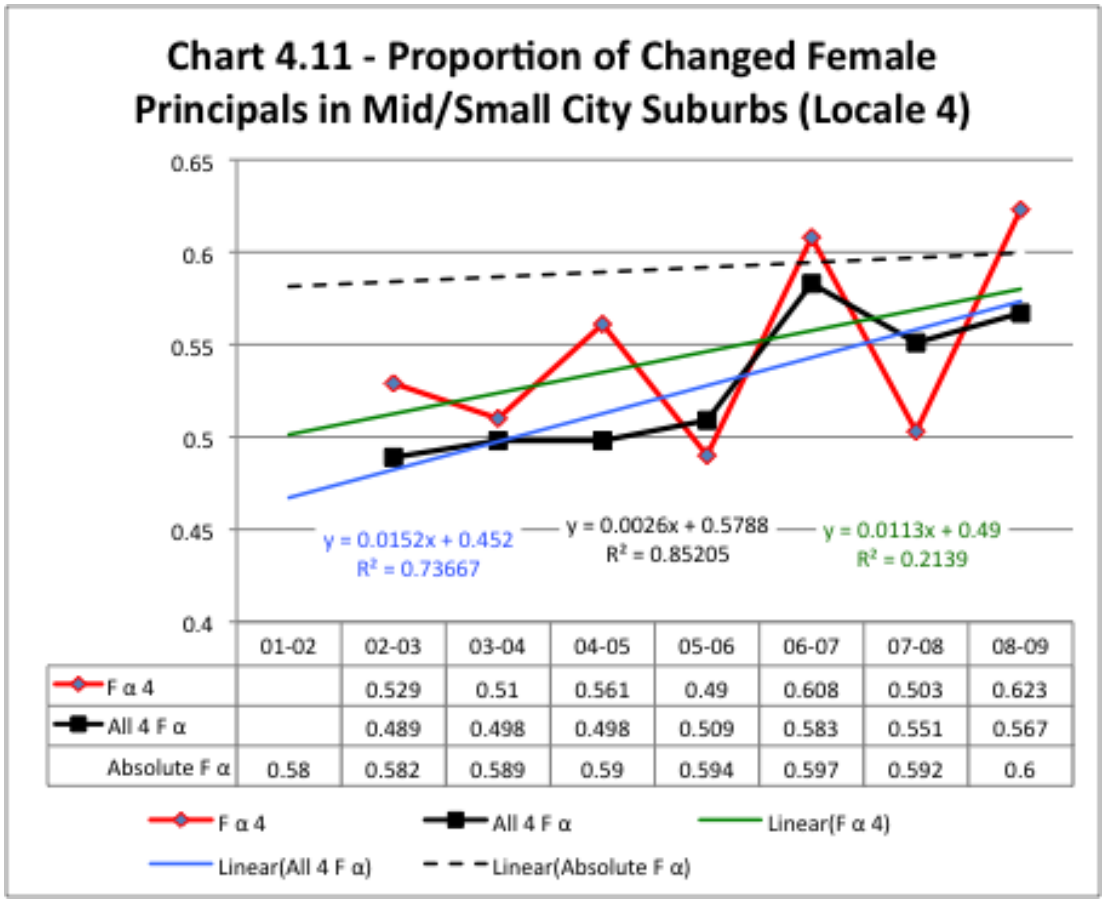
Table 4.13 reveals a very interesting finding for the Mid/Small City. The proportion of changed female principals varies quite a bit, jumping from a low of 0.49 in 2005-06 to a high of 0.623 in 2008-09. The high variation in the changed principal proportion results in the fit line having a low $R^2$ of 0.2139, as seen in Chart 4.11. While the change numbers fluctuate greatly, which is likely due to the smaller sample size, the overall proportion of female principals shows women are gaining

positions in the highly favorable Mid/Small City suburbs. The overall female principals show a strong $R^2$ of 0.73667. Hypothesis H3d states: Women will increase in proportion in mid-sized and small suburbs schools (Locale 4). H3d is confirmed.

Table 4.13 - Changed Principals: Gender by Mid/Small City Suburb (Locale 4)

| Year | Total CHANGED Locale 4 PR | Female 4 PR | Female Expected 4 | Female Difference | F o 4 | All 4 F o | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 172 | 91 | 99.3 | -8.3 | 0.529 | 0.489 | 0.000 |
| 03-04 | 239 | 122 | 141.6 | -19.6 | 0.51 | 0.498 | 0.000 |
| 04-05 | 157 | 88 | 92.6 | -4.6 | 0.561 | 0.498 | 0.000 |
| 05-06 | 145 | 71 | 85.6 | -14.6 | 0.49 | 0.509 | 0.000 |
| 06-07 | 189 | 115 | 110.3 | 4.7 | 0.608 | 0.583 | 0.108 |
| 07-08 | 183 | 92 | 110 | -18 | 0.503 | 0.551 | 0.000 |
| 08-09 | 138 | 86 | 82.7 | 3.3 | 0.623 | 0.567 | 0.000 |

Pink = Overrepresented




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α 4 | | 0.529 | 0.51 | 0.561 | 0.49 | 0.608 | 0.503 | 0.623 |
| All 4 F α | | 0.489 | 0.498 | 0.498 | 0.509 | 0.583 | 0.551 | 0.567 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

## Towns

Towns are the smallest of all the sample sizes in the Locale variable groups used in this study, with 2005-06 only having 19 changed principals. This small sample size would suggest a static group without much movement, yet even in this small group, women are gaining principal positions. Table 4.14 shows that while the small group size variable of changed female principals jumps erratically and also shows that they are still underrepresented, women are gaining ground. The

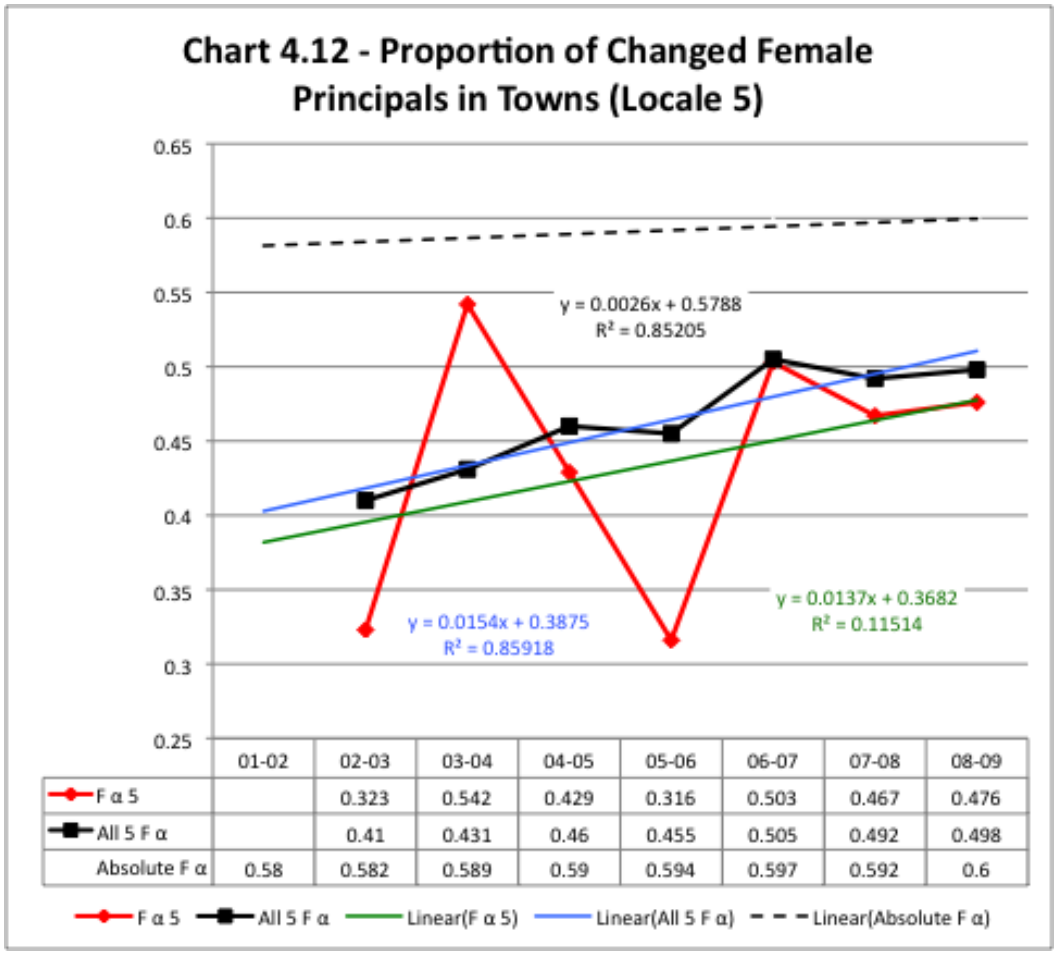
proportion of all female principals in towns goes from 0.41 in 2002-03 to 0.498 in 2008-09, a large proportional increase of 0.088 over the course of the study.

Table 4.14 - Changed Principals: Gender by Towns (Locale 5)

| Year | Total CHANGED Locale 5 PR | Female 5 PR | Female Expected 5 | Female Difference | F σ 5 | All 5 F σ | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 31 | 10 | 17.9 | -7.9 | 0.323 | 0.41 | 0.000 |
| 03-04 | 24 | 13 | 14.2 | -1.2 | 0.542 | 0.431 | 0.000 |
| 04-05 | 21 | 9 | 12.4 | -3.4 | 0.429 | 0.46 | 0.000 |
| 05-06 | 19 | 6 | 11.2 | -5.2 | 0.316 | 0.455 | 0.000 |
| 06-07 | 159 | 80 | 92.8 | -12.8 | 0.503 | 0.505 | 0.108 |
| 07-08 | 165 | 77 | 99.2 | -22.2 | 0.467 | 0.492 | 0.000 |
| 08-09 | 143 | 68 | 85.7 | -17.7 | 0.476 | 0.498 | 0.000 |

Pink = Overrepresented

As would be expected with such small sample sizes, the proportion of changed female principals varies greatly and returns a low $R^2$ of 0.11514 (Chart 4.12). However, the overall proportion of female principals in towns shows a strong $R^2$ of 0.85918. Hypothesis H3e states: Women will increase in proportion in town schools (Locale 5). H3e is confirmed.



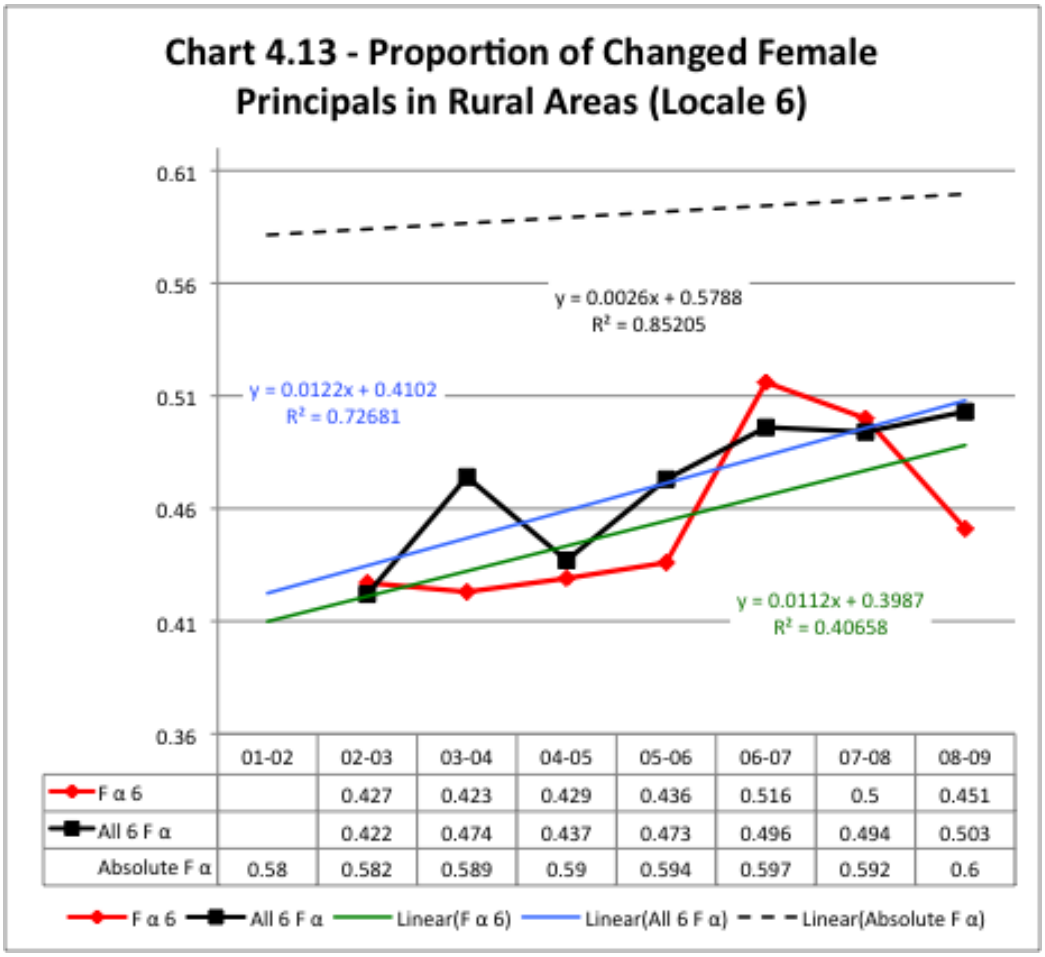

| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α 5 | | 0.323 | 0.542 | 0.429 | 0.316 | 0.503 | 0.467 | 0.476 |
| All 5 F α | | 0.41 | 0.431 | 0.46 | 0.455 | 0.505 | 0.492 | 0.498 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

## Rural

The rural areas have historically been havens for male principals; yet again the analysis confirms the hypothesis and shows that women are gaining ground even in rural areas. Table 4.15 shows that men continue to be overrepresented in the rural areas, but women are increasing their proportion of principal positions, going from 0.422 in 2002-03 to 0.503 in 2008-09. This is an increase of 0.081 and is a growth rate over four times higher than the average growth of all women principals across the entire study.

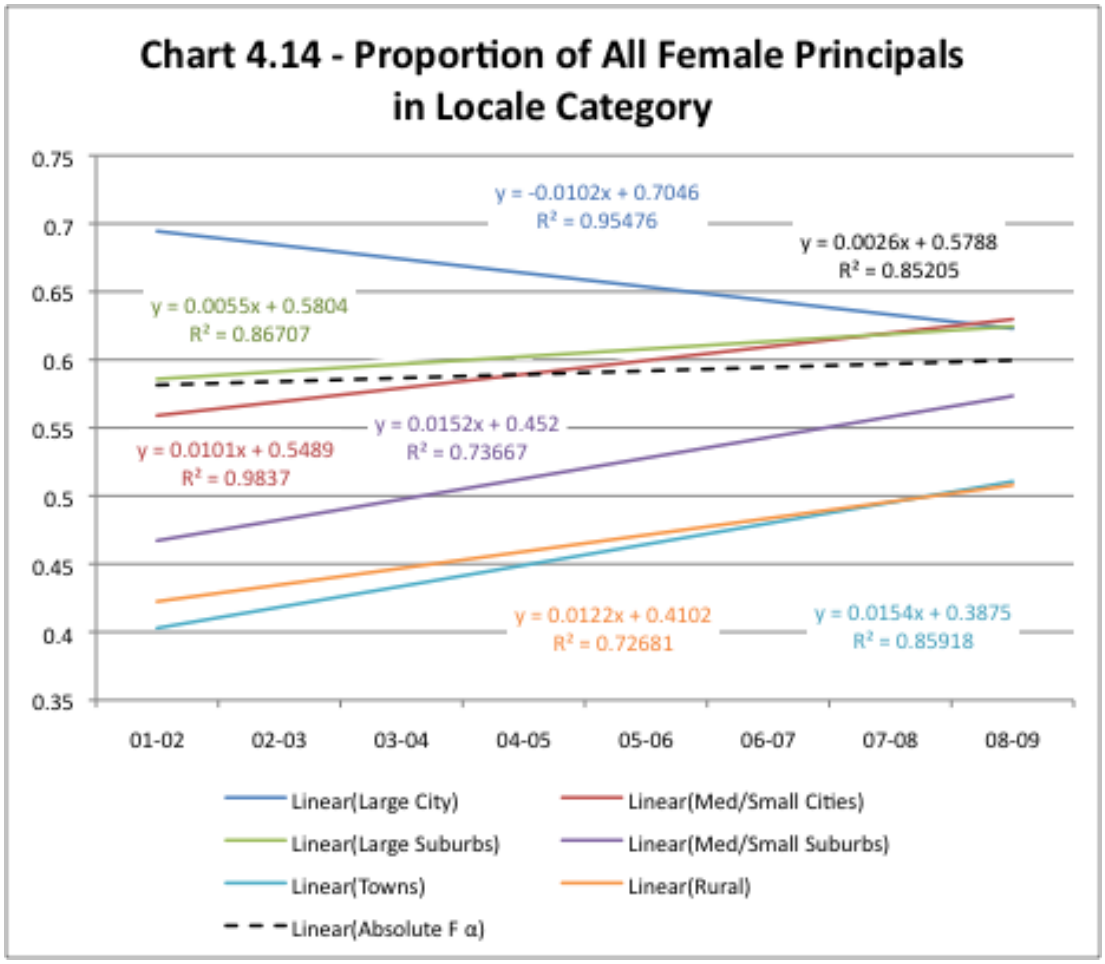
| Table 4.15 - Changed Principals: Gender by Rural (Locale 6) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Locale 6 PR | Female 6 PR | Female Expected 6 | Female Difference | F ⌀ 6 | All 6 F ⌀ | Pearson Chi-Square |
| 02-03 | 89 | 38 | 51.4 | -13.4 | 0.427 | 0.422 | 0.000 |
| 03-04 | 137 | 58 | 81.2 | -23.2 | 0.423 | 0.474 | 0.000 |
| 04-05 | 112 | 48 | 66.1 | -18.1 | 0.429 | 0.437 | 0.000 |
| 05-06 | 94 | 41 | 55.5 | -14.5 | 0.436 | 0.473 | 0.000 |
| 06-07 | 157 | 81 | 91.6 | -10.6 | 0.516 | 0.496 | 0.108 |
| 07-08 | 166 | 83 | 99.8 | -16.8 | 0.5 | 0.494 | 0.000 |
| 08-09 | 184 | 83 | 110.3 | -27.3 | 0.451 | 0.503 | 0.000 |
| | | | | | | Pink = Overrepresented | |

Chart 4.13 shows the increase of women across both the changed principals as well as across the overall women in the rural areas. The $R^2$ for the overall female principals in the rural areas is a strong 0.72681. Hypothesis H3f states: Women will increase in proportion in rural area schools (Locale 6). H3f is confirmed.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α 6 | | 0.427 | 0.423 | 0.429 | 0.436 | 0.516 | 0.5 | 0.451 |
| All 6 F α | | 0.422 | 0.474 | 0.437 | 0.473 | 0.496 | 0.494 | 0.503 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Each area of the Locale variable returns favorable findings for female principals. Females are declining in the large cities, an undesirable school location, while increasing in each of the other five locale categories, all of which are deemed locations that are more desirable. H3 states: Women will gain proportion in favorable schools while losing proportion in less desirable schools. H3 is confirmed. Chart 4.14 is given to allow for a visual overview of the proportion of female principals across all data years and is used again in Chapter V.




Size

School size was divided into four categories based on representing what schools look like, in regards to size, as opposed to attempting to balance out the categories according to proportion of the data. The four size categories are: Small schools (0 to 299 students), Medium-Small schools (300-799 students), Medium-Large schools (800-1299 students), and Large schools (1,300 or more students). Table 4.16 presents a coded breakdown of the number of students, total number of

principals and average percentage of the data each category contains. The last two columns were obtained by combining each of the data years into one master data set, called 2CombinedPR, and then sorting by the size variable.

Table 4.16- Coding of Size Variable

| Total # of Students | Category | Coded | Total # of Principals over All Years | Average % of Data |
|---|---|---|---|---|
| 0-299 | Small | 1 | 5770 | 12.00% |
| 300-799 | Medium-Small | 2 | 28094 | 58.44% |
| 800-1299 | Medium-Large | 3 | 8676 | 18.05% |
| 1300 + | Large | 4 | 5531 | 11.51% |

The Pearson Chi-Square test was run for the variable of "Size" by "Gender" and produced a result of 0.000 for each of the years. This verifies that size and gender are significantly related. A detailed analysis of each of the school level variables follows.

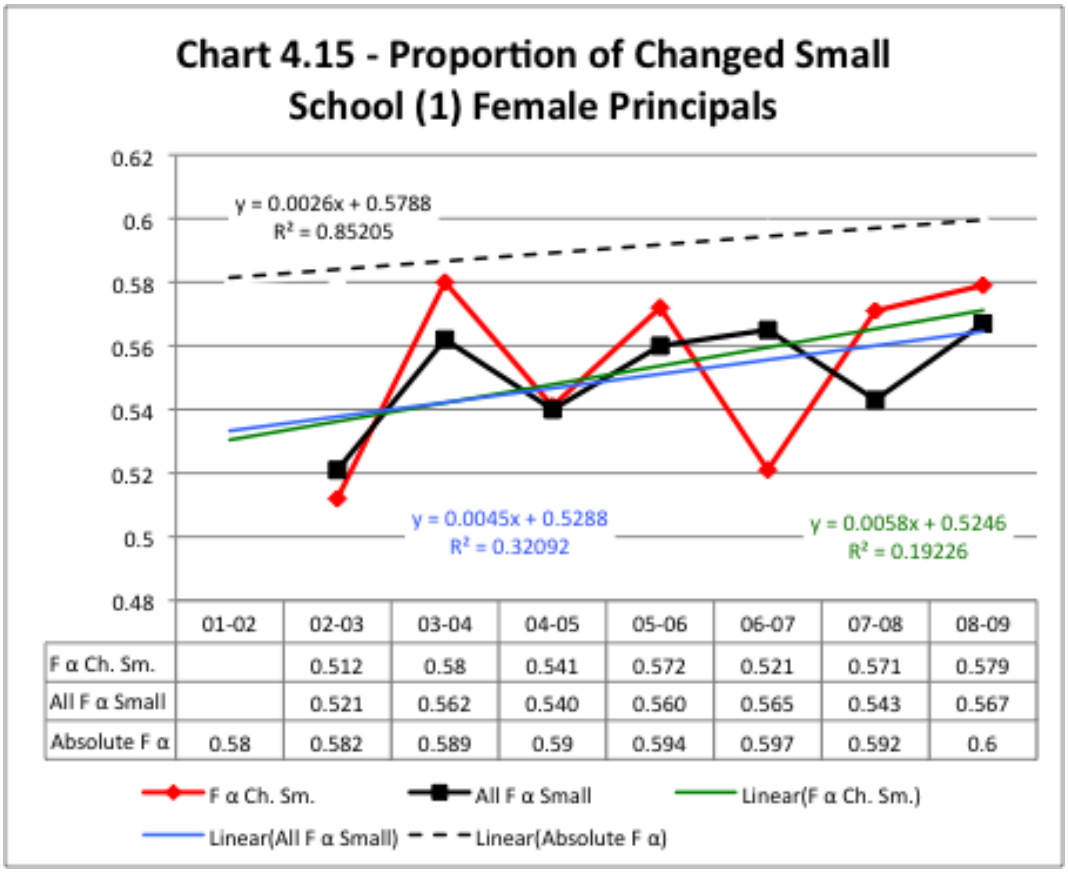
## Small Schools

H4a is confirmed as is demonstrated in Table 4.17. The proportion of female principals in small schools increased from 0.512 in 2002-03 to 0.579 in 2008-09, a proportional increase of 0.067 or three times the rate in the overall proportion of female principals. Nevertheless, females remain underrepresented in the small schools.

Table 4.17 - Changed Principals: Gender by Small Schools (Size 1)

| Year | Total CHANGED Small (1) PR | Female Small PR | Female Expected Small | Female Difference | F σ Ch. Sm. | All F σ Small | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 123 | 63 | 71.2 | -8.2 | 0.512 | 0.521 | 0.000 |
| 03-04 | 231 | 134 | 136.9 | -2.9 | 0.58 | 0.562 | 0.000 |
| 04-05 | 181 | 98 | 106.8 | -8.8 | 0.541 | 0.540 | 0.000 |
| 05-06 | 152 | 87 | 89.7 | -2.7 | 0.572 | 0.560 | 0.000 |
| 06-07 | 263 | 137 | 153.5 | -16.5 | 0.521 | 0.565 | 0.000 |
| 07-08 | 191 | 109 | 115 | -6 | 0.571 | 0.543 | 0.000 |
| 08-09 | 261 | 151 | 156.5 | -5.5 | 0.579 | 0.567 | 0.000 |

Chart 4.15 gives a visual representation of the changed female principals and all female principals in the small schools. Both the changed female small school principals and the overall female small school principals show that female principals are increasing. The proportion of all females goes from 0.521 in 2002-03 to 0.567 in 2008-09, for an increase of 0.046. The slope of the change line is slightly steeper than the overall line. Hypothesis H4a states: Women will increase in the proportion of principals at the small schools (Size 1). The analysis confirms H4a.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Ch. Sm. | | 0.512 | 0.58 | 0.541 | 0.572 | 0.521 | 0.571 | 0.579 |
| All F α Small | | 0.521 | 0.562 | 0.540 | 0.560 | 0.565 | 0.543 | 0.567 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Medium-Small Schools

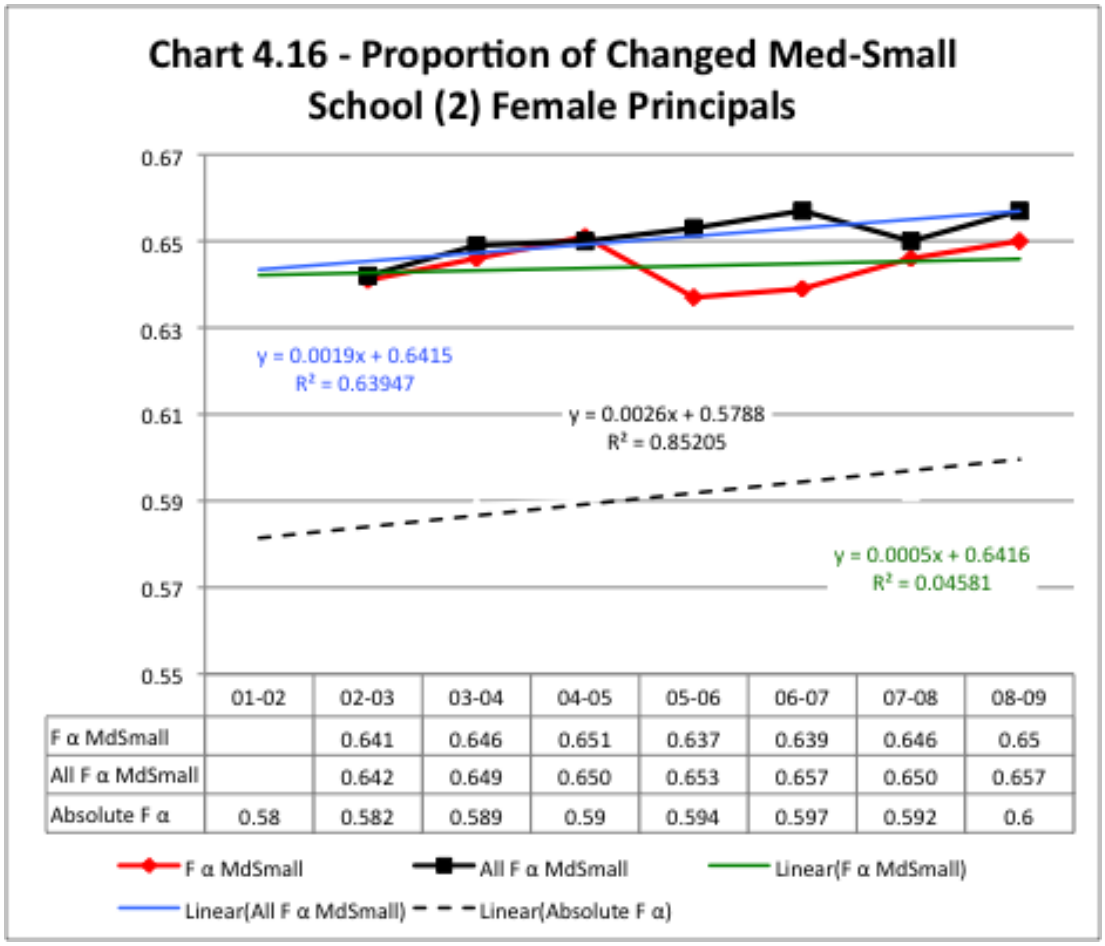
Women hold a strong majority of the principalships in the Medium-Small schools. H4b is confirmed as women continue to increase their hold on this position, proportionally increasing from 0.641 in 2002-03 to 0.65 in 2008-09 (see Table 4.18). While the increase is unexceptional at 0.009 over the study years, and is below the average overall proportion increase of all principals, the increase still indicates an upward trend in female principalships.

Table 4.18 - Changed Principals: Gender by Medium-Small Schools (Size 2)

| Year | Total CHANGED 2 MdSmall PR | Female MdSmall 2l PR | Female Expected MdSmall | Female # Difference | F α MdSmall | All F α MdSmall | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 1062 | 681 | 614.7 | 66.3 | 0.641 | 0.642 | 0.000 |
| 03-04 | 1419 | 917 | 840.8 | 76.2 | 0.646 | 0.649 | 0.000 |
| 04-05 | 1053 | 686 | 621.4 | 64.6 | 0.651 | 0.650 | 0.000 |
| 05-06 | 1016 | 647 | 599.6 | 47.4 | 0.637 | 0.653 | 0.000 |
| 06-07 | 1384 | 884 | 807.8 | 76.2 | 0.639 | 0.657 | 0.000 |
| 07-08 | 1185 | 766 | 713.5 | 52.5 | 0.646 | 0.650 | 0.000 |
| 08-09 | 1456 | 946 | 873 | 73 | 0.65 | 0.657 | 0.000 |

Pink = Overrepresented

Chart 4.16 shows that the changed female principals have remained quite level while experiencing some deviation in proportion. Note that the overall change in proportion is quite low, a swing of only 0.009 between the low year (2005-06) and the high year (2004-05). This returns a very low $R^2$ of just 0.04581, the lowest of the study to this point. However, the proportion for all female medium-small school principals shows a strong $R^2$ of 0.63947. Hypothesis H4b states: Women will increase in the proportion of principals at the medium-small schools (Size 2). H4b is confirmed.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α MdSmall | | 0.641 | 0.646 | 0.651 | 0.637 | 0.639 | 0.646 | 0.65 |
| All F α MdSmall | | 0.642 | 0.649 | 0.650 | 0.653 | 0.657 | 0.650 | 0.657 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

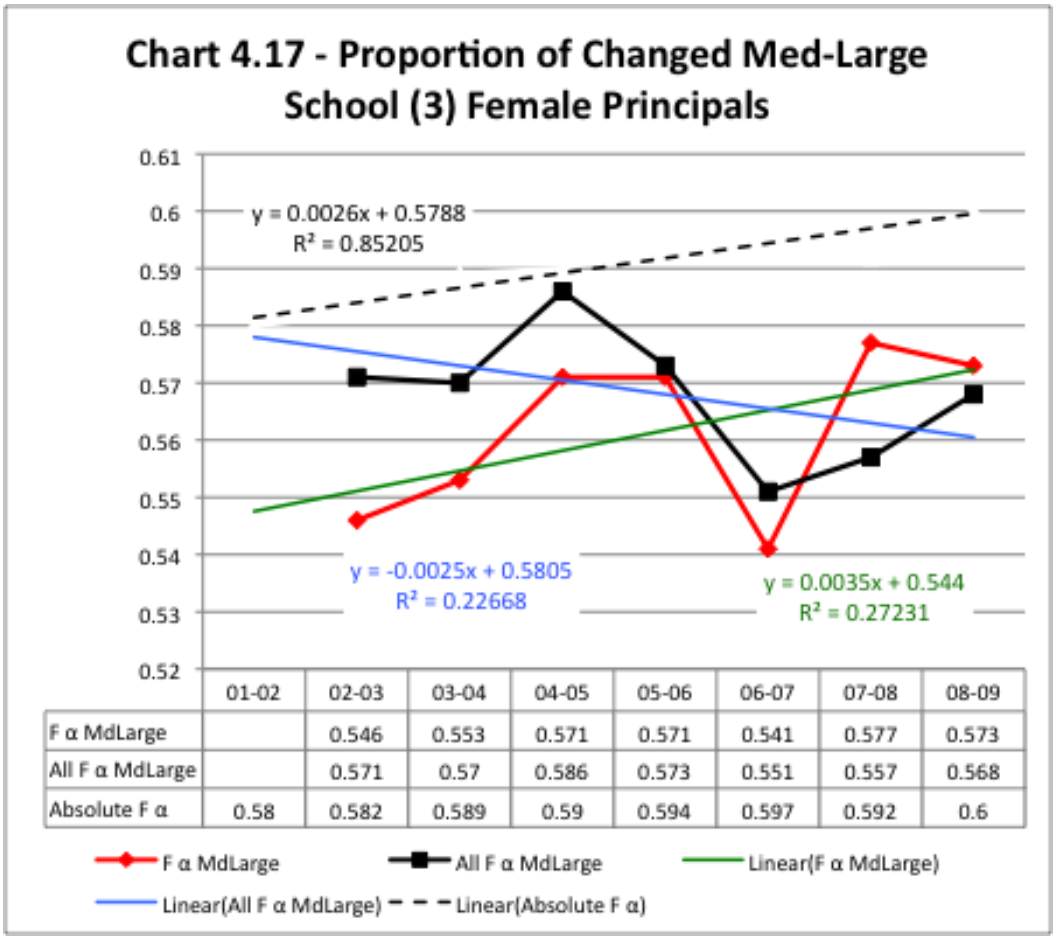
Medium-Large Schools

The analysis reveals something interesting about the medium-large schools; the number of female principals is proportionally declining from 0.571 in 2002-03 to 0.568, with waves of fluctuation within the study years (see Table 4.19). Chart 4.17 shows how the fit lines of the changed female medium-small principals and the overall female medium-school principals cross one another in the 2006-07 school year. At 0.22668 and 0.27231 respectively, neither $R^2$ linear regression lines are strong. While not being the strongest measure, hypothesis H4c, stating that women

will increase in the proportion of principals at the medium-large schools (Size 3) is weakly confirmed, as the changed female medium-large school principalships are increasing.

Table 4.19 - Changed Principals: Gender by Medium-Large Schools (Size 3)

| Year | Total CHANGED MdLarge (3) PR | Female Changed MdLarge PR | Female Expected MdLarge | Female Difference | F α MdLarge | All F α MdLarge | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 368 | 201 | 213 | -12 | 0.546 | 0.571 | 0.000 |
| 03-04 | 481 | 266 | 285 | -19 | 0.553 | 0.57 | 0.000 |
| 04-05 | 303 | 173 | 178.8 | -5.8 | 0.571 | 0.586 | 0.000 |
| 05-06 | 266 | 152 | 157 | -5 | 0.571 | 0.573 | 0.000 |
| 06-07 | 357 | 193 | 208.4 | -15.4 | 0.541 | 0.551 | 0.000 |
| 07-08 | 274 | 158 | 165 | -7 | 0.577 | 0.557 | 0.000 |
| 08-09 | 302 | 173 | 181.1 | -8.1 | 0.573 | 0.568 | 0.000 |




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α MdLarge | | 0.546 | 0.553 | 0.571 | 0.571 | 0.541 | 0.577 | 0.573 |
| All F α MdLarge | | 0.571 | 0.57 | 0.586 | 0.573 | 0.551 | 0.557 | 0.568 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

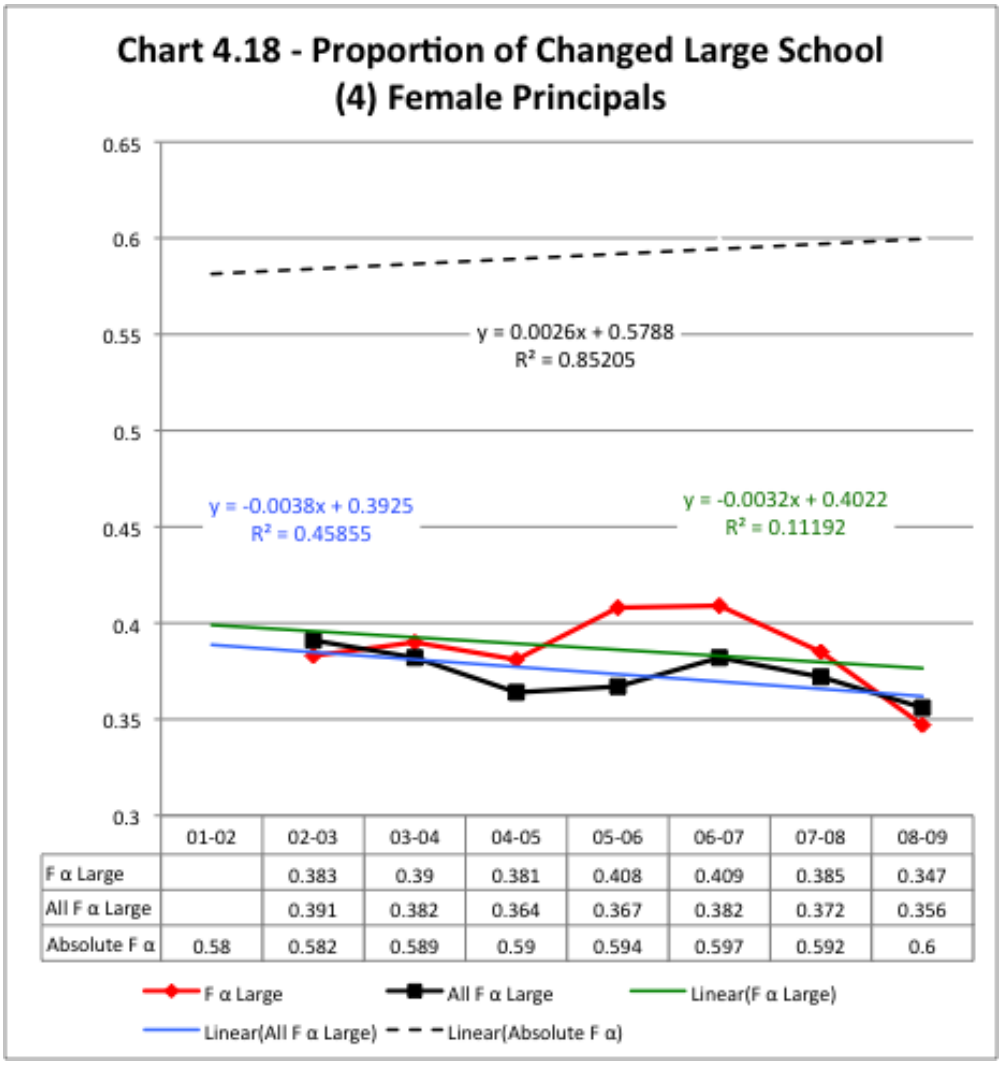
Large Schools

The large schools (with the smallest sample of the size variables), are where the analysis, for the first time in the study, proves the hypothesis incorrect. As can be seen in Table 4.20, female principals are dropping in both the changed and the overall female principalships. The proportion of female overall principals goes from being 0.391 in 2002-03 to 0.356 in 2008-09, a drop of 0.035. Chart 4.18 shows that while the fit line of the changed principals is weak (an $R^2$ of 0.11192), the overall female large school principals is showing an $R^2$ of 0.45855, which indicates that the data fit the regression line at almost a medium of .5. Hypothesis H4d states: Women

will increase in the proportion of principals at the large schools (Size 4). H4d is proven incorrect. This finding would be supported by a sexual politics supposition that sees women being kept out of the large schools.

Table 4.20 - Changed Principals: Gender by Large Schools (Size 4)

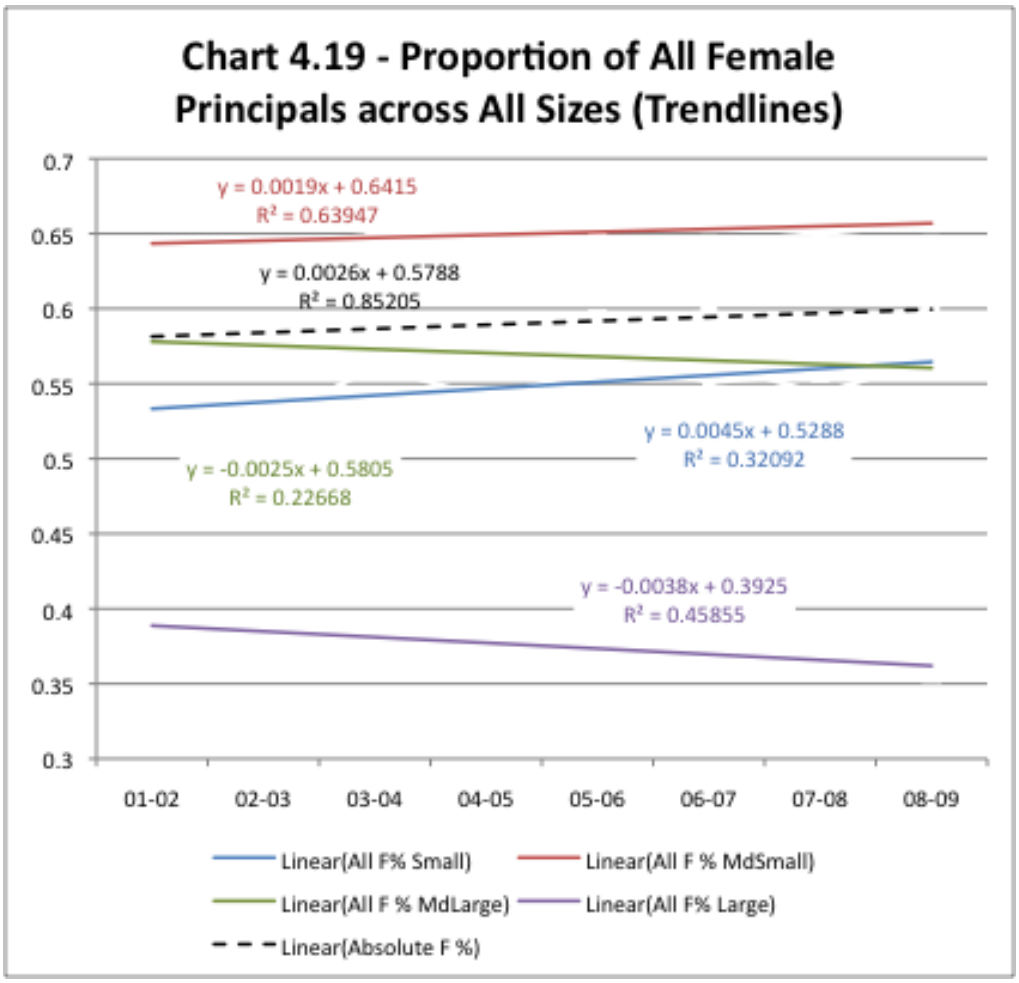
| Year | Total CHANGED Large PR | Female Large PR | Female Expected Large | Female Difference | F o Large | All F o Large | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 235 | 90 | 136 | -46 | 0.383 | 0.391 | 0.000 |
| 03-04 | 269 | 105 | 159.4 | -54.4 | 0.39 | 0.382 | 0.000 |
| 04-05 | 239 | 91 | 141 | -50 | 0.381 | 0.364 | 0.000 |
| 05-06 | 218 | 89 | 128.7 | -39.7 | 0.408 | 0.367 | 0.000 |
| 06-07 | 254 | 104 | 148.3 | -44.3 | 0.409 | 0.382 | 0.000 |
| 07-08 | 182 | 70 | 109.6 | -39.6 | 0.385 | 0.372 | 0.000 |
| 08-09 | 236 | 82 | 141.5 | -59.5 | 0.347 | 0.356 | 0.000 |




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Large | | 0.383 | 0.39 | 0.381 | 0.408 | 0.409 | 0.385 | 0.347 |
| All F α Large | | 0.391 | 0.382 | 0.364 | 0.367 | 0.382 | 0.372 | 0.356 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Two of the four size variables indicate that females are gaining positions as principals. The two declining slopes come in the largest sized schools, which are deemed the less desirable institutions. The small and medium-small schools make up over 70% (see Table 4.16) of the data in this variable group and both show female principalships are increasing in these favorable school sizes (Chart 4.19). While women are declining in the largest schools, the overall outlook of H4 (that

women will increase in the proportion of principals across all school sizes) is confirmed. This chart is used again in Chapter V.




Free and Reduced Lunch Students (Economy)

The National School Lunch Program is a federally assisted meal program operating in public and private schools. It provides nutritionally balanced, low-cost or free lunches to children each school day. The program was established under the

National School Lunch Act, signed by President Harry Truman in 1946 (http://www.fns.usda.gov, 2014). The second economic variable examined in this study is called "economy" and is created by taking the number of students receiving free or reduced lunches, the "FreeandReducedLunchSchool" variable, and dividing it by the number of "total students" in the school. This results in a proportion between 0 and 1. The higher the proportion, the more students the school has that are receiving free or reduced lunch from the state.

The "economy" variable was broken down into three categories: "Poor", schools that had a proportion at 0.6667 or higher; "Middle", schools that had between 0.3334 to 0.6666 proportion of students on the free or reduced lunch program; and "Rich", schools that had a proportion equal to or lower than 0.3333.

Table 4.25 has a coded breakdown of the economy variable, total number of principals per status, and average percentage of the data each category contains, as this percentage number is an average, the percentage will not come out to exactly 100%. The last two columns were obtained by combining each of the data years into one master data set, called 2CombinedPR, and then sorting by the status.

Table 4.25 - Economy Variable

| Economy Variable | Coded | Frequency: All Years of Study Combined | Average Percentage |
|---|---|---|---|
| Poor | 1 | 18095 | 37.0 |
| Middle | 2 | 14160 | 29.0 |
| Rich | 3 | 15018 | 30.7 |

Table 4.26 is a breakdown of the Pearson Chi-Squared test results for each of the study years. Two years, 2003-04 and 2004-05, are the only data that had results lower than the conventional criteria for statistical significance of 0.01 or 0.005; meaning that the "Economy" variable is not significantly related to gender. What follows is a detailed analysis of each of the status variables.

Table 4.26 - Pearson Chi-Square Results for Each Year for Economy by Gender

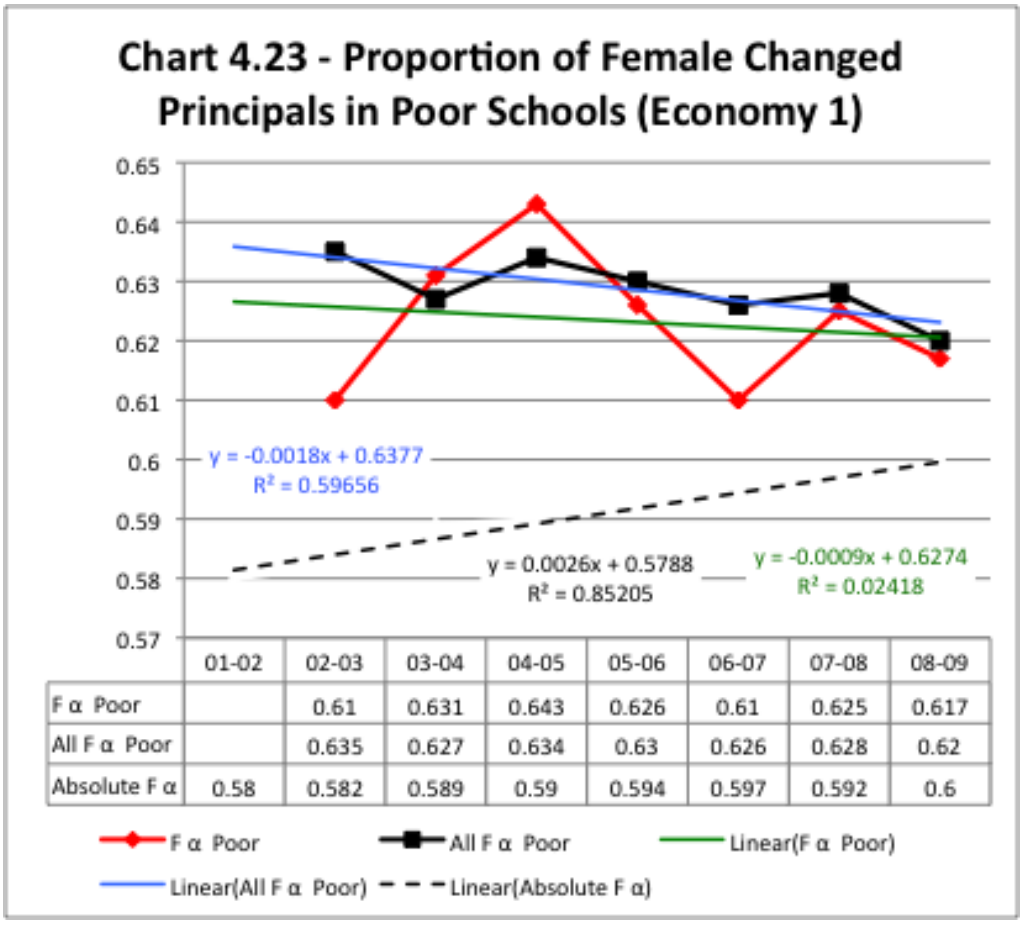
| Year | Pearson Chi-Square |
|---|---|
| 02-03 | 0.15 |
| 03-04 | 0.007 |
| 04-05 | 0.003 |
| 05-06 | 0.075 |
| 06-07 | 0.041 |
| 07-08 | 0.186 |
| 08-09 | 0.257 |

Poor Schools (Economy 1)

The Table 4.27 data demonstrate that women are overrepresented in poor schools. However, the overall proportion of female principals in the poor schools has gone from 0.635 in 2002-03 to 0.62 in 2008-09, a decline of 0.015. Further, the Pearson chi-square for each of the years shows that there is not a significant relationship between gender and the economy level.

| Table 4.27 - Changed Principals: Gender by Poor School (Economy 1) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Poor (1) PR | Female Poor PR | Female Expected Poor | Female Difference | F α Poor | All F α Poor | Pearson Chi-Square |
| 02-03 | 633 | 386 | 366.6 | 19.4 | 0.61 | 0.635 | 0.15 |
| 03-04 | 890 | 562 | 527.2 | 34.8 | 0.631 | 0.627 | 0.007 |
| 04-05 | 625 | 402 | 368.9 | 33.1 | 0.643 | 0.634 | 0.003 |
| 05-06 | 572 | 358 | 337.6 | 20.4 | 0.626 | 0.63 | 0.075 |
| 06-07 | 906 | 553 | 529.5 | 23.5 | 0.61 | 0.626 | 0.041 |
| 07-08 | 776 | 485 | 467.7 | 17.3 | 0.625 | 0.628 | 0.186 |
| 08-09 | 979 | 604 | 585 | 19 | 0.617 | 0.62 | 0.257 |
| | | | | | | Pink = Overrepresented | |

Chart 4.23 shows that the proportion of all female principals in the poor schools is declining, while the $R^2$ of 0.59656 shows that the trend is reasonably strong. The analysis shows that while women remain overrepresented in the poor schools, the overall proportion is beginning to mirror the overall proportion of women in the principalship. Therefore, hypothesis H5a, which states: Women will maintain or lose proportion in the less favorable poor schools, is confirmed.



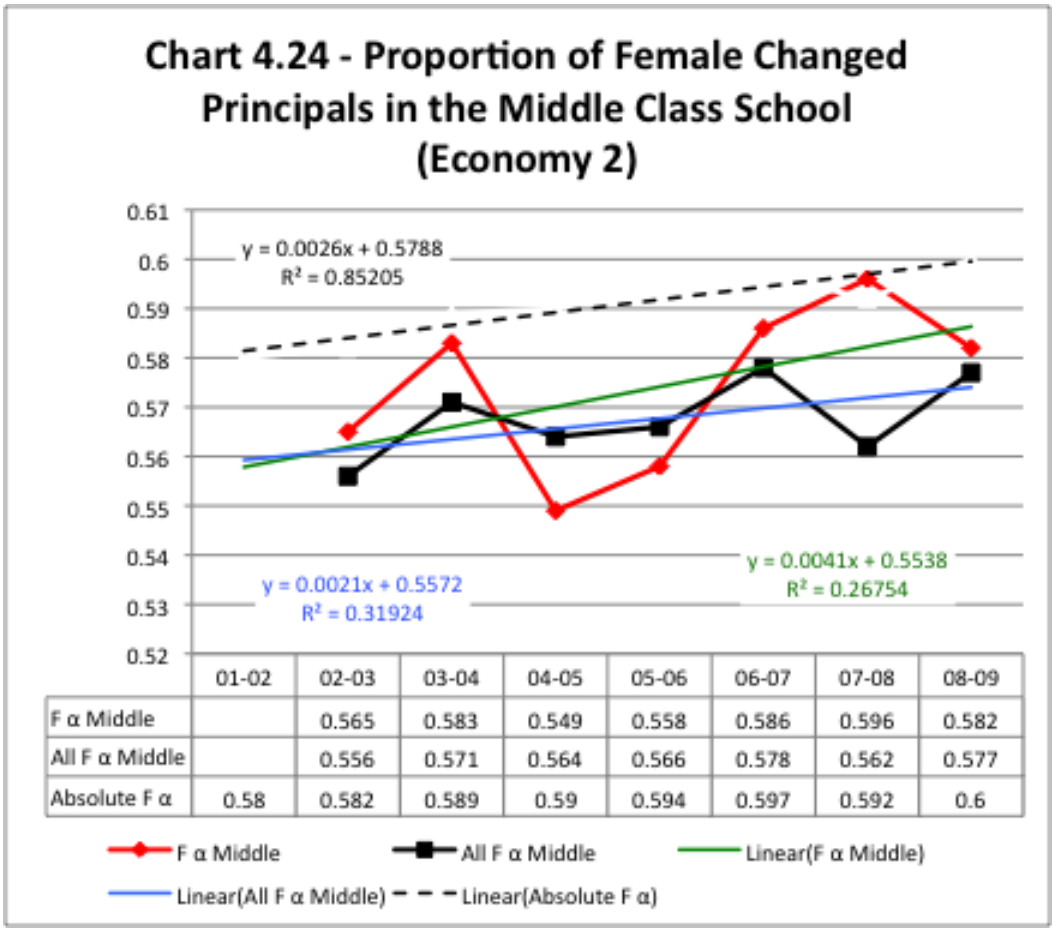

| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Poor | | 0.61 | 0.631 | 0.643 | 0.626 | 0.61 | 0.625 | 0.617 |
| All F α Poor | | 0.635 | 0.627 | 0.634 | 0.63 | 0.626 | 0.628 | 0.62 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Middle Class Schools (Economy 2)

The second category within the Economy variable is the "Middle Class". Table 4.28 shows the results of the analysis at the middle class level. Women hold the majority of principal positions at the middle class. That majority is growing, improving proportionally from a low of 0.556 in 2002-03 to 0.577 in 2008-09, an increase of 0.021. Again, with mixed results of the Pearson Chi-square test of reliability, the results do not suggest there is a significant relationship between "gender" and "Economy 2".

| Table 4.28 - Changed Principals: Gender by Middle Class School (Economy 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Middle (2) PR | Female Middle PR | Female Expected Middle | Female Difference | F a Middle | All F a Middle | Pearson Chi-Square |
| 02-03 | 540 | 305 | 312.8 | -7.8 | 0.565 | 0.56 | 0.15 |
| 03-04 | 712 | 415 | 421.7 | -6.7 | 0.583 | 0.57 | 0.007 |
| 04-05 | 521 | 285 | 307.5 | -22.5 | 0.549 | 0.56 | 0.003 |
| 05-06 | 457 | 255 | 269.7 | -14.7 | 0.558 | 0.57 | 0.075 |
| 06-07 | 695 | 407 | 406.2 | 0.8 | 0.586 | 0.58 | 0.041 |
| 07-08 | 552 | 329 | 332.7 | -3.7 | 0.596 | 0.56 | 0.186 |
| 08-09 | 651 | 379 | 389 | -10 | 0.582 | 0.58 | 0.257 |
| | | | | | | Pink = Overrepresented | |

Chart 4.24 is a visual representation of the changing relationship of female principals in the middle class schools. While both the overall and changed $R^2$ are modest (respectively 0.31924 and 0.26754), the overall trend points to women gaining a larger proportion in the middle class schools. Hypothesis H5b states: Women will increase or maintain their proportion in the somewhat favorable middle class schools. H5b is confirmed.



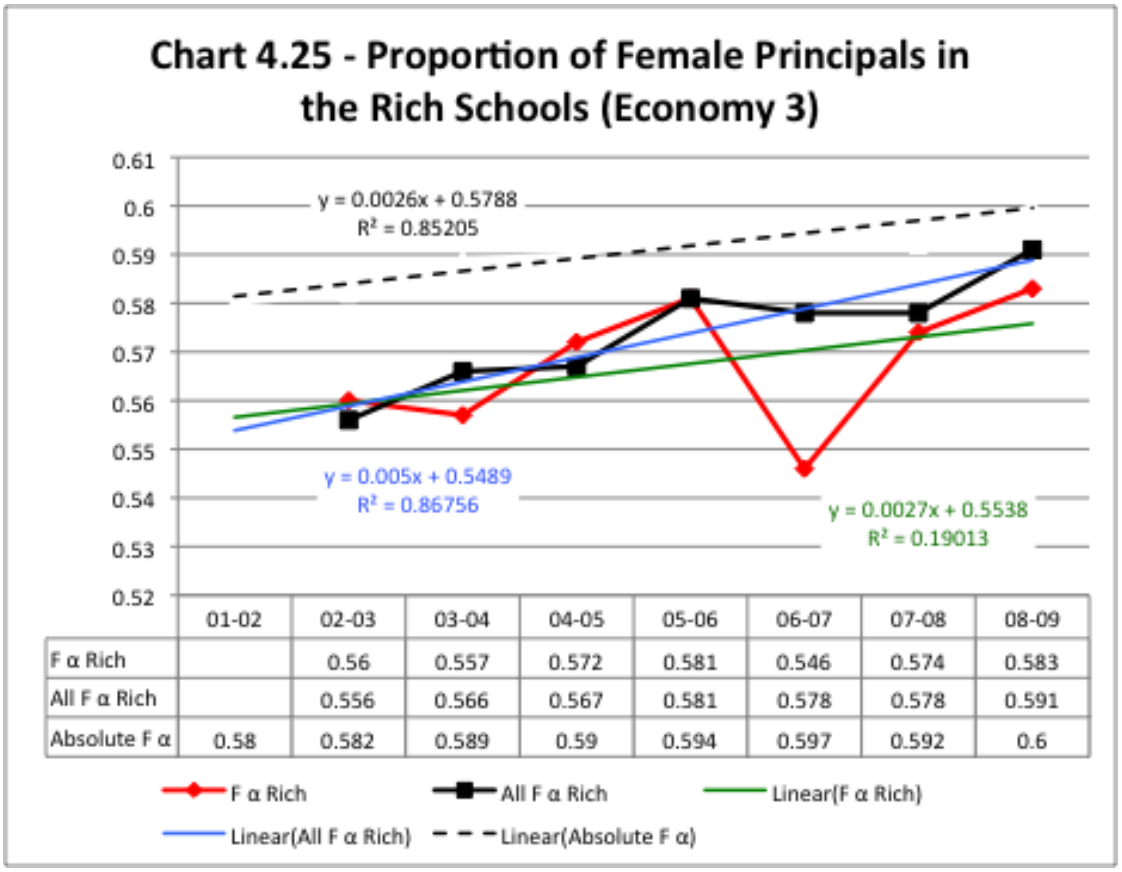

| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Middle | | 0.565 | 0.583 | 0.549 | 0.558 | 0.586 | 0.596 | 0.582 |
| All F α Middle | | 0.556 | 0.571 | 0.564 | 0.566 | 0.578 | 0.562 | 0.577 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Rich Schools (Economy 3)

The last of the three categories within the "economy" variable is the Rich schools. Table 4.29 shows that women are underrepresented in the "Rich" schools, though they are gaining in proportion over the study years. The overall proportion of females within rich school principalships goes from 0.556 in 2002-03 to 0.591 in 2008-09, an increase of 0.035 that well out performs the overall average of 0.002 across all principals.

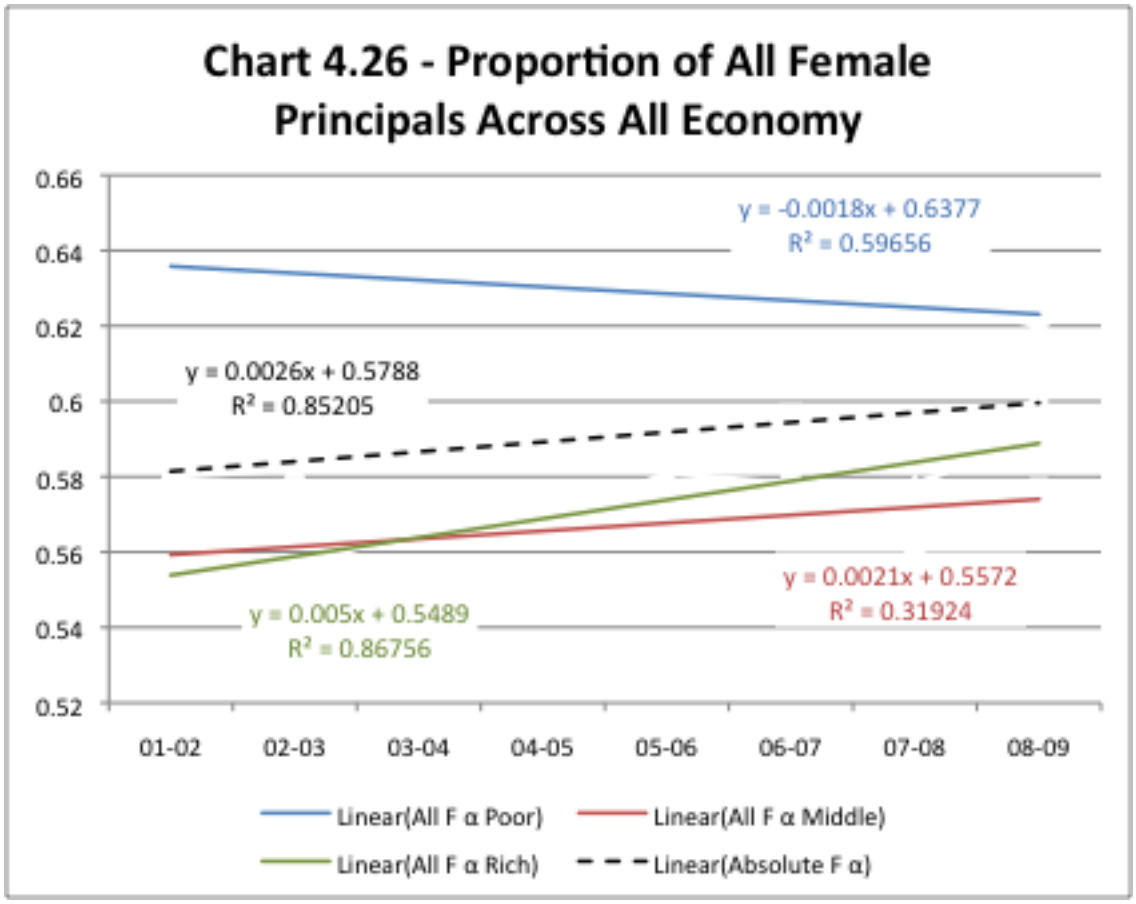
| Table 4.29 - Changed Principals: Gender by Rich School (Economy 3) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Rich (3) PR | Female Rich PR | Female Expected Rich | Female Difference | F α Rich | All F α Rich | Pearson Chi-Square |
| 02-03 | 614 | 344 | 355.6 | -11.6 | 0.56 | 0.556 | 0.15 |
| 03-04 | 797 | 444 | 472.1 | -28.1 | 0.557 | 0.566 | 0.007 |
| 04-05 | 628 | 359 | 370.6 | -11.6 | 0.572 | 0.567 | 0.003 |
| 05-06 | 623 | 362 | 367.7 | -5.7 | 0.581 | 0.581 | 0.075 |
| 06-07 | 632 | 345 | 369.4 | -24.4 | 0.546 | 0.578 | 0.041 |
| 07-08 | 474 | 272 | 285.7 | -13.7 | 0.574 | 0.578 | 0.186 |
| 08-09 | 609 | 355 | 363.9 | -8.9 | 0.583 | 0.591 | 0.257 |

Chart 4.25 visually represents the increase that female principals have experienced in the principal position over the study years. The $R^2$ of the overall females in the principalship in the rich schools is 0.86756 and shows the slope to be 0.005, the steepest of all three of the categories in the economy variable. Hypothesis H5c states: Women will increase in the proportion of principalships in the rich schools. H5c is confirmed.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Rich | | 0.56 | 0.557 | 0.572 | 0.581 | 0.546 | 0.574 | 0.583 |
| All F α Rich | | 0.556 | 0.566 | 0.567 | 0.581 | 0.578 | 0.578 | 0.591 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Chart 4.26 is a visual representation of all the "economy" categories of schools for "all female principals". It is clear that women are gaining in the favorable schools while falling more in line with the absolute proportion in the poor schools. This finding supports and confirms H5, that women will gain proportion of principals in the more favorable economy schools. Sexual politics theory would predict the opposite of these findings. Chart 4.26 is used further in Chapter V.




Academic Performance Index Scores (API)

The Academic Performance Index (API) is the cornerstone of California's *Public Schools Accountability Act of 1999* (CDE, 2014). The API measures the academic performance and growth of schools on a variety of academic measures and reports the school's score as a base score on a 200 to 1,000 point scale. The score comes from test results on the Standardized Testing and Reporting (STAR) Program, the California High School Exit Examination (CAHSEE), and the California Alternate Performance Assessment (CAPA). A school's score or placement on the

API is an indicator of the school's performance level. The statewide API performance target for all schools is 800. A school's growth is measured by how well the school is moving toward or past that goal.

For the Base API Report, schools receive a Base API score, which includes statewide ranking among similar schools plus growth targets. A school's API score is ranked as one of ten categories (deciles). A ranking in the first decile is the lowest rank while a ranking in the tenth decile is the highest. The statewide ranking compares a school's API with those of all schools of the same type statewide (i.e., elementary, middle, or high schools). The similar schools ranking compares a school's API with those of 100 other schools of the same type (i.e., elementary, middle, or high schools) and with similar challenges.

For this study, the statewide ranking was combined into three API categories: "Low" performing, made up of deciles 1-3; "Medium" performing, made up of deciles 4-7; and "High" performing, made up of deciles 8-10. Table 4.30 has a coded breakdown of the API variables, total number of principals per rank, and average percentage of the data each category contains. The last two columns were obtained by combining each of the data years into one master data set, called 2CombinedPR, and then sorting by the rank.

| Table 4.30 - API Ranks | | | |
|---|---|---|---|
| Rank | Code | Frequency: All Years of the Study | Percentage |
| Low | 1 | 13696 | 28.0 |
| Medium | 2 | 17651 | 36.1 |
| High | 3 | 13506 | 27.6 |
| Missing | 9 | 3994 | 8.2 |

For all of the study years, not a single Pearson Chi-Squared returned a significant finding. Also, the statistical analysis does not demonstrate a significant connection between API scores and gender; however, from the trend lines in the data, the relationship with gender can still be observed. Table 4.31 is a breakdown of the Pearson Chi-Squared test results for each study year. What follows is a detailed analysis of each of the status variables.

| Chart 4.31- Pearson Chi-Square Results for Each Year of API by Gender | |
|---|---|
| Year | Pearson Chi-Square |
| 02-03 | 0.609 |
| 03-04 | 0.434 |
| 04-05 | 0.945 |
| 05-06 | 0.505 |
| 06-07 | 0.614 |
| 07-08 | 0.725 |
| 08-09 | 0.203 |

Low Performing Schools (API 1)

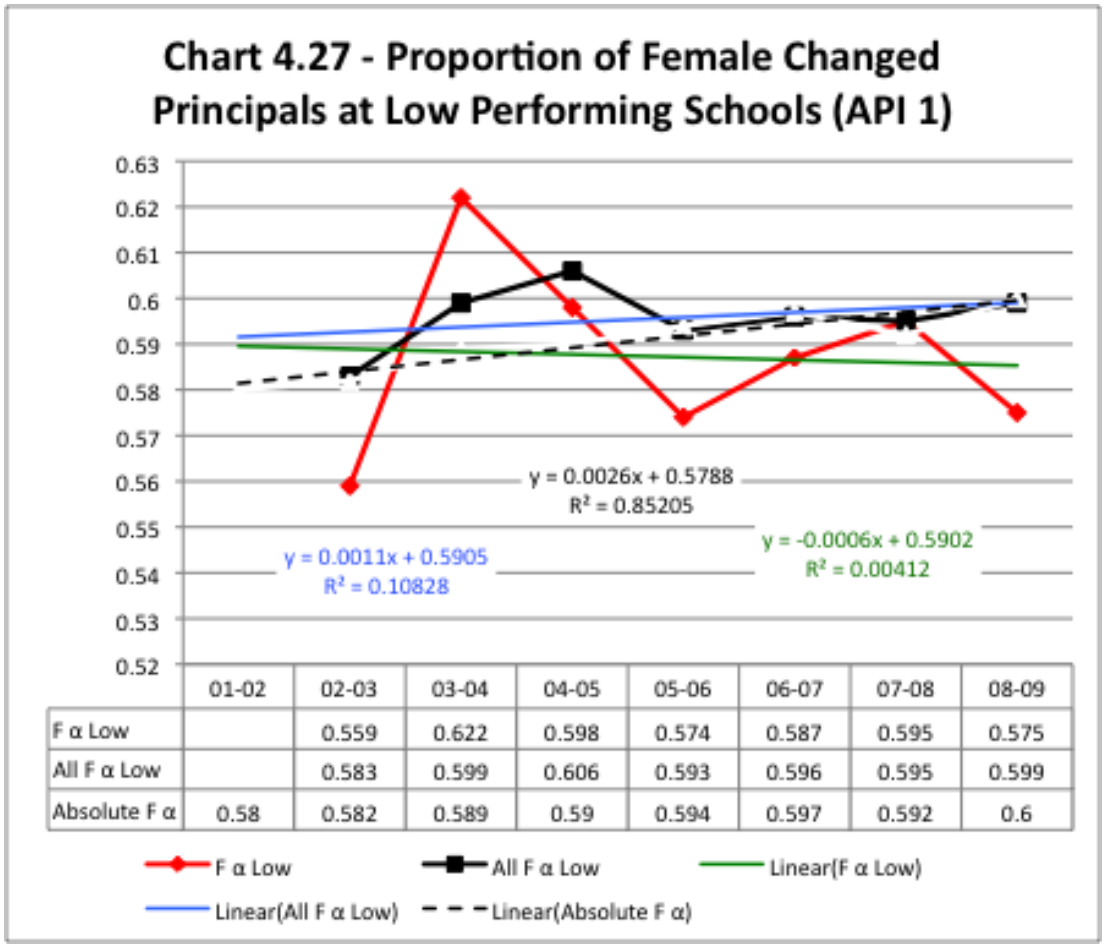
Table 4.32 shows that women are under-represented in five of the seven years of the study and that the "all female proportion in low performing" schools proportion changed from 0.583 in 2002-03 to 0.599 in 2008-09. Chart 4.27 visually

reveals that while the all proportion number is increasing, it is not keeping pace with the overall increase in female principals across the study years (the absolute female proportion). While both the $R^2$ of the "all" principals and the "changed" principals show that the model is not a good predictor of the change, both regressions are incredibly low. This clearly demonstrates that females are not being relegated to the poor schools. Hypothesis H6a states that women will maintain or lose proportion in the low performing schools. H6a is confirmed.

Table 4.32 - Changed Principals: Gender by Low Performing School (API 1)

| Year | Total CHANGED Low Performing (1) PR | Female Low PR | Female Expected Low | Female Difference | F o Low | All F o Low | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 581 | 325 | 336.8 | -11.8 | 0.559 | 0.583 | 0.609 |
| 03-04 | 714 | 444 | 430.2 | 13.8 | 0.622 | 0.599 | 0.434 |
| 04-05 | 523 | 313 | 310.7 | 2.3 | 0.598 | 0.606 | 0.945 |
| 05-06 | 493 | 283 | 292.1 | -9.1 | 0.574 | 0.593 | 0.505 |
| 06-07 | 682 | 400 | 403.5 | -3.5 | 0.587 | 0.596 | 0.614 |
| 07-08 | 657 | 391 | 398.6 | -7.6 | 0.595 | 0.595 | 0.725 |
| 08-09 | 636 | 366 | 383.6 | -17.6 | 0.575 | 0.599 | 0.203 |

Pink = Overrepresented




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Low | | 0.559 | 0.622 | 0.598 | 0.574 | 0.587 | 0.595 | 0.575 |
| All F α Low | | 0.583 | 0.599 | 0.606 | 0.593 | 0.596 | 0.595 | 0.599 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Medium Performing Schools (API 2)

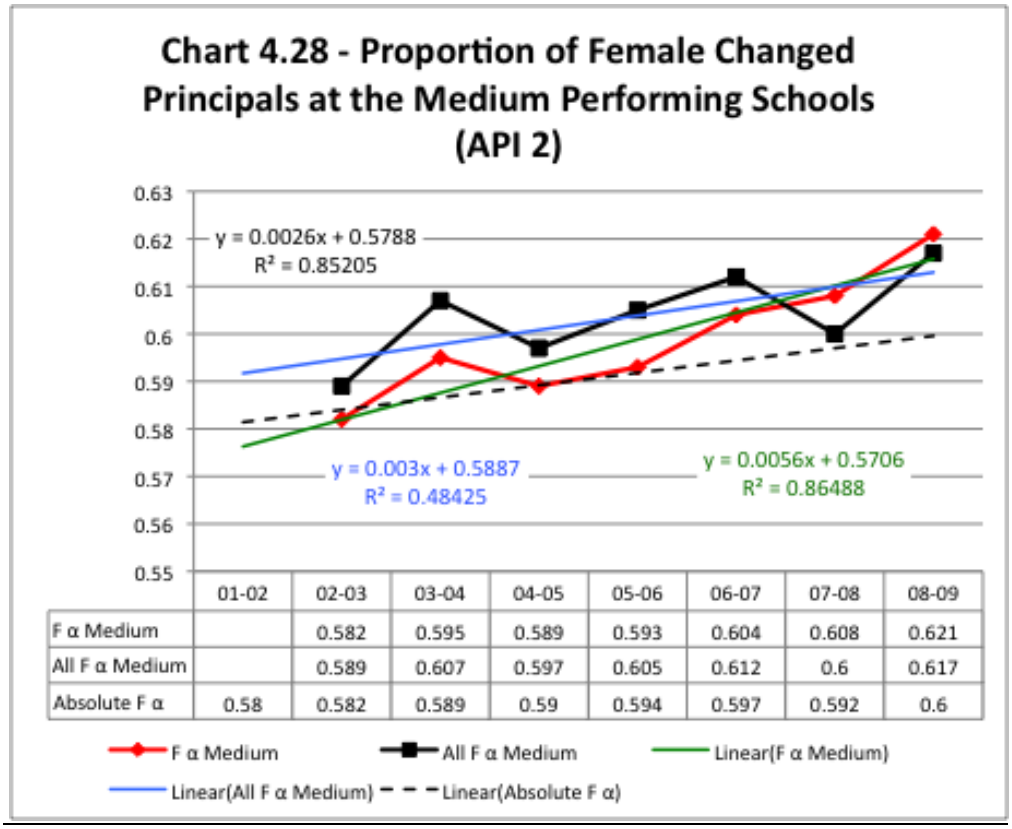
While the Pearson Chi-Square test of relationship confirms that the medium performing school findings are not significantly related, female principals are overrepresented in five of the seven years in the study (see Table 4.33). The overall proportion of female principals has gone from 0.589 in 2002-03 to 0.617 in 2008-09, an increase of 0.028. This shows that female principals in the medium performing schools are growing at 140% of the growth of overall female principals. Chart 4.28 shows the proportional increase of female principals in the medium

performing schools and that the changed female principals have a strong relation of $R^2$ of 0.86488. Both the slope of the changed females, as well as the "All females", in the medium performing schools, is steeper than the growth of the "absolute" female proportion. Hypothesis H6b states: Women will increase or maintain proportion in the medium performing schools. Therefore, H6b is confirmed.

Table 4.33 - Changed Principals: Gender by Medium Performing School (Api 2)

| Year | Total CHANGED Med Performing (2) PR | Female Med PR | Female Expected Med | Female Difference | F α Medium | All F α Medium | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 656 | 382 | 380.3 | 1.7 | 0.582 | 0.589 | 0.609 |
| 03-04 | 855 | 509 | 515.1 | -6.1 | 0.595 | 0.607 | 0.434 |
| 04-05 | 640 | 377 | 380.2 | -3.2 | 0.589 | 0.597 | 0.945 |
| 05-06 | 580 | 344 | 343.7 | 0.3 | 0.593 | 0.605 | 0.505 |
| 06-07 | 844 | 510 | 499.4 | 10.6 | 0.604 | 0.612 | 0.614 |
| 07-08 | 804 | 489 | 487.8 | 1.2 | 0.608 | 0.6 | 0.725 |
| 08-09 | 826 | 513 | 498.3 | 14.7 | 0.621 | 0.617 | 0.203 |

Pink = Overrepresented




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Medium | | 0.582 | 0.595 | 0.589 | 0.593 | 0.604 | 0.608 | 0.621 |
| All F α Medium | | 0.589 | 0.607 | 0.597 | 0.605 | 0.612 | 0.6 | 0.617 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

<u>High Performing Schools (API 3)</u>

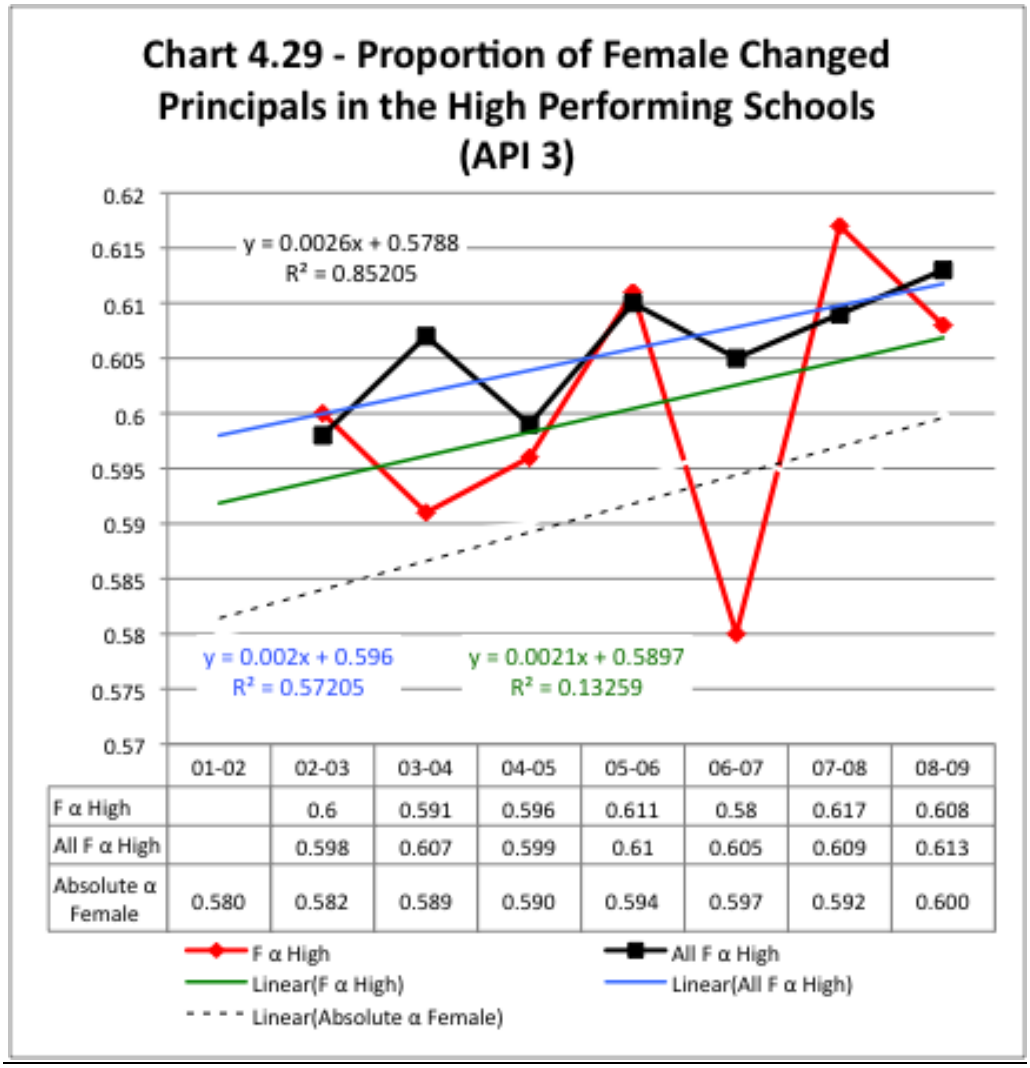
The High performing schools show an increase in the proportion of female principals, going from 0.598 in 2002-03 to 0.613 in 2008-09 (see Table 4.34). While the increase of 0.0015 is below the overall increase of 0.002, the proportion of high performing schools that are led by a woman is 0.0013 higher than the overall proportion of female principals. Chart 4.29 is a visual representation that the proportion of women is increasing at the high performing schools. While the $R^2$ for the changed principals does not predict the change very well at being a mere 0.13259, the $R^2$ for the overall female principals in the high performing schools is a

respectable 0.57205. Hypothesis H6c states: Women will be gaining in proportion in the high performing schools. The results of the analysis confirm H6c.

Table 4.34 - Changed Principals: Gender by High Performing School (Api 3)

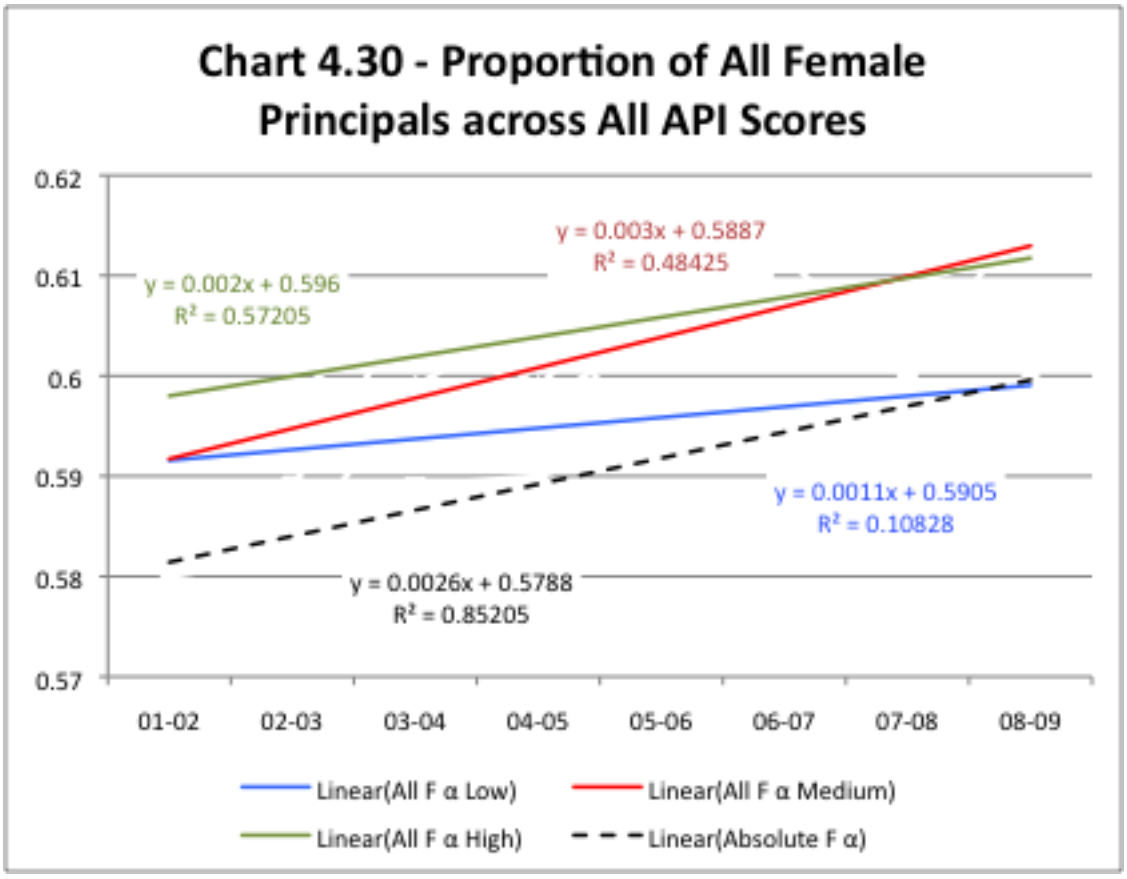
| Year | Total CHANGED High Performing (3) PR | Female High PR | Female Expected High | Female Difference | F a High | All F a High | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 483 | 290 | 280 | 10 | 0.6 | 0.598 | 0.609 |
| 03-04 | 665 | 393 | 400.7 | -7.7 | 0.591 | 0.607 | 0.434 |
| 04-05 | 502 | 299 | 298.2 | 0.8 | 0.596 | 0.599 | 0.945 |
| 05-06 | 483 | 295 | 286.2 | 8.8 | 0.611 | 0.61 | 0.505 |
| 06-07 | 595 | 345 | 352.1 | -7.1 | 0.58 | 0.605 | 0.614 |
| 07-08 | 634 | 391 | 384.6 | 6.4 | 0.617 | 0.609 | 0.725 |
| 08-09 | 650 | 395 | 392.1 | 2.9 | 0.608 | 0.613 | 0.203 |

Pink = Overrepresented




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α High | | 0.6 | 0.591 | 0.596 | 0.611 | 0.58 | 0.617 | 0.608 |
| All F α High | | 0.598 | 0.607 | 0.599 | 0.61 | 0.605 | 0.609 | 0.613 |
| Absolute α Female | 0.580 | 0.582 | 0.589 | 0.590 | 0.594 | 0.597 | 0.592 | 0.600 |

Chart 4.30 is a visual representation of all the "API" categories of schools for "all female principals". It is clear that women are gaining in the favorable high achieving schools while falling more in line with the absolute proportion in the low achieving schools. This finding is again the last thing sexual politics theory would predict happening. Hypothesis H6 states: There will be no inherent bias in the achievement characteristics of the schools in which women are principals. H6 is confirmed. Chart 4.30 is used further in Chapter V.




Pupil-Teacher Ratios

Pupil-Teacher ratio refers to the ratio of students in the classroom per teacher. The conventional wisdom has been that the lower the number, the better the instruction for the student. In 1964, California enacted educational codes in order to enforce lower class sizes. In sections 41376 and 41378 of the California Education Code, the maximum class sizes and penalties for districts are defined

(ced.ca.gov, 2014). The code states that:

- Kindergarten—average class size not to exceed 31 students; no class larger than 33 students.
- Grades one through three—average class size not to exceed 30 students; no class larger than 32 students.
- Grades four through eight—in the current fiscal year, average number of students per teacher not to exceed the greater of 29.9 (the statewide average number of students per teacher in 1964) or the district's average number of students per teacher in 1964.

The objective of these laws is to encourage the reduction of class size and the ratio of pupils to teachers. If the above limits are exceeded, statute requires the Superintendent of Public Instruction to reduce the district's revenue limit apportionment for each student over the limit. In short, this means that the penalty for exceeding the limit is a loss in all revenue limits funding for each student over the limit (cde.ca.gov, 2014).

According to the NCES website, during the 1970s and early 1980s, public school enrollment decreased, while the number of teachers generally increased. For public schools, the number of pupils per teacher—that is, the pupil-teacher ratio—declined from 22.3 in 1970 to 17.9 in 1985. After enrollment started increasing in 1985, the public school pupil-teacher ratio continued to decline, reaching 17.2 in

1989. After a period of relative stability during the late 1980s through the mid-1990s, the ratio declined from 17.3 in 1995 to 15.4 in 2009 (nces.ed.gov). The World Bank has the United States holding steady at an average pupil-teacher ratio of 14.29 for the early 2000's through 2014 (data.worldbank.org, 2014). California, however reports a much higher pupil-teacher ratio; the CDE reports the average class size in the primary schools to be 19.1 with the middle and high schools being much higher (CDE, 2014).

For this study, the Pupil-Teacher (PT) ratio was combined into four categories: "Low", made up of ratios that meet or fall below the national average of 15.4; "Medium-Low", made up of ratios of 15.41 to 17.99; "Medium-High", made up of ratios of 18.00 to 21.00, and "High", made up of ratios of 21.01 and higher. Table 4.35 has a coded breakdown of the PT categories, total number of principals per category, and average percentage of the data each category contains. The last two columns were obtained by combining each of the data years into one master data set, called 2CombinedPR, and then sorting by the rank.

Chart 4.35 - Pupil-Teacher

| Category | Code | Frequency: All Years of the Study | Percentage |
|---|---|---|---|
| Low | 1 | 2848 | 5.8 |
| Medium-Low | 2 | 6130 | 12.5 |
| Medium-High | 3 | 18673 | 38.2 |
| High | 4 | 19840 | 41.8 |

Utilizing the Pearson Chi-Square statistical test against the variable of "gender" by the "pupil-teacher ratio" each of the years of the study returns significant findings. This means that the pupil-teacher ratio is significantly related to gender. What follows is a detailed analysis of each of the categorical variables.

## Low Pupil-Teacher Ratio Schools (PT 1)

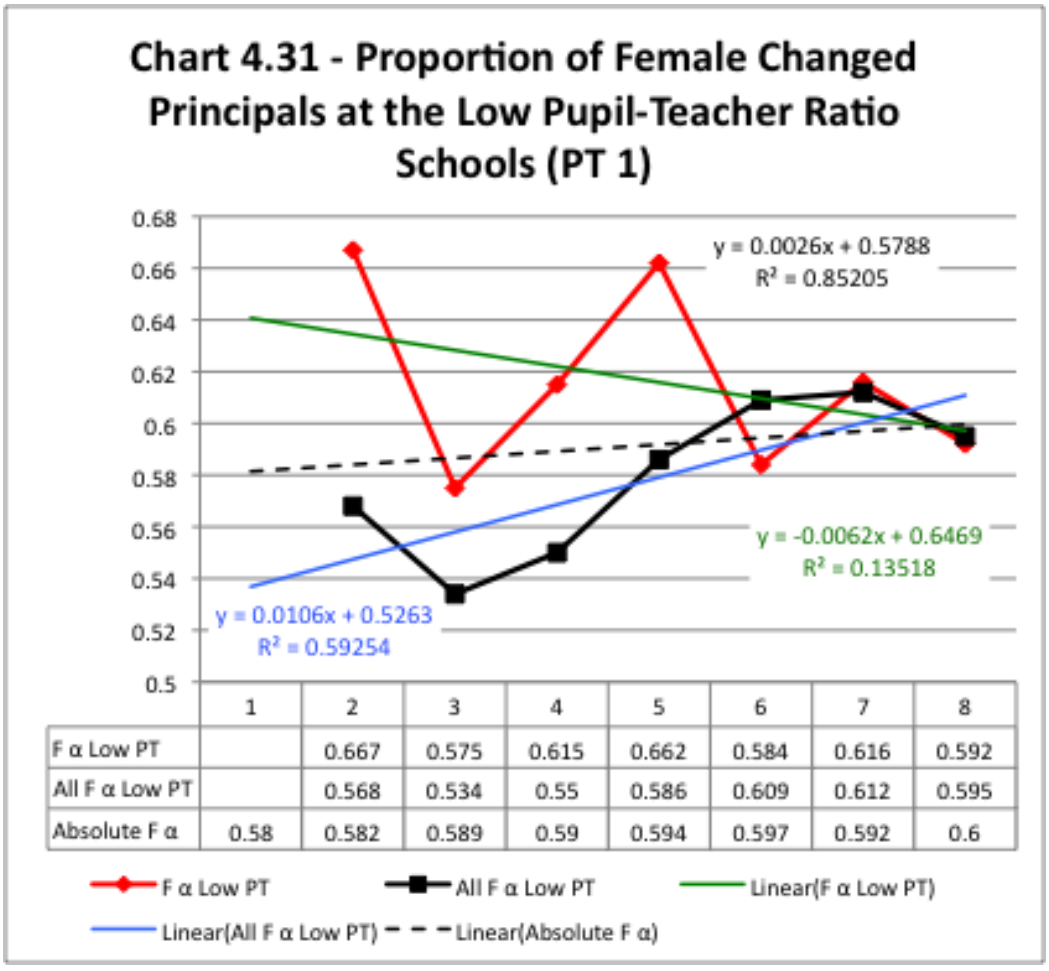
From a principal's perspective, Low Pupil-Teacher schools would be viewed as the most favorable because the teachers would have smaller, more controllable classes. Table 4.36 shows that female principals are overrepresented in five of the seven years of the study and that the proportion of the "All Female Low PT" goes from being 0.568 to .595 in 2008-09, an increase of 0.027. Chart 4.31 shows that the proportion of all female principals in the low pupil-teacher ratio schools has increased at a faster rate than the overall absolute slope of all females, meaning that female principals are moving into the principalship at a relatively fast rate. The slope of the "All Low" PT level shows that women are gaining positions in these favorable schools and returns a respectable $R^2$ of 0.59254. While the actual numbers of the changed principals shows a highly fluctuating decreased line, the $R^2$ is just 0.13518. Four of the seven years in the study show women being represented at a higher rate than the absolute proportion of female principals.

Hypothesis H7a states: Women will gain proportion in the favorable low pupil-teacher ratio schools. H7a is confirmed.

Table 4.36 - Changed Principals: Gender by Low Pupil-Teacher Ratio School (PT 1)

| Year | Total CHANGED Low PT (1) PR | Female Low PT PR | Female Expected Low PT | Female Difference | F α Low PT | All F α Low PT | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 60 | 40 | 34.7 | 5.3 | 0.667 | 0.568 | 0.000 |
| 03-04 | 87 | 50 | 51.6 | -1.6 | 0.575 | 0.534 | 0.000 |
| 04-05 | 52 | 32 | 30.7 | 1.3 | 0.615 | 0.55 | 0.000 |
| 05-06 | 71 | 47 | 41.9 | 5.1 | 0.662 | 0.586 | 0.000 |
| 06-07 | 101 | 59 | 58.9 | 0.1 | 0.584 | 0.609 | 0.005 |
| 07-08 | 268 | 165 | 161.4 | 3.6 | 0.616 | 0.612 | 0.000 |
| 08-09 | 120 | 71 | 71.9 | -0.9 | 0.592 | 0.595 | 0.000 |

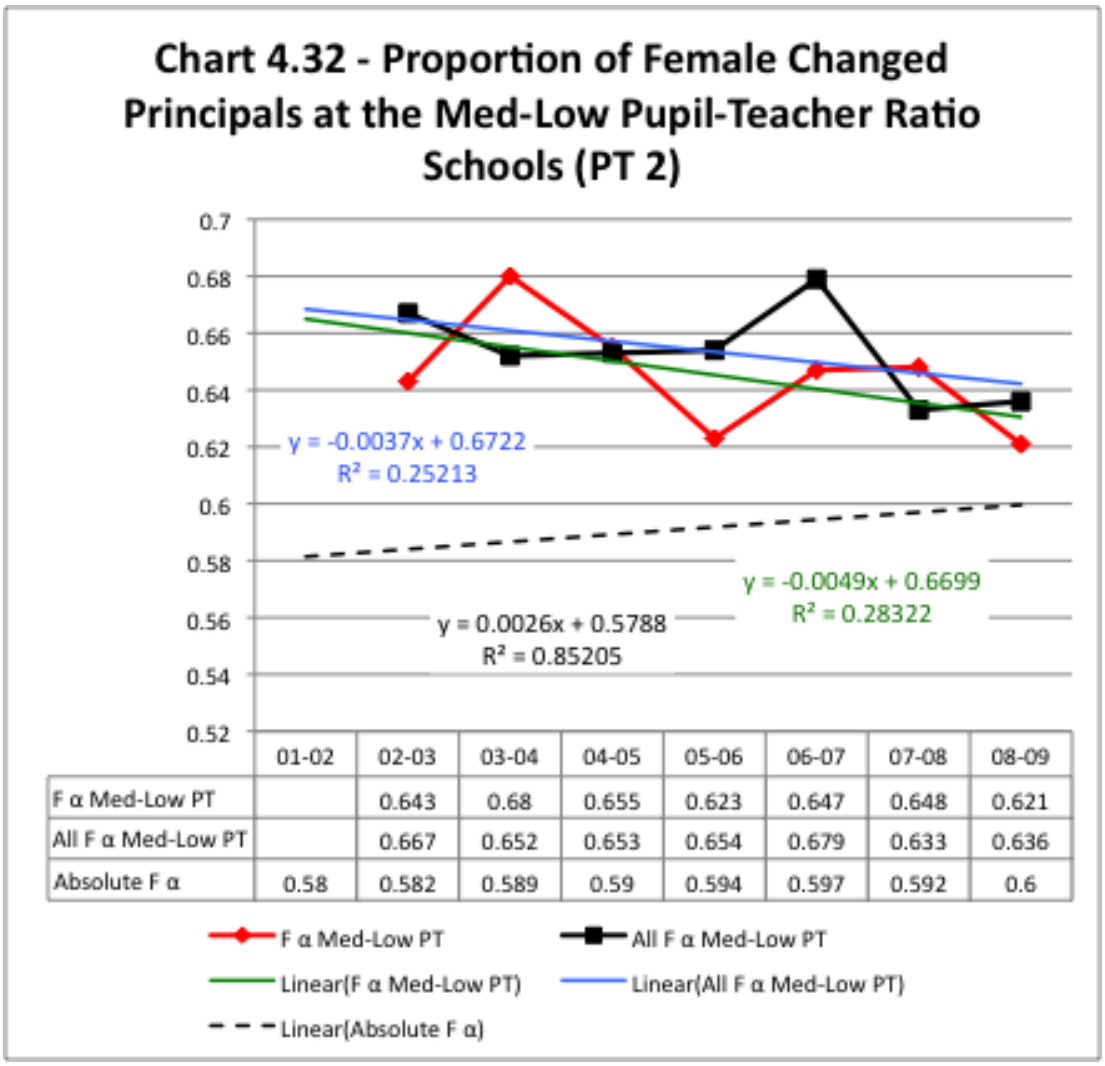
Pink = Overrepresented



Medium-Low Pupil-Teacher Ratio Schools (PT2)

The medium-low pupil-teacher ratio schools show a declining proportion of female principals, going from 0.667 in 2002-03 to 0.636 in 2008-09, a change of 0.031 (see Table 4.37). Each year of the study women are overrepresented in the principalship. Chart 4.32 gives a visual representation of the data and shows that neither the "Changed" or "All Med-Low" PT schools have a very high $R^2$, being just 0.28322 and 0.25213 respectively. While the $R^2$ is very low, it is clear that women are decreasing in the Medium-Low Pupil-Teacher Ratio schools. While initially this finding may seem to support the sexual politics theory, female principals in this pupil-teacher ratio are extremely overrepresented. The proportion of female principals in the medium-low pupil-teacher schools in 2002-03 was 0.085 higher than the absolute proportion of female principals (0.667 compared to 0.582). While female principals are declining in proportion across the study in this particular variable, female principals in the medium-low pupil-teacher ratio school are still 0.016 higher than the absolute value of female principals. Hypothesis H7b states: Women will gain proportion in the favorable medium/low pupil-teacher ratio schools. H7b is confirmed.

| Table 4.37 - Changed Principals: Gender by Med-Low Pupil-Teacher Ratio School (PT 2) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Med-Low PT (2) PR | Female Med-Low PT PR | Female Expected Med-Low PT | Female Difference | F α Med-Low PT | All F α Med-Low PT | Pearson Chi-Square |
| 02-03 | 185 | 119 | 107.1 | 11.9 | 0.643 | 0.667 | 0.000 |
| 03-04 | 219 | 149 | 129.8 | 19.2 | 0.68 | 0.652 | 0.000 |
| 04-05 | 171 | 112 | 101 | 11 | 0.655 | 0.653 | 0.000 |
| 05-06 | 162 | 101 | 95.6 | 5.4 | 0.623 | 0.654 | 0.000 |
| 06-07 | 238 | 154 | 138.9 | 15.1 | 0.647 | 0.679 | 0.005 |
| 07-08 | 537 | 348 | 323.3 | 24.7 | 0.648 | 0.633 | 0.000 |
| 08-09 | 224 | 139 | 134.3 | 4.7 | 0.621 | 0.636 | 0.000 |
| | | | | | | Pink = Overrepresented | |

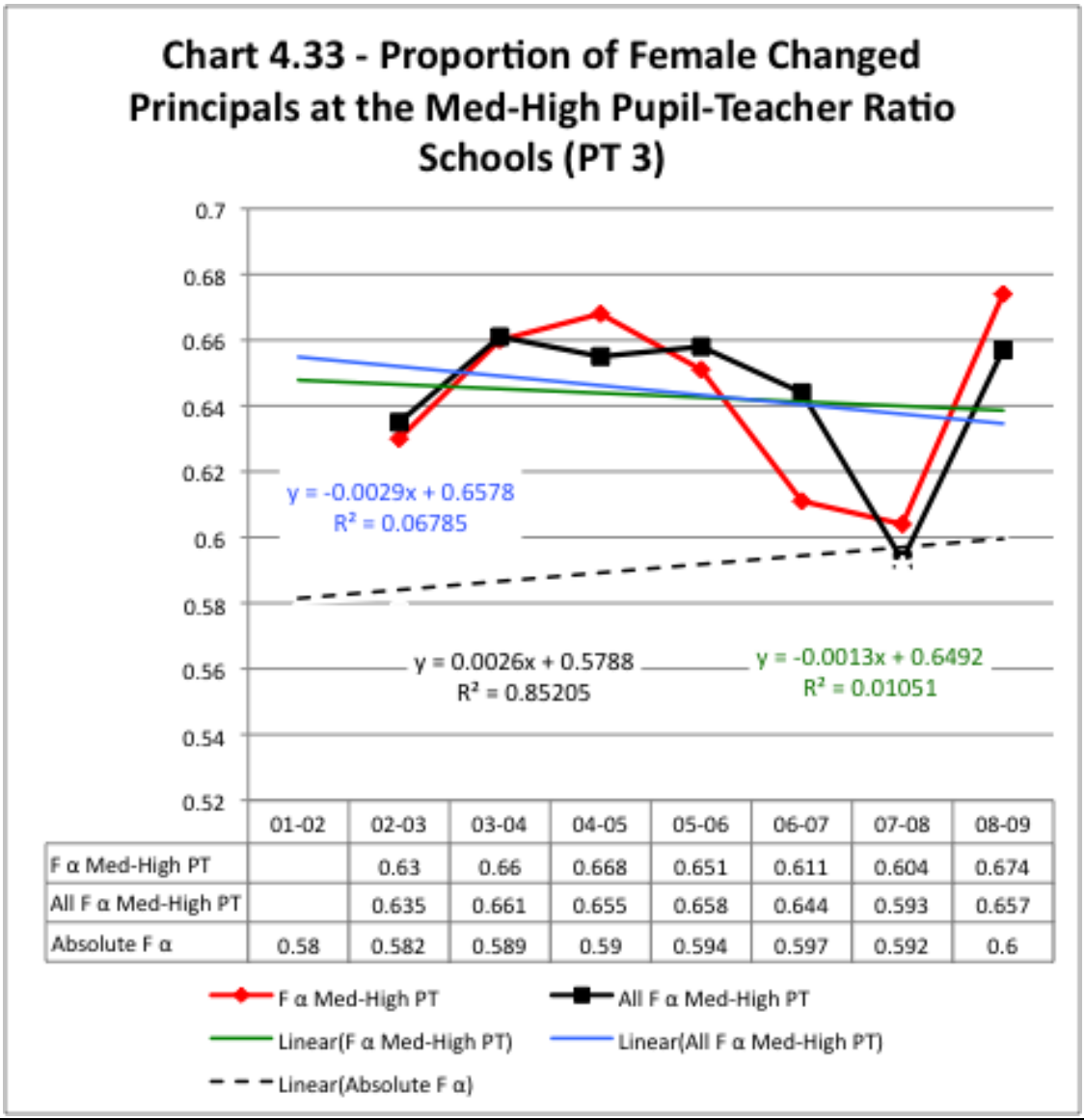



| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Med-Low PT | | 0.643 | 0.68 | 0.655 | 0.623 | 0.647 | 0.648 | 0.621 |
| All F α Med-Low PT | | 0.667 | 0.652 | 0.653 | 0.654 | 0.679 | 0.633 | 0.636 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Medium-High Pupil-Teacher Ratio Schools (PT 3)

Table 4.38 shows that female principals are overrepresented in the medium-high pupil-teacher ratio schools. Like the Medium-Low grouping, this particular variable grouping shows that women are significantly more represented in the group than in the absolute female grouping. The 2008-09 proportion of all female medium-high, pupil-teacher ratio school is 0.657, 0.057 higher than the absolute female principal value. Chart 4.33 reveals that while both lines are weak, having an $R^2$ of only 0.06785 for the "all medium-high female" principals and an even lower $R^2$ of 0.01051 for the changed principals, each of the annual observations is higher than the absolute female principal proportion. Again, female principals are overrepresented in the data and are slightly declining, which is the opposite of what would be expected utilizing a sexual politics context. Hypothesis H7c states: Women will maintain or lose proportion in the less favorable medium/high pupil-teacher ratio schools. H7c is confirmed.

| Table 4.38 - Changed Principals: Gender by Med-High Pupil-Teacher Ratio School (PT 3) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Med-High PT (3) PR | Female Med-High PT PR | Female Expected Med-High PT | Female Difference | F o Med-High PT | All F o Med-High PT | Pearson Chi-Square |
| 02-03 | 756 | 476 | 437.6 | 38.4 | 0.63 | 0.635 | 0.000 |
| 03-04 | 944 | 623 | 559.6 | 63.4 | 0.66 | 0.661 | 0.000 |
| 04-05 | 660 | 441 | 389.7 | 51.3 | 0.668 | 0.655 | 0.000 |
| 05-06 | 627 | 408 | 370.1 | 37.9 | 0.651 | 0.658 | 0.000 |
| 06-07 | 872 | 533 | 508.9 | 24.1 | 0.611 | 0.644 | 0.005 |
| 07-08 | 742 | 448 | 446.7 | 1.3 | 0.604 | 0.593 | 0.000 |
| 08-09 | 801 | 540 | 480.2 | 59.8 | 0.674 | 0.657 | 0.000 |
| | | | | | | | Pink = Overrepresented |




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Med-High PT | | 0.63 | 0.66 | 0.668 | 0.651 | 0.611 | 0.604 | 0.674 |
| All F α Med-High PT | | 0.635 | 0.661 | 0.655 | 0.658 | 0.644 | 0.593 | 0.657 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

High Pupil-Teacher Ratio Schools (PT 4)

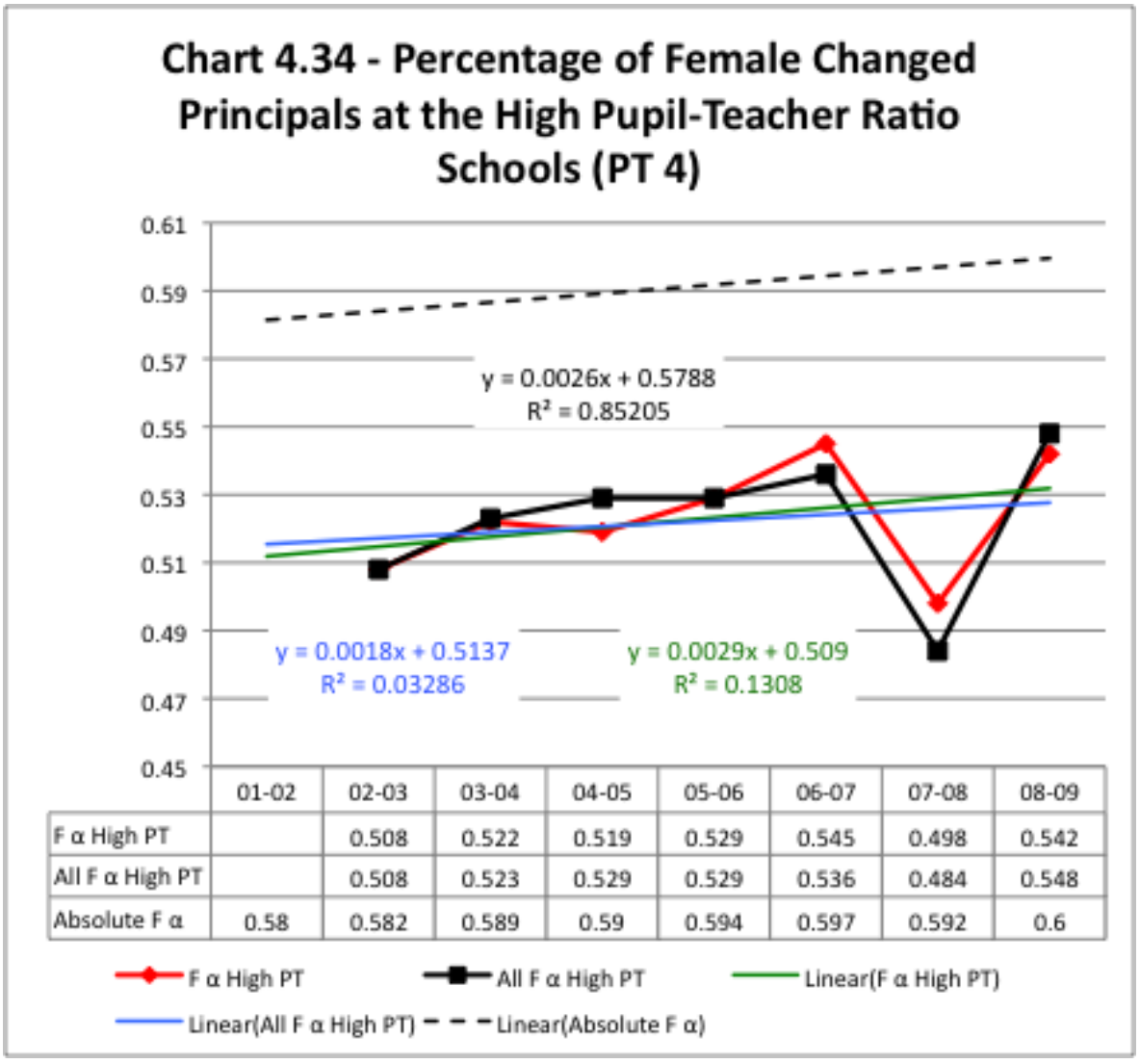
The high pupil-teacher ratio schools have the largest number of variables of any in the pupil-teacher variable group, accounting for roughly 42% of the total observations in the variable group. Table 4.39 reveals that the number of female principals in this group is underrepresented, yet rising. The proportion of female

principals goes from 0.508 in 2002-03 to 0.548 in 2008-09. Chart 4.34 is a visual representation of the proportion of female principals in the high pupil-teacher ratio schools. The $R^2$'s of the two lines reveal that neither is reliable for trend projections, but weakly indicate that women are gaining positions in this area over time.

Hypothesis H7d states: Women will maintain or lose proportion in the unfavorable high pupil-teacher ratio schools. H7d is confirmed as women are gaining positions in these schools, even while being significantly underrepresented.

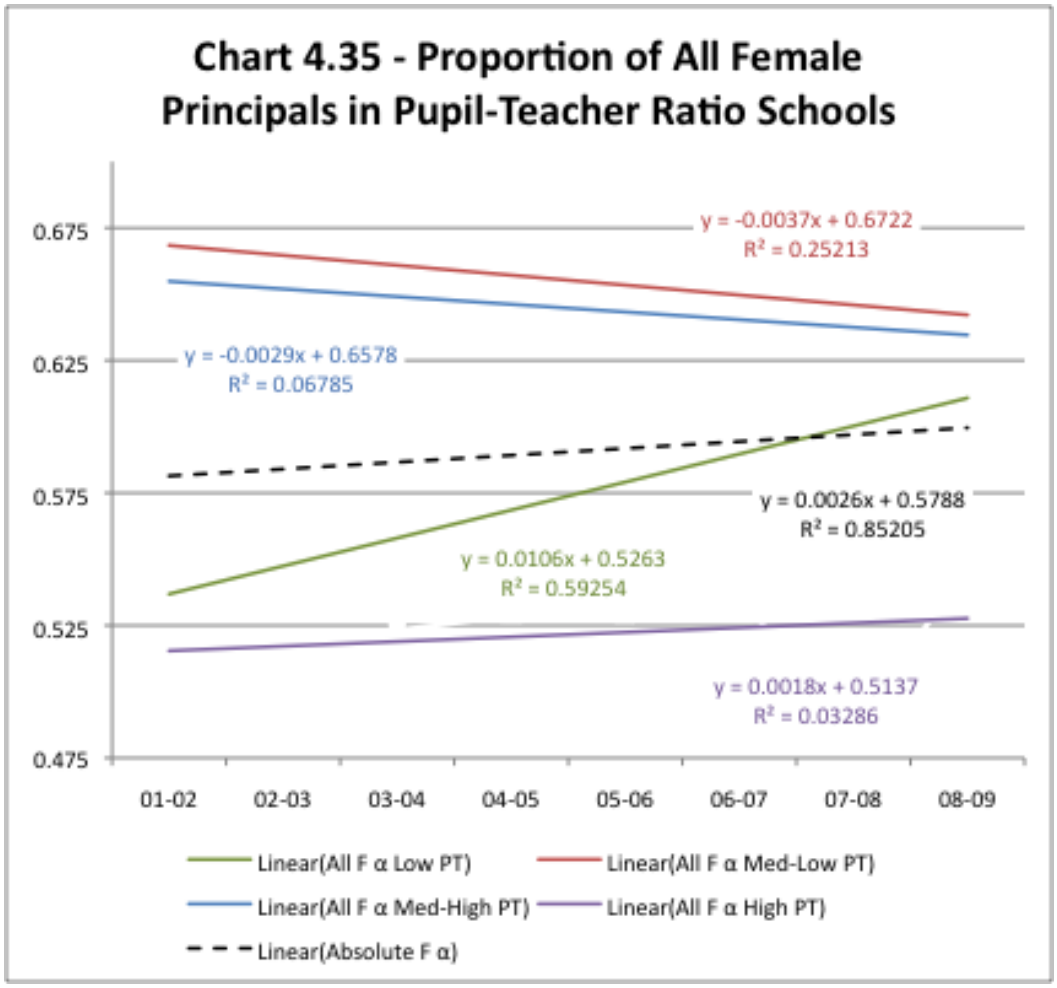
Table 4.39 - Changed Principals: Gender by High Pupil-Teacher Ratio School (PT 4)

| Year | Total CHANGED High PT (4) PR | Female High PT PR | Female Expected High PT | Female Difference | F α High PT | All F α High PT | Pearson Chi-Square |
|---|---|---|---|---|---|---|---|
| 02-03 | 787 | 400 | 455.6 | -55.6 | 0.508 | 0.508 | 0.000 |
| 03-04 | 1149 | 600 | 681.1 | -81.1 | 0.522 | 0.523 | 0.000 |
| 04-05 | 892 | 463 | 526.7 | -63.7 | 0.519 | 0.529 | 0.000 |
| 05-06 | 792 | 419 | 467.4 | -48.4 | 0.529 | 0.529 | 0.000 |
| 06-07 | 1025 | 559 | 598.2 | -39.2 | 0.545 | 0.536 | 0.005 |
| 07-08 | 285 | 142 | 171.6 | -29.6 | 0.498 | 0.484 | 0.000 |
| 08-09 | 1110 | 602 | 665.5 | -63.5 | 0.542 | 0.548 | 0.000 |




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α High PT | | 0.508 | 0.522 | 0.519 | 0.529 | 0.545 | 0.498 | 0.542 |
| All F α High PT | | 0.508 | 0.523 | 0.529 | 0.529 | 0.536 | 0.484 | 0.548 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

It is clear from the data that the overall hypothesis of H7, which states that there will be no inherent bias in the pupil-teacher characteristics of the schools in which women are principals, is confirmed. There is no bias present in the schools females obtain around the pupil-teacher ratio variable. Chart 4.35 shows all the trend lines for each of the variable categories in the pupil-teacher ratios and is discussed further in Chapter V.




Principal's Education Level

California's Department of Education breaks the principal's education level down into seven categories ranging from the Doctorate degree to less than Bachelor's. Table 4.40 has a coded breakdown of the education levels, total number of principals per level, and average proportion of the data each level contains. The last two columns were obtained by combining each of the data years into one

master data set, called 2CombinedPR, and then sorting by the level. Because the last two columns do not have sufficient numbers to matter, they were not included in the study.

Table 4.40 - Principal's Education Levels

| Level | Code | Frequency: All Years of the Study | Percentage |
|---|---|---|---|
| Doctorate | 1 | 3200 | 6.6 |
| Master's + 30 | 2 | 18807 | 38.5 |
| Masters | 3 | 20939 | 42.9 |
| Bachelor's + 30 | 4 | 4496 | 9.2 |
| Bachelors | 5 | 1340 | 2.7 |
| Less than Bachelors | Not Coded | 49 | 0.1 |
| Not Reported | Not Coded | 16 | 0.0 |

Table 4.41 is a breakdown of each of the study year's Pearson Chi-Squared test results. None of the annual data had results lower than the conventional criteria for statistical significance of 0.01 or 0.005; meaning that the "Education" variable is not significantly related to gender (see Chart LR4.6 on page 95). What follows is a detailed analysis of each of the status variables.

Table 4.41- Pearson Chi-Square Results for Each Year of Principal's Education by Gender

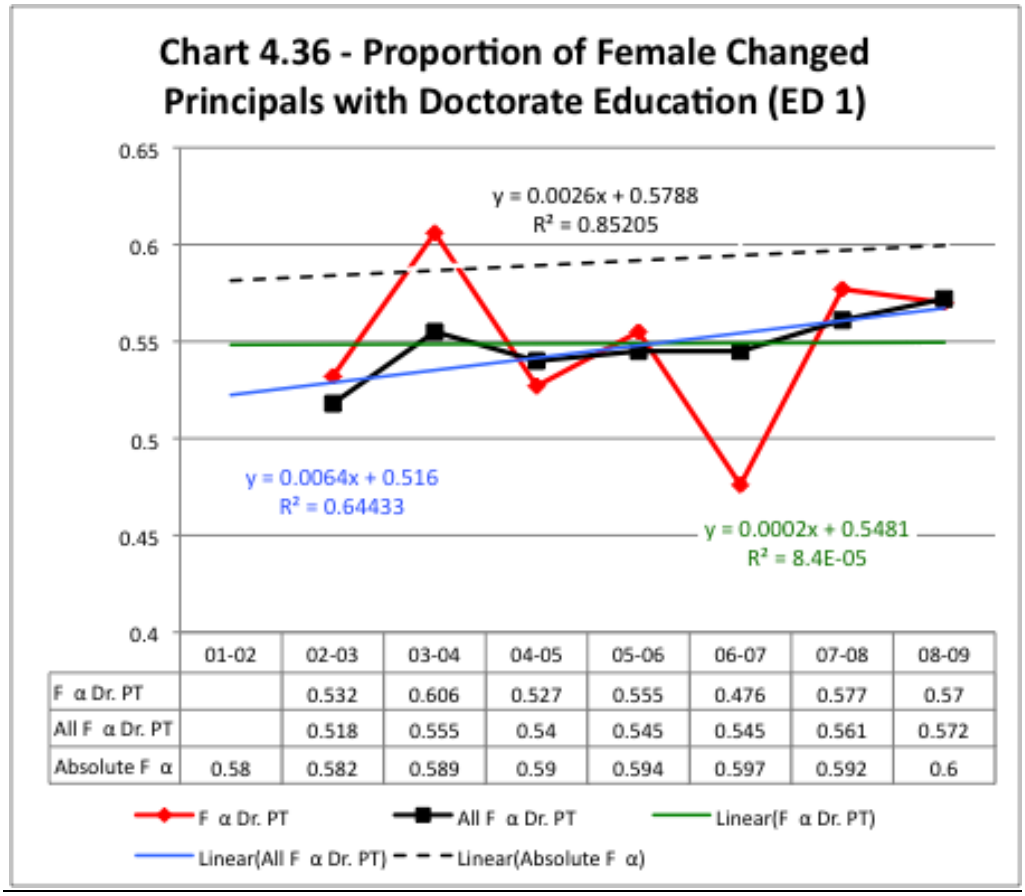
| Year | Pearson Chi-Square Test |
|---|---|
| 02-03 | 0.067 |
| 03-04 | 0.917 |
| 04-05 | 0.246 |
| 05-06 | 0.213 |
| 06-07 | 0.011 |
| 07-08 | 0.011 |
| 08-09 | 0.11 |

Principals with Doctorate Degree (ED 1)

Table 4.42 shows that the proportion of "all female principals" with doctorate degrees is increasing across the study years, going from 0.518 in 2002-03 to 0.572 in 2008-09. This proportional increase of 0.054 is more than twice the rise of 0.02 of the absolute value. It can also be seen that women are underrepresented in this category. Chart 4.36 gives a visual representation of the data and shows the $R^2$ of the "changed" and "all" female principals. While the "changed" line is nearly level, the "all" line offers a healthy $R^2$ of 0.64433, which indicates that the slope of the "all female principals with a doctorate" is fairly reliable. While all of the data is statistically insignificant, the actual points of the data allow for understanding of the particular trends. H8a is confirmed, as female principals being underrepresented in this case would indicate that men have more doctorates at this level.

Table 4.42 - Changed Principals: Gender by Doctorate Education (ED 1)

| Year | Total CHANGED Doctorate (1) PR | Female Doctorate PR | Female Expected Doctorate PR | Female Difference | F ⌀ Dr. PT | All F ⌀ Dr. PT | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 109 | 58 | 63 | -5 | 0.532 | 0.518 | 0.067 |
| 03-04 | 155 | 94 | 91.8 | 2.2 | 0.606 | 0.555 | 0.917 |
| 04-05 | 112 | 59 | 66.1 | -7.1 | 0.527 | 0.54 | 0.246 |
| 05-06 | 110 | 61 | 64.9 | -3.9 | 0.555 | 0.545 | 0.213 |
| 06-07 | 143 | 68 | 83.4 | -15.4 | 0.476 | 0.545 | 0.011 |
| 07-08 | 137 | 79 | 82.3 | -3.3 | 0.577 | 0.561 | 0.011 |
| 08-09 | 142 | 81 | 85 | -4 | 0.57 | 0.572 | 0.11 |




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Dr. PT | | 0.532 | 0.606 | 0.527 | 0.555 | 0.476 | 0.577 | 0.57 |
| All F α Dr. PT | | 0.518 | 0.555 | 0.54 | 0.545 | 0.545 | 0.561 | 0.572 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Principals with Master's + 30 Hours (ED 2)

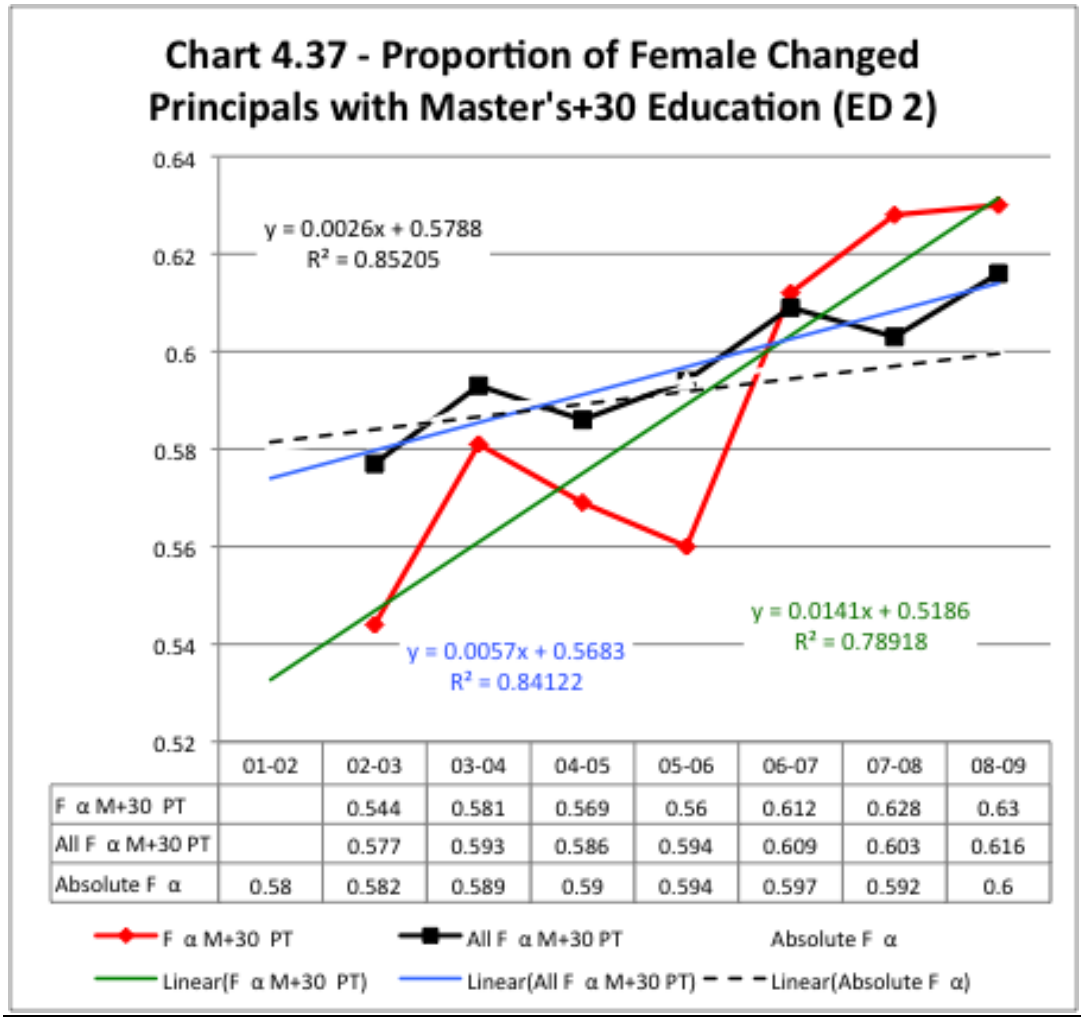
Table 4.43 shows how "all female" principals with a Master's degree plus 30 hours has gone proportionally from 0.577 in 2002-03 to 0.616 in 2008-09, an increase of 0.039, nearly doubling that of the "absolute" growth. During this time period, female principals went from being underrepresented to overrepresented in this category. Chart 4.37 shows that the $R^2$ of the "all female" principals is a very strong 0.84122, while having a slope of 0.0057, almost double that of the "absolute" slope. The "changed" slope is also very strong at 0.0141. Hypothesis H8a states:

Women will have equal to or less Master's+30 degrees than men. From this analysis H8b is confirmed.

Table 4.43 - Changed Principals: Gender by Master's +30 Hrs. Education (ED 2)

| Year | Total CHANGED Master + 30 (2) PR | Female Master+ 30 PR | Female Expected Master+30 PR | Female Difference | F ⍺ M+30 PT | All F ⍺ M+30 PT | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 691 | 376 | 399.1 | -23.1 | 0.544 | 0.577 | 0.067 |
| 03-04 | 898 | 522 | 531.9 | -9.9 | 0.581 | 0.593 | 0.917 |
| 04-05 | 564 | 321 | 332.8 | -11.8 | 0.569 | 0.586 | 0.246 |
| 05-06 | 529 | 296 | 312.2 | -16.2 | 0.56 | 0.594 | 0.213 |
| 06-07 | 773 | 473 | 451 | 22 | 0.612 | 0.609 | 0.011 |
| 07-08 | 750 | 471 | 450.4 | 20.6 | 0.628 | 0.603 | 0.011 |
| 08-09 | 722 | 455 | 432.3 | 22.7 | 0.63 | 0.616 | 0.11 |

Pink = Overrepresented



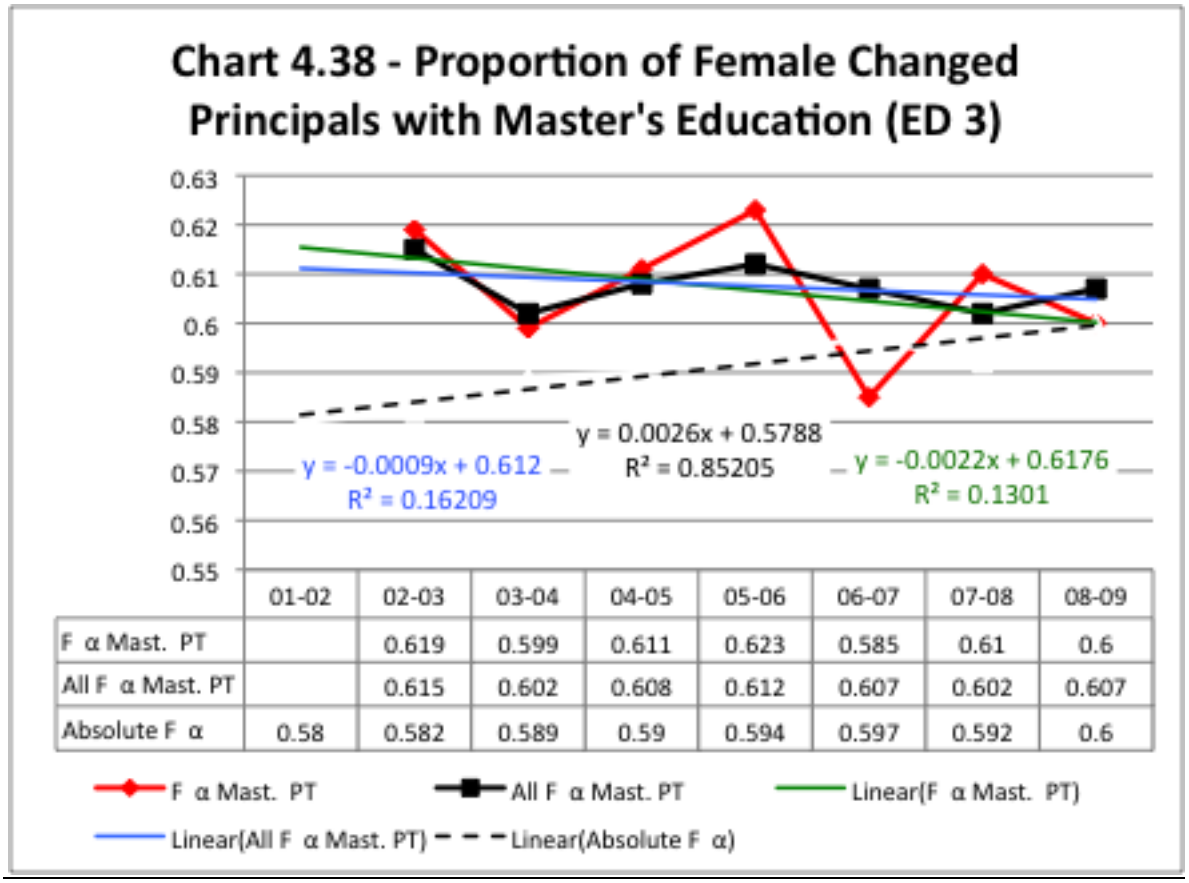

| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α M+30 PT | | 0.544 | 0.581 | 0.569 | 0.56 | 0.612 | 0.628 | 0.63 |
| All F α M+30 PT | | 0.577 | 0.593 | 0.586 | 0.594 | 0.609 | 0.603 | 0.616 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Principals with a Master's (ED 3)

The education variable of Master's degree only, the largest category within principal's education, is showing a decline in the female principal proportion. Table 4.44 shows that while women have historically been overrepresented in this category, they are declining back to the mean of the overall principal's proportion.

| Table 4.44 - Changed Principals: Gender by Master's Education (ED 3) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Master (3) PR | Female Master PR | Female Expected Master PR | Female Difference | F α Mast. PT | All F α Mast. PT | Change Chi-Square Test |
| 02-03 | 746 | 462 | 430.9 | 31.1 | 0.619 | 0.615 | 0.067 |
| 03-04 | 1067 | 639 | 632 | 7 | 0.599 | 0.602 | 0.917 |
| 04-05 | 835 | 510 | 492.6 | 17.4 | 0.611 | 0.608 | 0.246 |
| 05-06 | 794 | 495 | 468.5 | 26.5 | 0.623 | 0.612 | 0.213 |
| 06-07 | 949 | 555 | 553.7 | 1.3 | 0.585 | 0.607 | 0.011 |
| 07-08 | 963 | 587 | 578.3 | 8.7 | 0.61 | 0.602 | 0.011 |
| 08-09 | 969 | 581 | 580.2 | 0.8 | 0.6 | 0.607 | 0.11 |
| | | | | | | | Pink = Overrepresented |

Chart 4.38 gives a visual representation of the data and shows that while neither the "all female principals" or "changed female principals" have strong $R^2$'s, being just 0.16209 and 0.1301 respectively, the lines are decreasing. As the Master's only category is the largest number of observations for a category, it shows that women have had an advantage in the category that is now slipping away. Hypothesis H8c states: Women will have equal to or less Master's degrees than men. From the analysis, H8c is confirmed.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Mast. PT | | 0.619 | 0.599 | 0.611 | 0.623 | 0.585 | 0.61 | 0.6 |
| All F α Mast. PT | | 0.615 | 0.602 | 0.608 | 0.612 | 0.607 | 0.602 | 0.607 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Principals with a Bachelor's + 30 (ED 4)

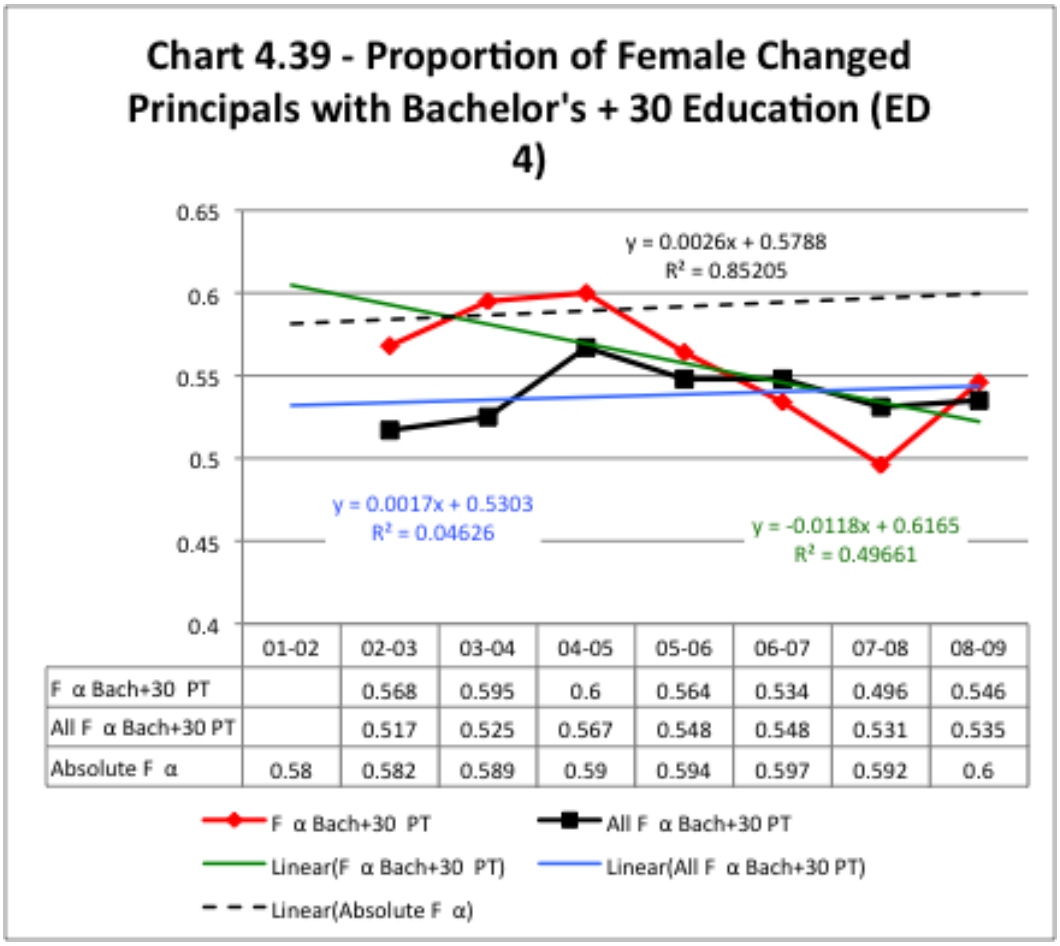
The second to the lowest level of education that this study investigates is the group of Bachelor's degree plus 30 hours that accounts for just 0.092% of the data. Principals in this category would not stay for long as educator's salaries are based in part by their level of education. Table 4.45 shows that the proportion of the "all female" group has gone from 0.517 in 2002-03 to 0.535 in 2008-09, a rise of 0.018 and below the "absolute" increase of 0.02. Chart 4.39 gives a visual representation of the data and shows that women are not gaining ground on the "absolute" value (a slope of 0.0026 for the absolute as compared to 0.0017 for the "all" line). This

indicates that women are underrepresented in the low education variable of Bachelor's degree plus 30 hours. Hypothesis H8d states: Women will have equal to or less Bachelor's+30 degrees than men. From the analysis, H8d is confirmed.

Table 4.45 - Changed Principals: Gender by Bachelor's + 30 Hrs. Education (ED 4)

| Year | Total CHANGED Bach. + 30 (4) PR | Female Bach. +30 PR | Female Expected Bach. + 30 PR | Female Difference | F α Bach+30 PT | All F α Bach+30 PT | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 190 | 108 | 109.7 | -1.7 | 0.568 | 0.517 | 0.067 |
| 03-04 | 232 | 138 | 137.4 | 0.6 | 0.595 | 0.525 | 0.917 |
| 04-05 | 190 | 114 | 112.1 | 1.9 | 0.6 | 0.567 | 0.246 |
| 05-06 | 163 | 92 | 96.2 | -4.2 | 0.564 | 0.548 | 0.213 |
| 06-07 | 268 | 143 | 156.4 | -13.4 | 0.534 | 0.548 | 0.011 |
| 07-08 | 240 | 119 | 144.1 | -25.1 | 0.496 | 0.531 | 0.011 |
| 08-09 | 269 | 147 | 161.1 | -14.1 | 0.546 | 0.535 | 0.11 |

Pink = Overrepresented




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Bach+30 PT | | 0.568 | 0.595 | 0.6 | 0.564 | 0.534 | 0.496 | 0.546 |
| All F α Bach+30 PT | | 0.517 | 0.525 | 0.567 | 0.548 | 0.548 | 0.531 | 0.535 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Principals with a Bachelor's (ED 5)

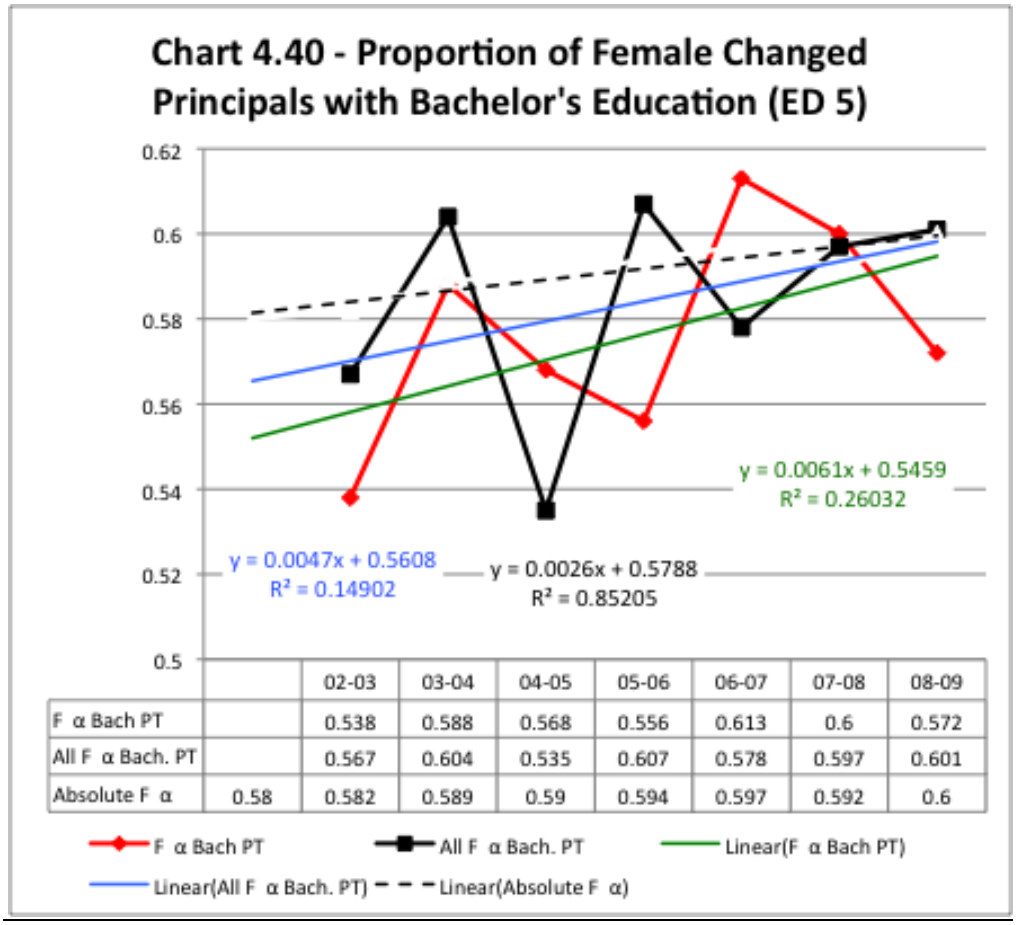
The lowest education level of principals examined in this study is principals that hold just a Bachelor's degree. This is the smallest category, accounting for just 0.027% of the data, and shows that women have historically been underrepresented in this category but have now surpassed the "absolute" point (see Table 4.46). Chart 4.40 gives a visual representation of the data and shows that the slopes of the lines are steeper than the "absolute" line, while deviating widely, as would be expected in a small sample size. The slope of the "all" and "changed" lines suggest that female principals have caught up to the "absolute" line and are poised to exceed the

proportion. Hypothesis H8e states: Women will have equal to or less Bachelor's degrees than men. H8e is confirmed.

Table 4.46 - Changed Principals: Gender by Bachelor's Education (ED 5)

| Year | Total CHANGED Bachelors (5) PR | Female Bach. PR | Female Expected Bach. PR | Female Difference | F α Bach | All F α Bach. | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 52 | 28 | 30 | -2 | 0.538 | 0.567 | 0.067 |
| 03-04 | 51 | 30 | 30.2 | -0.2 | 0.588 | 0.604 | 0.917 |
| 04-05 | 74 | 42 | 43.7 | -1.7 | 0.568 | 0.535 | 0.246 |
| 05-06 | 54 | 30 | 31.9 | -1.9 | 0.556 | 0.607 | 0.213 |
| 06-07 | 124 | 76 | 72.4 | 3.6 | 0.613 | 0.578 | 0.011 |
| 07-08 | 160 | 96 | 96.1 | -0.1 | 0.6 | 0.597 | 0.011 |
| 08-09 | 152 | 87 | 91 | -4 | 0.572 | 0.601 | 0.11 |

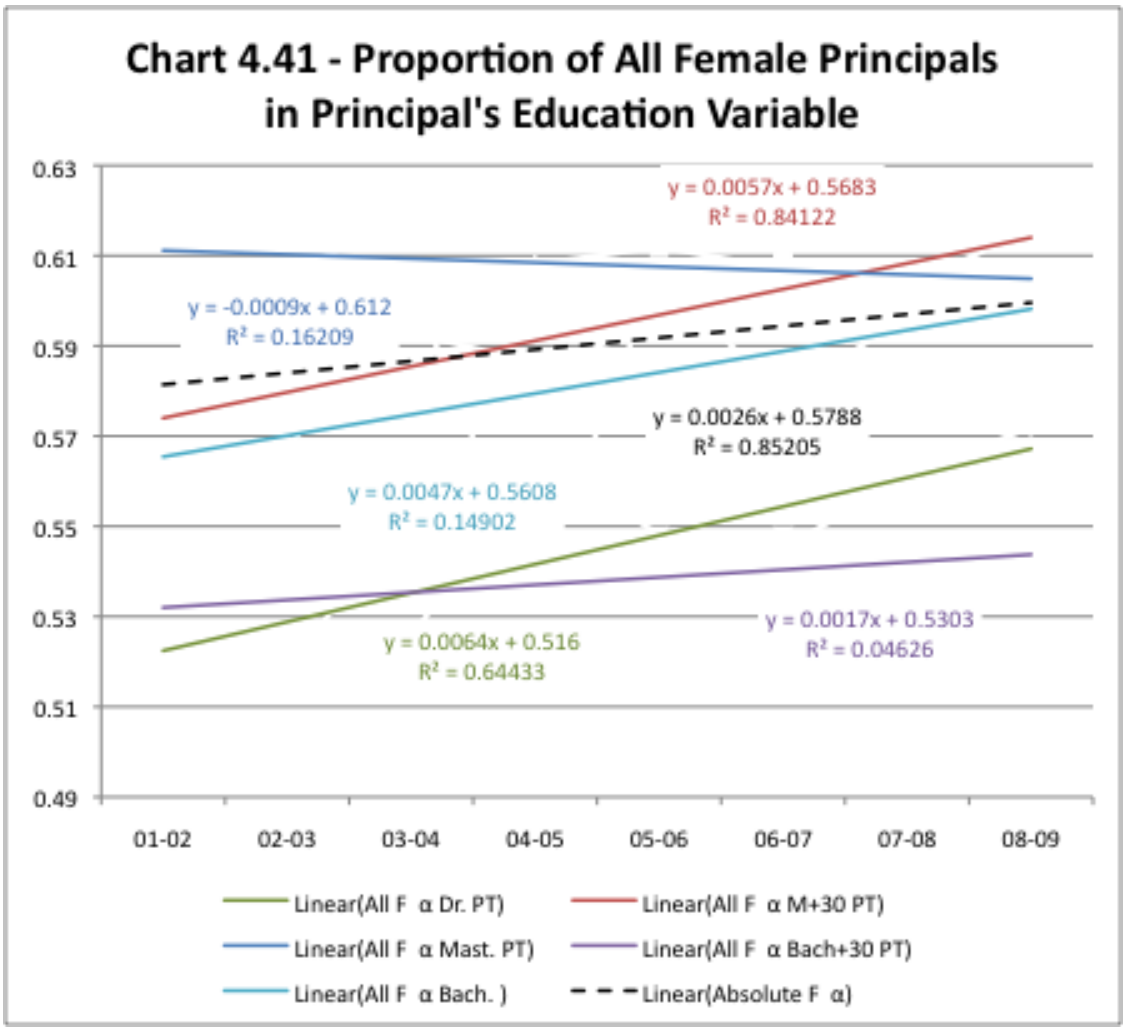
Pink = Overrepresented




| | | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Bach PT | | 0.538 | 0.588 | 0.568 | 0.556 | 0.613 | 0.6 | 0.572 |
| All F α Bach. PT | | 0.567 | 0.604 | 0.535 | 0.607 | 0.578 | 0.597 | 0.601 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Chart 4.41 gives a visual representation of all principal's education lines in one chart. The education variable has produced findings that both confirm and deny the hypotheses of this study. In the strictest sense, the overall hypothesis of H8, that there will be no inherent bias as women hold equal to or lower education level than men in the principalship, must be denied. However, when the three largest categories within the variable are confirmed, and those three variables (Doctorate, Master's +30, and Master's degrees) account for 88.1% of the data, the overall premise of bias being removed is confirmed. Specifically, H8 is generally confirmed.

This finding would prove difficult for sexual politics theory to predict. The chart is further discussed in Chapter V.




Principal's Ethnicity

The California Department of Education breaks ethnicity into eight categories. Table 4.47 has a coded breakdown of ethnicity in the data, total number of principals per level, and the average percentage of the data each level contains.

The last two columns were obtained by combining each of the data years into one master data set, called 2CombinedPR, and then sorting by ethnicity.

Table 4.47 - Ethnicity

| Ethnicity | Code | Frequency: All Years of the Study | Percentage |
|---|---|---|---|
| American Indian or Alaska Native | 1 | 277 | 0.6 |
| Asian | 2 | 1538 | 3.1 |
| Pacific Islander | 3 | 74 | 0.2 |
| Filipino | 4 | 268 | 0.5 |
| Hispanic or Latino | 5 | 7982 | 16.3 |
| African American, not Hispanic | 6 | 4047 | 8.3 |
| White, not Hispanic | 7 | 34257 | 70.1 |
| Multiple or no Response | 8 | 404 | 0.8 |

This study uses the first seven variables for analysis, omitting the "Multiple or no Response" variable. Table 4.48 is a breakdown of each of the study year's Pearson Chi-Squared test results. Three of the seven years of the study had results higher than the conventional criteria for statistical significance of 0.01 or 0.005; meaning that the "Ethnicity" variable is not significantly related to gender in some years while it is in others.

Table 4.48 - Pearson Chi-Square Results for Each Year of Principal's Ethnicity

| Year | Pearson Chi-Square Test |
|---|---|
| 02-03 | 0.110 |
| 03-04 | 0.000 |
| 04-05 | 0.095 |
| 05-06 | 0.014 |
| 06-07 | 0.000 |
| 07-08 | 0.001 |
| 08-09 | 0.001 |

Ethnicity is a variable unlike any other variable in this study. Ethnicity is connected to culture, traditions, traits, background, heritage, nationality, and social norms. Ethnicity has been shown to have a major influence on nearly every aspect of life. Research in the social sciences has long documented and studied the effect of ethnicity on society and social institutions. During the 1980's and 1990's, scholarship around the variable of ethnicity exploded and a litany of research emerged (Eriksen, 2002). Ethnicity has been shown to impact nearly every aspect of humanity, from same-sex attraction (Collier et al., 2013) to liver transplant utilization (Orman et al, 2013). While it is necessary to address the issue of ethnicity in this study, it is beyond the scope of this work to give a detailed analysis of the impact of ethnicity on every facet of women in the principalship. However, this section will follow the same pattern as the other variables and provide the numbers of women principals across each of the ethnicity variables.

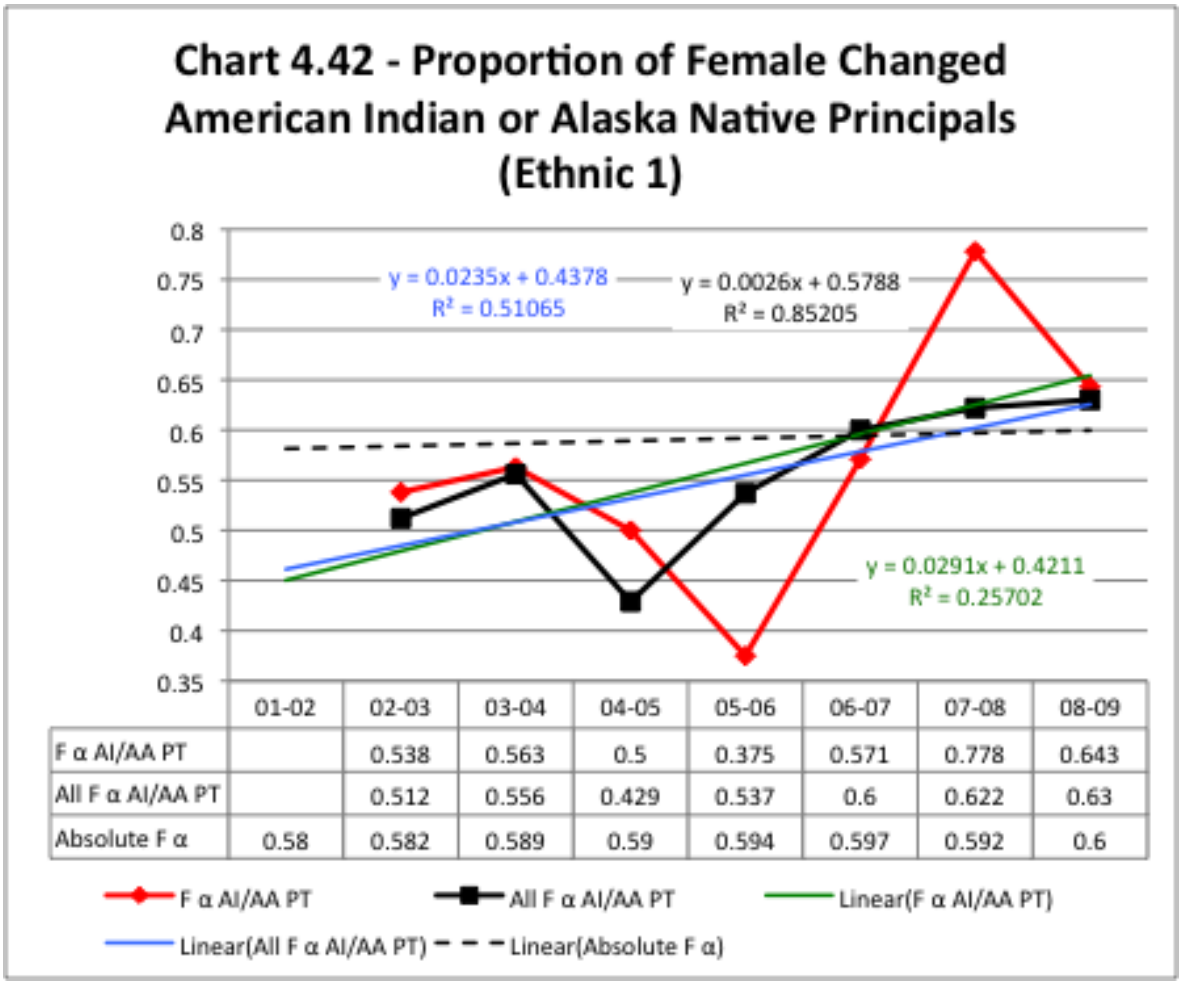
American Indian or Alaska Native Principals

The ethnicity category of American Indian or Alaska Native has the third smallest number of variables, 277 individuals, across the seven years of the study. The small sample size, ranging from 8 to 16 changed principals per year, calls any conclusions from the data into question, see Table 4.49. However, the $R^2$ for the "all principals" (0.51065) indicates that the rise in proportion of American Indian or Alaska Native female principals is consistent (see Chart 4.42).

Table 4.49 - Changed Principals: Gender by American Indian or Alaska Native Ethnicity (Ethnic 1)

| Year | Total CHANGED AI / AA (1) PR | Female AI/AA PR | Female Expected AI/AA PR | Female Difference | F σ AI/AA PR | All F σ AI/AA PR | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 13 | 7 | 7.5 | -0.5 | 0.538 | 0.512 | 0.110 |
| 03-04 | 16 | 9 | 9.5 | -0.5 | 0.563 | 0.556 | 0.000 |
| 04-05 | 12 | 6 | 7.1 | -1.1 | 0.5 | 0.429 | 0.095 |
| 05-06 | 8 | 3 | 4.7 | -1.7 | 0.375 | 0.537 | 0.014 |
| 06-07 | 14 | 8 | 8.2 | -0.2 | 0.571 | 0.6 | 0.000 |
| 07-08 | 9 | 7 | 5.4 | 1.6 | 0.778 | 0.622 | 0.001 |
| 08-09 | 14 | 9 | 8.4 | 0.6 | 0.643 | 0.63 | 0.001 |

Pink = Overrepresented




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α AI/AA PT | | 0.538 | 0.563 | 0.5 | 0.375 | 0.571 | 0.778 | 0.643 |
| All F α AI/AA PT | | 0.512 | 0.556 | 0.429 | 0.537 | 0.6 | 0.622 | 0.63 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Asian Principals

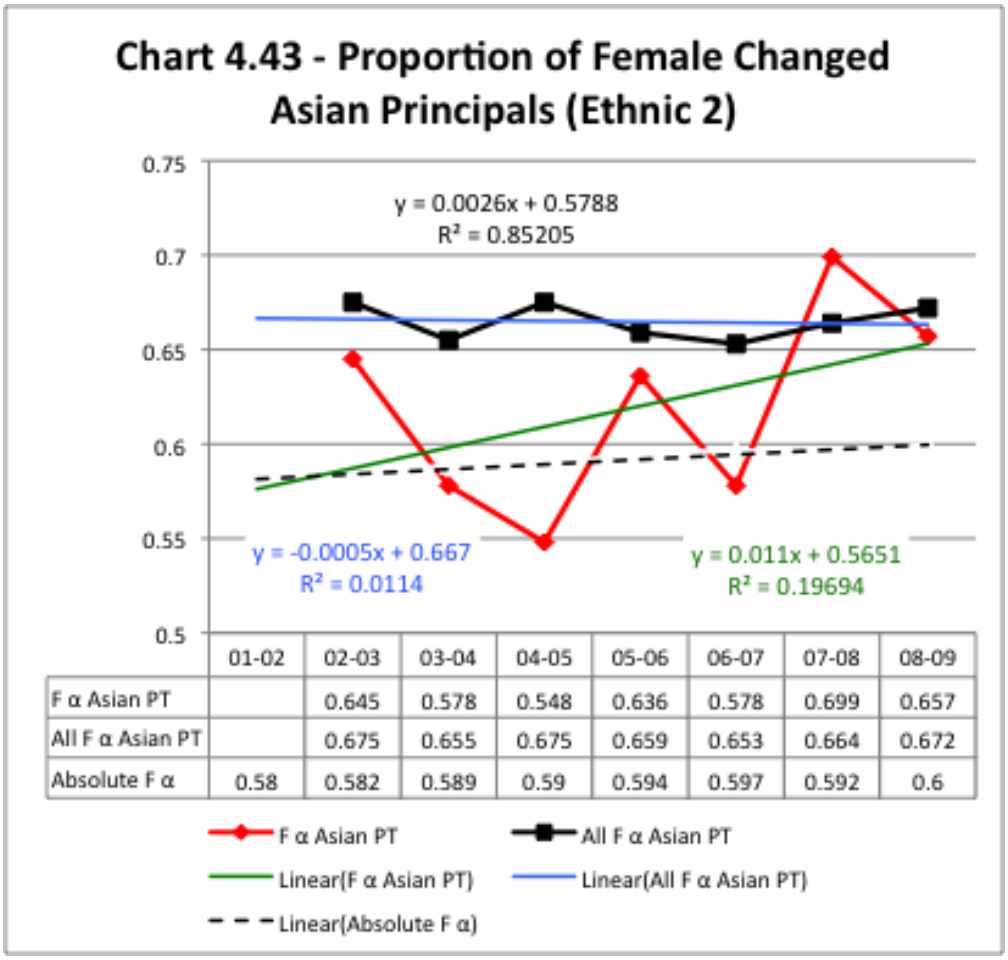
The size of the number of Asian principals is the median in the ethnicity category, with 1538 total principals across the seven years of the study. While still being a smaller sample size, the number of variables lends to having more confidence in the findings. In table 4.50, the proportion of female Asian principals has remained relatively steady over the years of the study, dropping proportionally

by only 0.003. In Chart 4.43 the $R^2$ for the "all principals" (0.0114) and the "changed principals" (0.1964) are both weak and suggest that the data is not reliable in predicting what will happen with female Asian principals in the future.

Table 4.50 - Changed Principals: Gender by Asian Ethnicity (Ethnic 2)

| Year | Total CHANGED Asian (2) PR | Female Asian PR | Female Expected Asian PR | Female Difference | F σ Asian PT | All F σ Asian PT | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 62 | 40 | 35.8 | 4.2 | 0.645 | 0.675 | 0.110 |
| 03-04 | 83 | 48 | 49.2 | -1.2 | 0.578 | 0.655 | 0.000 |
| 04-05 | 42 | 23 | 24.8 | -1.8 | 0.548 | 0.675 | 0.095 |
| 05-06 | 44 | 28 | 26 | 2 | 0.636 | 0.659 | 0.014 |
| 06-07 | 83 | 48 | 48.4 | -0.4 | 0.578 | 0.653 | 0.000 |
| 07-08 | 73 | 51 | 43.8 | 7.2 | 0.699 | 0.664 | 0.001 |
| 08-09 | 70 | 46 | 41.9 | 4.1 | 0.657 | 0.672 | 0.001 |

Pink = Overrepresented

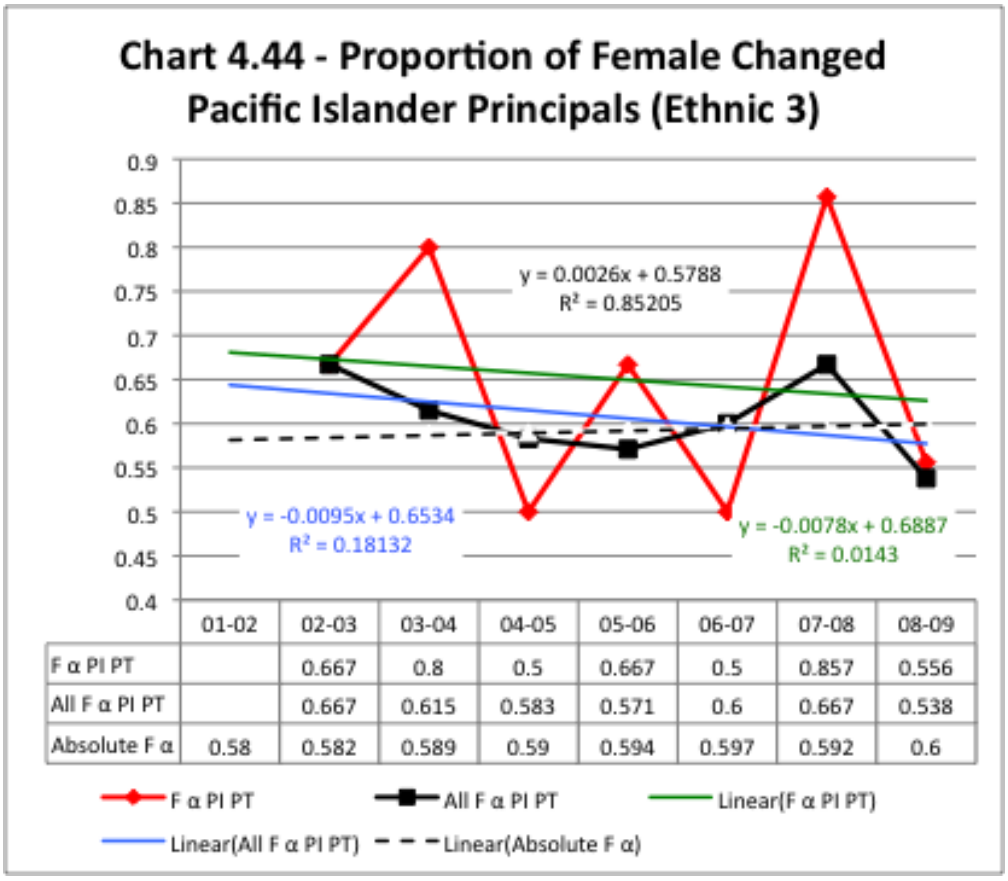



| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Asian PT | | 0.645 | 0.578 | 0.548 | 0.636 | 0.578 | 0.699 | 0.657 |
| All F α Asian PT | | 0.675 | 0.655 | 0.675 | 0.659 | 0.653 | 0.664 | 0.672 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Pacific Islander Principals

The smallest of the categorized ethnicity variables in the study is the Pacific Islanders with just 74 total principals over the span of the study accounting proportionally by just 0.002. The incredibly small sample size, with the number of changed principals never reaching double digits, calls any conclusions from the data into question, see Table 4.51. The $R^2$ for both "all principals" (0.18132) and the "changed principals" (0.0143) suggest that the data is not reliable in predicting what will happen with female Pacific Islander principals in the future, see Chart 4.44.

| Table 4.51 - Changed Principals: Gender by Pacific Islander (Ethnic 3) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED PI (3) PR | Female PI PR | Female Expected PI PR | Female Difference | F α PI PT | All F α PI PT | Change Chi-Square Test |
| 02-03 | 3 | 2 | 1.7 | 0.3 | 0.667 | 0.667 | 0.110 |
| 03-04 | 5 | 4 | 3 | 1 | 0.8 | 0.615 | 0.000 |
| 04-05 | 4 | 2 | 2.4 | -0.4 | 0.5 | 0.583 | 0.095 |
| 05-06 | 3 | 2 | 1.8 | 0.2 | 0.667 | 0.571 | 0.014 |
| 06-07 | 4 | 2 | 2.3 | -0.3 | 0.5 | 0.6 | 0.000 |
| 07-08 | 7 | 6 | 4.2 | 1.8 | 0.857 | 0.667 | 0.001 |
| 08-09 | 9 | 5 | 5.4 | -0.4 | 0.556 | 0.538 | 0.001 |
| | | | | | | | Pink = Overrepresented |



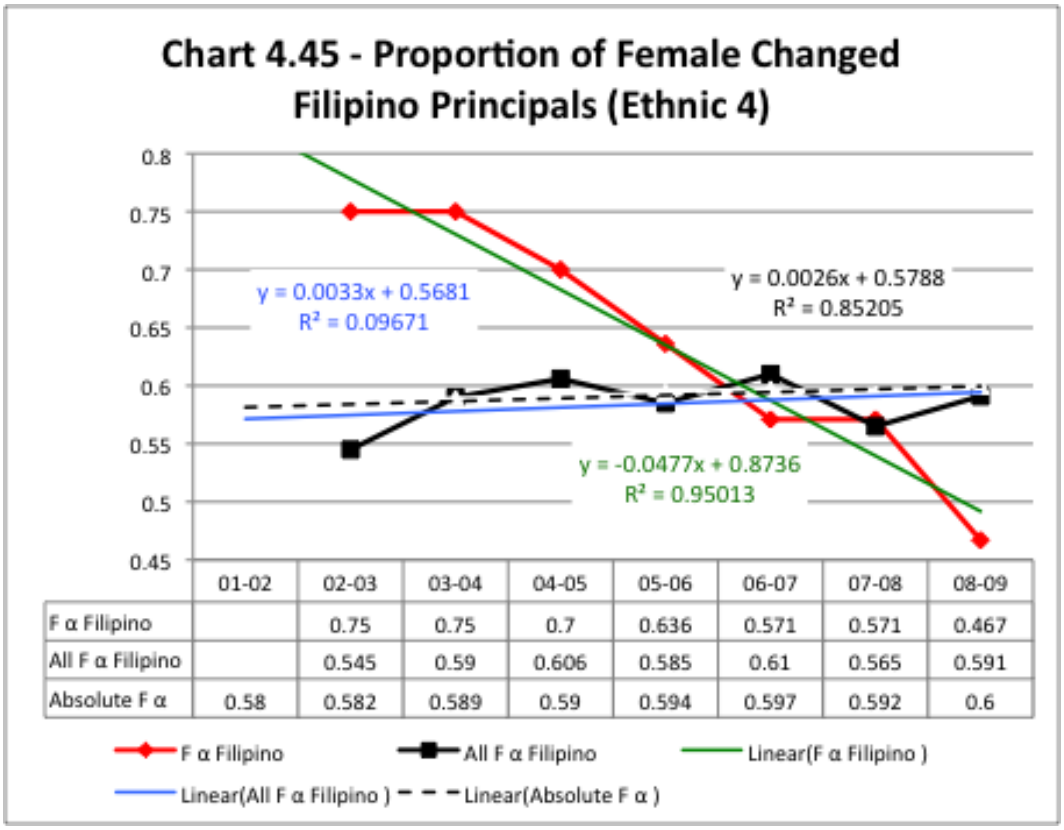

## Filipino Principals

The second smallest of the categorized ethnicity variables in the study is the Filipino Principals with just 268 total principals over the span of the study

accounting for a proportion of just 0.005. The small sample size, with the number of changed principals never getting over 16, precludes any conclusions from the data into question (see Table 4.52). While the $R^2$ for "all principals" (0.09671) is weak, the $R^2$ for "changed principals" (0.95013) is very strong and suggests that the decrease in female Filipino principals is significant, see Chart 4.45.

Table 4.52 - Changed Principals: Gender by Filipino (Ethnic 4)

| Year | Total CHANGED Filipino (4) PR | Female Filipino PR | Female Expected Filipino PR | Female Difference | F σ Filipino | All F σ Filipino | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 8 | 6 | 4.6 | 1.4 | 0.75 | 0.545 | 0.110 |
| 03-04 | 16 | 12 | 9.5 | 2.5 | 0.75 | 0.59 | 0.000 |
| 04-05 | 10 | 7 | 5.9 | 1.1 | 0.7 | 0.606 | 0.095 |
| 05-06 | 11 | 7 | 6.5 | 0.5 | 0.636 | 0.585 | 0.014 |
| 06-07 | 14 | 8 | 8.2 | -0.2 | 0.571 | 0.61 | 0.000 |
| 07-08 | 14 | 8 | 8.4 | -0.4 | 0.571 | 0.565 | 0.001 |
| 08-09 | 15 | 7 | 9 | -2 | 0.467 | 0.591 | 0.001 |

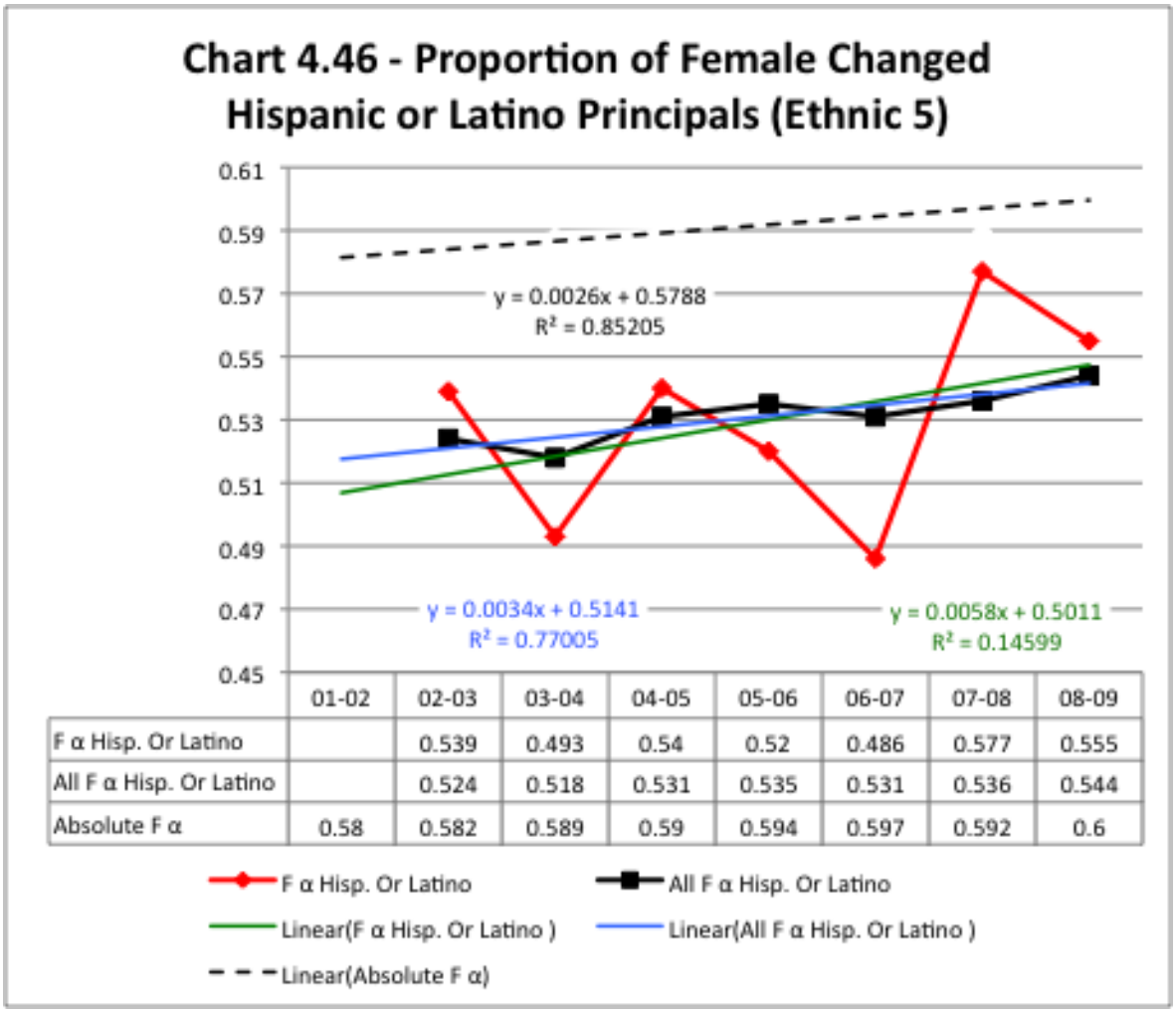



| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Filipino | | 0.75 | 0.75 | 0.7 | 0.636 | 0.571 | 0.571 | 0.467 |
| All F α Filipino | | 0.545 | 0.59 | 0.606 | 0.585 | 0.61 | 0.565 | 0.591 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Hispanic or Latino Principals

The second largest of the categorized ethnicity variables in the study is the Hispanic or Latino Principals with 7982 total principals over the span of the study accounting for 0.163 by proportion of the data. Table 4.53 shows that women are underrepresented across the years of the study, but that they are gaining ground, going from 0.524 in 2002-03 to 0.544 in 2008-09. The increase in proportion is exactly the same as the absolute proportion of 0.02. Chart 4.46 shows that the "all principals" $R^2$ is strong with 0.77005,with a slope of 0.0034, suggesting that Hispanic or Latino female principals are slowly increasing at a faster rate than women overall in the state.

| Table 4.53 - Changed Principals: Gender by Hispanic or Latino (Ethnic 5) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Hisp. Or Latino (5) PR | Female Hisp. Or Latino PR | Female Expected Hisp. Or Latino PR | Female Difference | F α Hisp. Or Latino | All F α Hisp. Or Latino | Change Chi-Square Test |
| 02-03 | 297 | 160 | 171.5 | -11.5 | 0.539 | 0.524 | 0.110 |
| 03-04 | 379 | 187 | 224.5 | -37.5 | 0.493 | 0.518 | 0.000 |
| 04-05 | 300 | 162 | 177 | -15 | 0.54 | 0.531 | 0.095 |
| 05-06 | 306 | 159 | 180.6 | -21.6 | 0.52 | 0.535 | 0.014 |
| 06-07 | 416 | 202 | 242.7 | -40.7 | 0.486 | 0.531 | 0.000 |
| 07-08 | 421 | 243 | 252.8 | -9.8 | 0.577 | 0.536 | 0.001 |
| 08-09 | 389 | 216 | 232.9 | -16.9 | 0.555 | 0.544 | 0.001 |



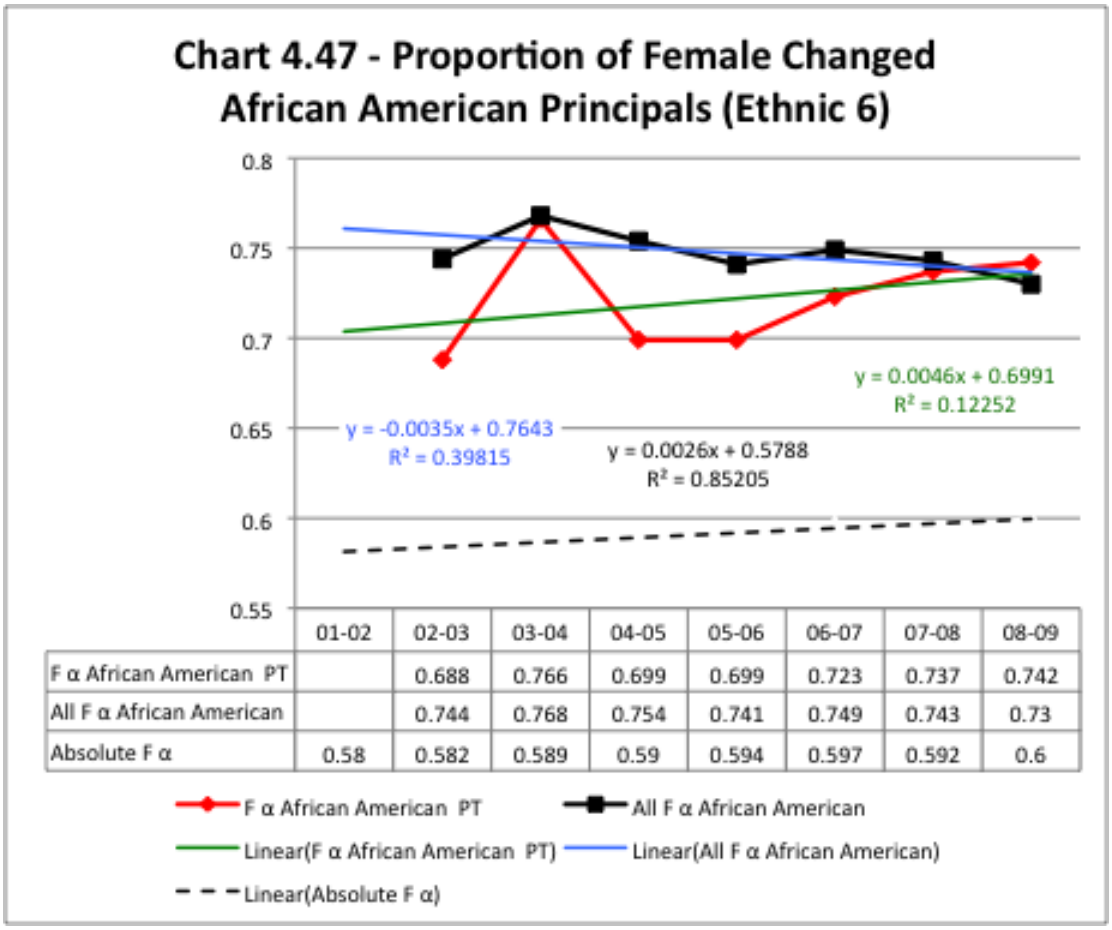
## African American Principals

The third largest of the categorized ethnicity variables in the study is the African American Principals with 4047 total principals over the span of the study proportionally accounting for 0.083 of the data. Table 4.54 shows that African American women are over represented across the years of the study, while slowly losing ground, going from 0.744 in 2002-03 to 0.73 in 2008-09. African American female principals hold 0.14 higher proportion than the absolute value of women in the state. Chart 4.47 visually represents that African American female are losing some ground in their dominant position. While the $R^2$ for "all principals" (0.39815) and the "changed principals" (0.12252) are not strong, the slopes of both lines are negative (Chart 4.45).

Table 4.54 - Changed Principals: Gender by African American (Ethnic 6)

| Year | Total CHANGED African American (6) PR | Female African American PR | Female Expected African American PR | Female Difference | F α African American PT | All F α African American | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 160 | 110 | 92.4 | 17.6 | 0.688 | 0.744 | 0.110 |
| 03-04 | 214 | 164 | 126.8 | 37.2 | 0.766 | 0.768 | 0.000 |
| 04-05 | 156 | 109 | 92 | 17 | 0.699 | 0.754 | 0.095 |
| 05-06 | 136 | 95 | 80.3 | 14.7 | 0.699 | 0.741 | 0.014 |
| 06-07 | 191 | 138 | 111.4 | 26.6 | 0.723 | 0.749 | 0.000 |
| 07-08 | 209 | 154 | 125.5 | 28.5 | 0.737 | 0.743 | 0.001 |
| 08-09 | 209 | 155 | 125.1 | 29.9 | 0.742 | 0.73 | 0.001 |

Pink = Overrepresented




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α African American PT | | 0.688 | 0.766 | 0.699 | 0.699 | 0.723 | 0.737 | 0.742 |
| All F α African American | | 0.744 | 0.768 | 0.754 | 0.741 | 0.749 | 0.743 | 0.73 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

White Principals

White female principals proportionally account for 0.701 of the entire ethnicity variable found in the study. As would be expected with this large proportion of the data, the proportion of white female principals is very close to the absolute values. Table 4.55 shows that white female principals went from 0.571% in 2002-03 to 0.587% in 2008-09, a proportional gain of 0.016. Chart 4.48 is a visual representation of the data and shows that the $R^2$ for "all principals" (0.79785) is quite strong and that the slope (0.0036) is steeper than the absolute slope

(0.0026). This suggests that white women, while being slightly less represented than the absolute value, are gaining.

Table 4.55 - Changed Principals: Gender by White (Ethnic 7)

| Year | Total CHANGED White (7) PR | Female White PR | Female Expected White PR | Female Difference | F% White PT | All F% White PT | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 1230 | 699 | 710.4 | -11.4 | 0.568 | 0.571 | 0.110 |
| 03-04 | 1657 | 980 | 981.5 | -1.5 | 0.591 | 0.58 | 0.000 |
| 04-05 | 1229 | 726 | 725.1 | 0.9 | 0.591 | 0.581 | 0.095 |
| 05-06 | 1127 | 674 | 665 | 9 | 0.598 | 0.59 | 0.014 |
| 06-07 | 1506 | 895 | 878.7 | 16.3 | 0.594 | 0.594 | 0.000 |
| 07-08 | 149 | 868 | 894.8 | -26.8 | 0.583 | 0.587 | 0.001 |
| 08-09 | 1519 | 892 | 909.5 | -17.5 | 0.587 | 0.596 | 0.001 |

Pink = Overrepresented

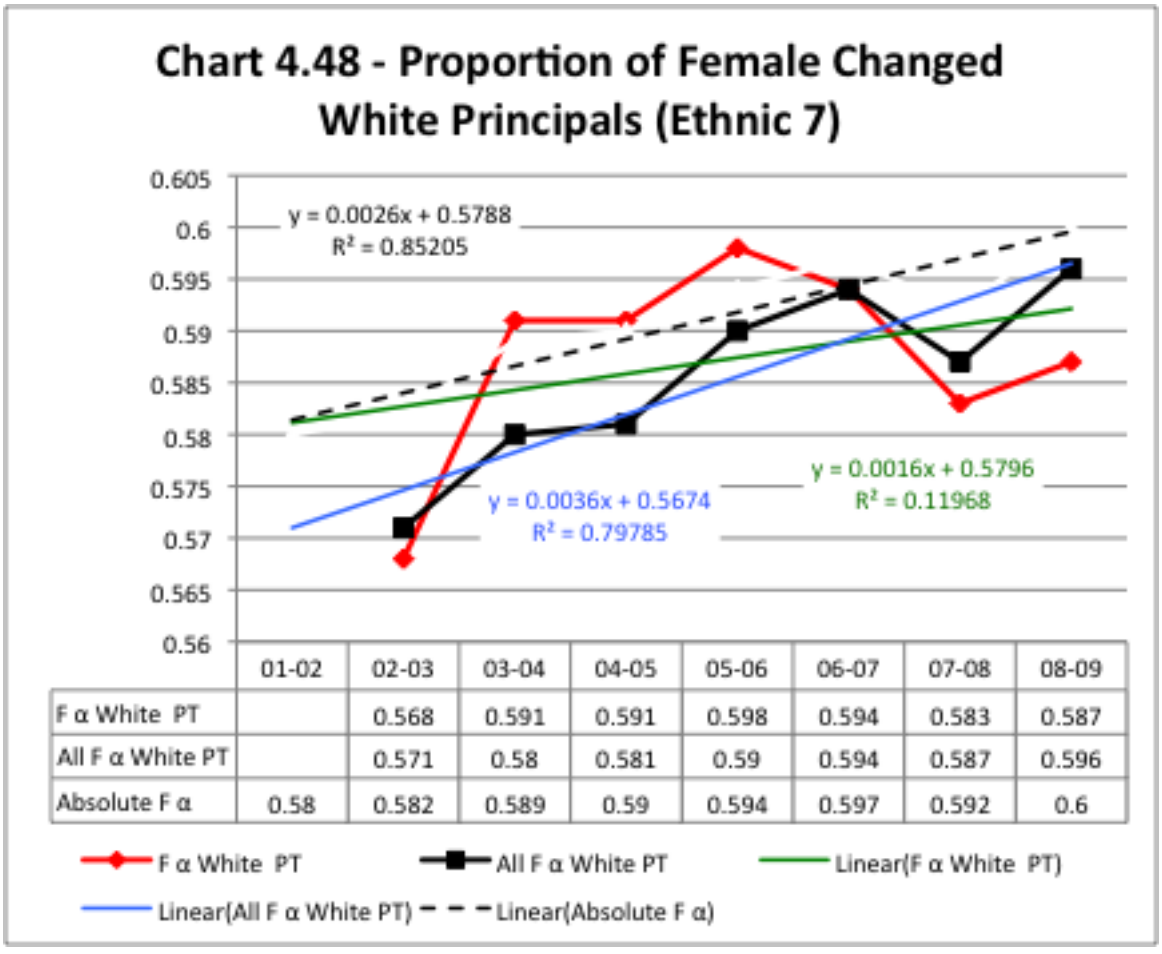
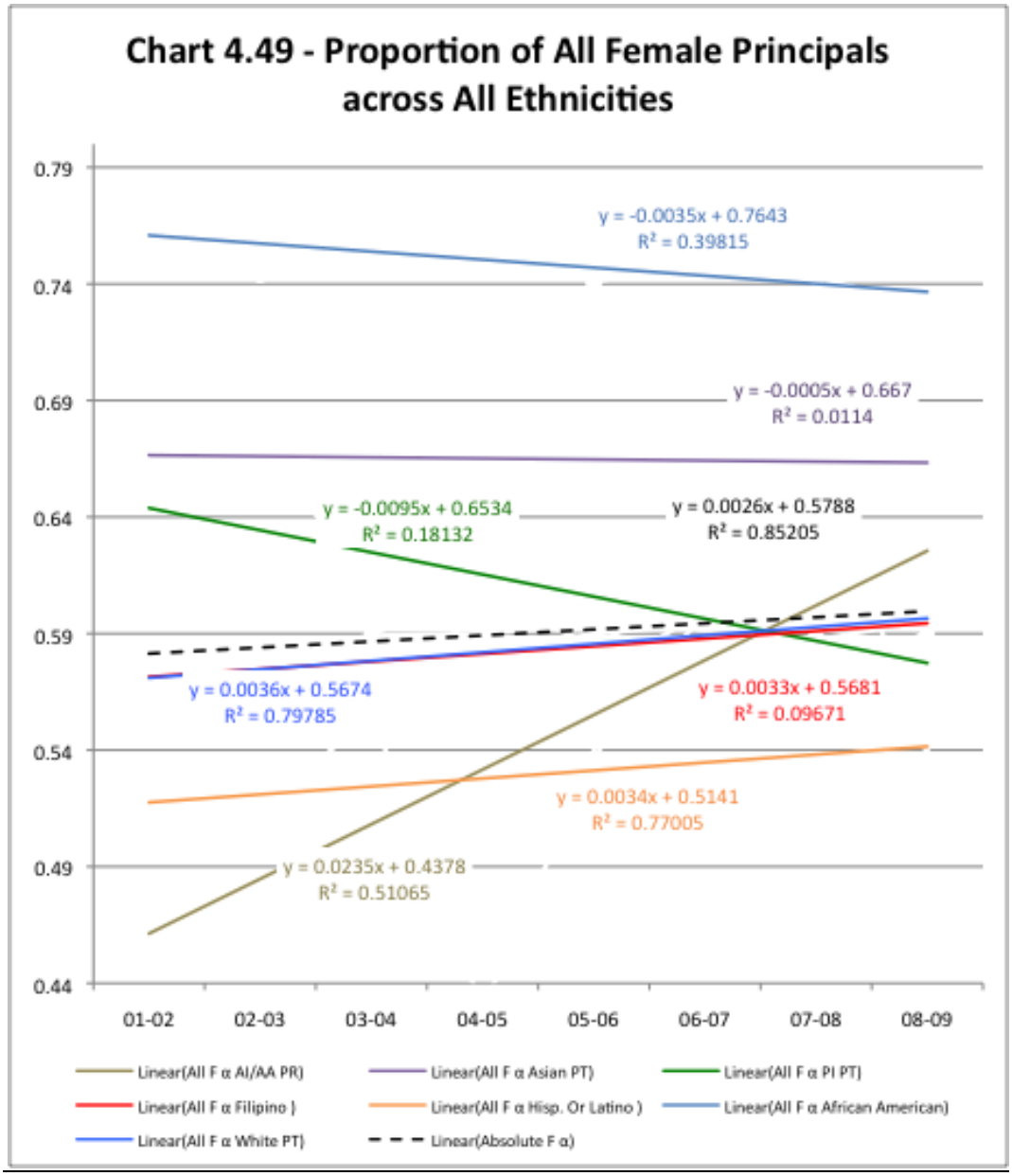


Chart 4.49 is a visual representation of all ethnicities across the years of the study. This chart shows that African American and Asian female principals are overrepresented and are shrinking back towards the absolute female proportion line. Hispanic or Latino female principals are underrepresented but are showing an increased proportion across the study.




Principal's Years in the District

The PAIF data supplied the number of years each principal were employed in the district. Table 4.56 gives a brief overview of the statistical make-up of the district tenure. The years in the district were broken down into four categories:

"Low Years" (principals that had 0 to 5 years in the district), "Medium-Low Years", (6 to 12 years in the district), "Medium-High Years" (13 to 20 years in the district) and "High Years" (21 or more years in the district). Table 4.57 has a coded breakdown of the "District" variable, total number of principals per status, and percentage of the data for each category. The last two columns were obtained by combining each of the data years into one master data set, called 2CombinedPR, and then sorting by the status.

Table 4.56 - Years in District Statistics for All Study Years

| Figure | |
|---|---|
| Number of Principals | 48818 |
| Missing | 29 |
| Mean | 14.77 |
| Median | 13 |
| Low | 0 Years |
| High | 59 Years |

Table 4.57 - District Variable

| Category | Code | Frequency: All Years of the Study | Percentage |
|---|---|---|---|
| Low Years | 1 | 11961 | 24.5 |
| Medium-Low Years | 2 | 11398 | 23.3 |
| Medium-High Years | 3 | 11469 | 23.5 |
| High Years | 4 | 13990 | 28.6 |

Table 4.58 is a breakdown of each of the study years Pearson Chi-Squared test results. Only one year, 2003-04, has a result lower than the conventional criteria for statistical significance of 0.01 or 0.005; meaning that the "District"

variable is significantly related to gender. What follows is a detailed analysis of each of the status variables.

Table 4.58 - Pearson Chi-Square Results for Each Year for District by Gender

| Year | Pearson Chi-Square |
|---|---|
| 02-03 | 0.018 |
| 03-04 | 0.063 |
| 04-05 | 0.003 |
| 05-06 | 0.000 |
| 06-07 | 0.000 |
| 07-08 | 0.000 |
| 08-09 | 0.000 |

Low Years in District

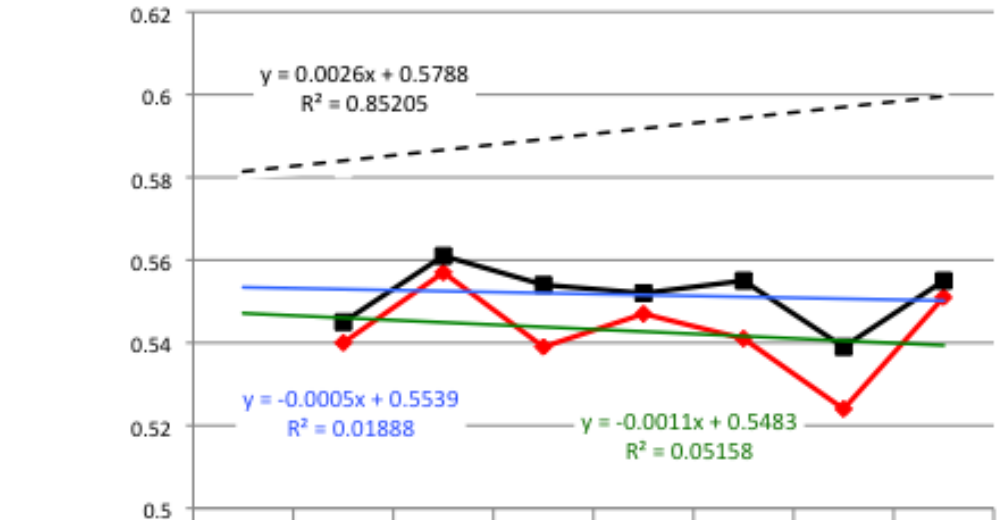
Table 4.59 shows that female principals in the "Low Years" category are underrepresented in each year of the study while increasing in proportion from 0.545 in 2002-03 to 0.555 in 2008-09, an increase of 0.01.

Table 4.59 - Changed Principals: Gender by District Low Years (District 1)

| Year | Total CHANGED Low District (1) PR | Female Low District PR | Female Expected Low Dist PR | Female Difference | F ɑ Low Distr. Yrs | All F ɑ Low Distr. Yr | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 593 | 320 | 342.7 | -22.7 | 0.54 | 0.545 | 0.018 |
| 03-04 | 745 | 415 | 441.3 | -26.3 | 0.557 | 0.561 | 0.063 |
| 04-05 | 651 | 351 | 384.1 | -33.1 | 0.539 | 0.554 | 0.003 |
| 05-06 | 547 | 299 | 322.8 | -23.8 | 0.547 | 0.552 | 0.000 |
| 06-07 | 830 | 449 | 484.3 | -35.3 | 0.541 | 0.555 | 0.000 |
| 07-08 | 829 | 434 | 497.8 | -63.8 | 0.524 | 0.539 | 0.000 |
| 08-09 | 755 | 416 | 452.1 | -36.1 | 0.551 | 0.555 | 0.000 |

Chart 4.50 gives a visual representation of the data and shows that the R²'s of "all female principals" (0.01888) and the "changed female principals" (0.05158) are weak, but that they are declining slightly. Hypothesis 9a states: Women will gain proportion in the favorable low district years. H9a is denied at face due to the lack of statistical significance in the findings.

**Chart 4.50 - Proportion of Female Changed Principals with Low District Years (District 1)**




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Low Distr. Yrs | | 0.54 | 0.557 | 0.539 | 0.547 | 0.541 | 0.524 | 0.551 |
| All F α Low Distr. Yr | | 0.545 | 0.561 | 0.554 | 0.552 | 0.555 | 0.539 | 0.555 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

F α Low Distr. Yrs — All F α Low Distr. Yr
Linear(F α Low Distr. Yrs) — Linear(All F α Low Distr. Yr)
Linear(Absolute F α)

<u>Medium-Low Years in the District</u>

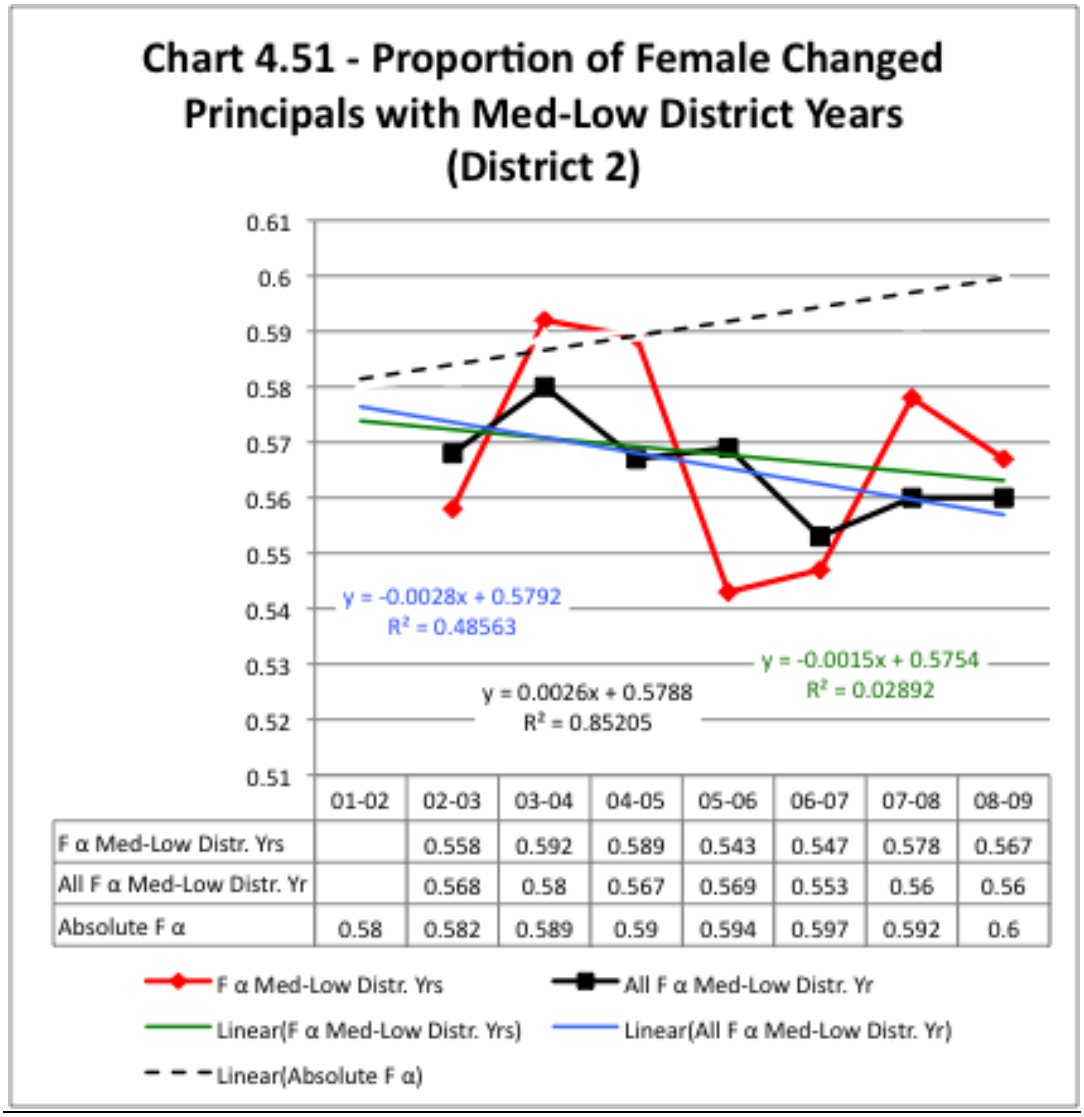
Table 4.60 shows that female principals in the "Medium-Low Years" category

are underrepresented in each year of the study and that the proportion of the "all females" declines from 0.568 in 2002-03 to 0.56 in 2008-09, a decrease of 0.008.

Table 4.60 - Changed Principals: Gender by District Med-Low Years (District 2)

| Year | Total CHANGED Med-Low District (2) PR | Female Med-Low District PR | Female Expected Med-Low Dist PR | Female Difference | F ⌀ Med-Low Distr. Yrs | All F ⌀ Med-Low Distr. Yr | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 373 | 208 | 215.6 | -7.6 | 0.558 | 0.568 | 0.018 |
| 03-04 | 497 | 294 | 294.4 | -0.4 | 0.592 | 0.58 | 0.063 |
| 04-05 | 384 | 226 | 226.6 | -0.6 | 0.589 | 0.567 | 0.003 |
| 05-06 | 394 | 214 | 232.5 | -18.5 | 0.543 | 0.569 | 0.000 |
| 06-07 | 536 | 293 | 312.7 | -19.7 | 0.547 | 0.553 | 0.000 |
| 07-08 | 592 | 342 | 355.5 | -13.5 | 0.578 | 0.56 | 0.000 |
| 08-09 | 547 | 310 | 327.5 | -17.5 | 0.567 | 0.56 | 0.000 |

Chart 4.51 gives a visual representation of the data and shows that the $R^2$ of "all female principals" (0.48563) is reasonably strong while the $R^2$ of "changed female principals" (0.02892) is weak. Both linear lines have a negative slope. The preliminary conclusion to H9b, that women will maintain or gain proportion in the favorable medium/low district years, is false.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Med-Low Distr. Yrs | | 0.558 | 0.592 | 0.589 | 0.543 | 0.547 | 0.578 | 0.567 |
| All F α Med-Low Distr. Yr | | 0.568 | 0.58 | 0.567 | 0.569 | 0.553 | 0.56 | 0.56 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Medium-High Years in District

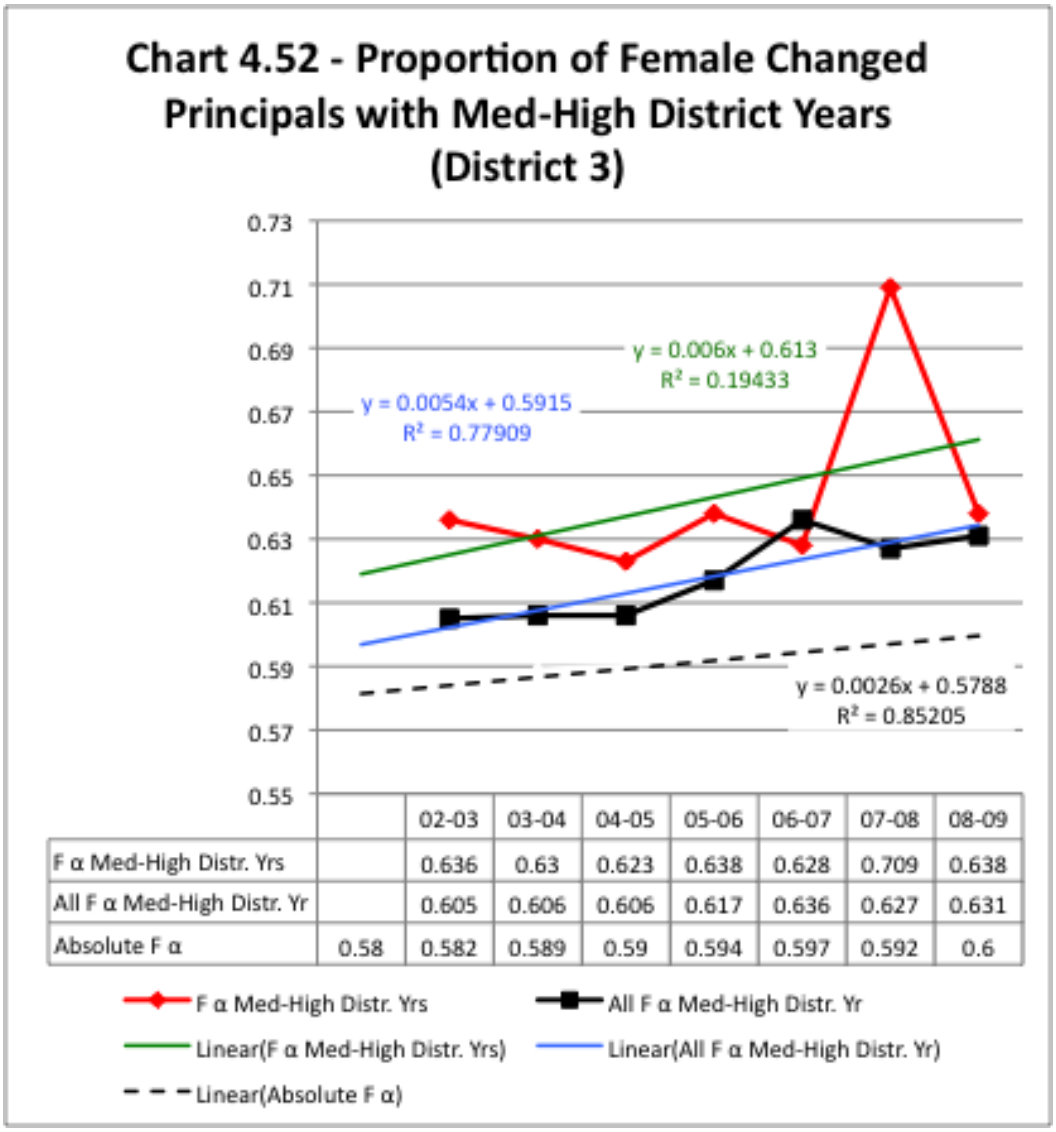
Table 4.61 shows that female principals in the "Medium-High Years" category are overrepresented in each year of the study and that the proportion of the "all females" increases from 0.605 in 2002-03 to 0.631 in 2008-09, an increase of 0.026, which is 0.006 higher than the absolute increase of female principals.

Table 4.61 - Changed Principals: Gender by District Med-High Years (District 3)

| Year | Total CHANGED Med-High District (3) PR | Female Med-High District PR | Female Expected Med-High Dist PR | Female Difference | F ø Med-High Distr. Yrs | All F ø Med-High Distr. Yr | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 387 | 246 | 223.7 | 22.3 | 0.636 | 0.605 | 0.018 |
| 03-04 | 559 | 352 | 331.1 | 20.9 | 0.63 | 0.606 | 0.063 |
| 04-05 | 366 | 228 | 215.9 | 12.1 | 0.623 | 0.606 | 0.003 |
| 05-06 | 356 | 227 | 210.1 | 16.9 | 0.638 | 0.617 | 0.000 |
| 06-07 | 425 | 267 | 248 | 19 | 0.628 | 0.636 | 0.000 |
| 07-08 | 437 | 310 | 262.4 | 47.6 | 0.709 | 0.627 | 0.000 |
| 08-09 | 484 | 309 | 289.8 | 19.2 | 0.638 | 0.631 | 0.000 |

Pink = Overrepresented

Chart 4.52 gives a visual representation of the data and shows that the $R^2$ of "all female principals" (0.77909) is strong while the $R^2$ of "changed female principals" (0.19433) is weak. Both linear lines have positive slopes. Hypothesis H9c states: Women will maintain or lose proportion in the medium/high district years. H9c is supported.




| | | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Med-High Distr. Yrs | | 0.636 | 0.63 | 0.623 | 0.638 | 0.628 | 0.709 | 0.638 |
| All F α Med-High Distr. Yr | | 0.605 | 0.606 | 0.606 | 0.617 | 0.636 | 0.627 | 0.631 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

High Years in the District

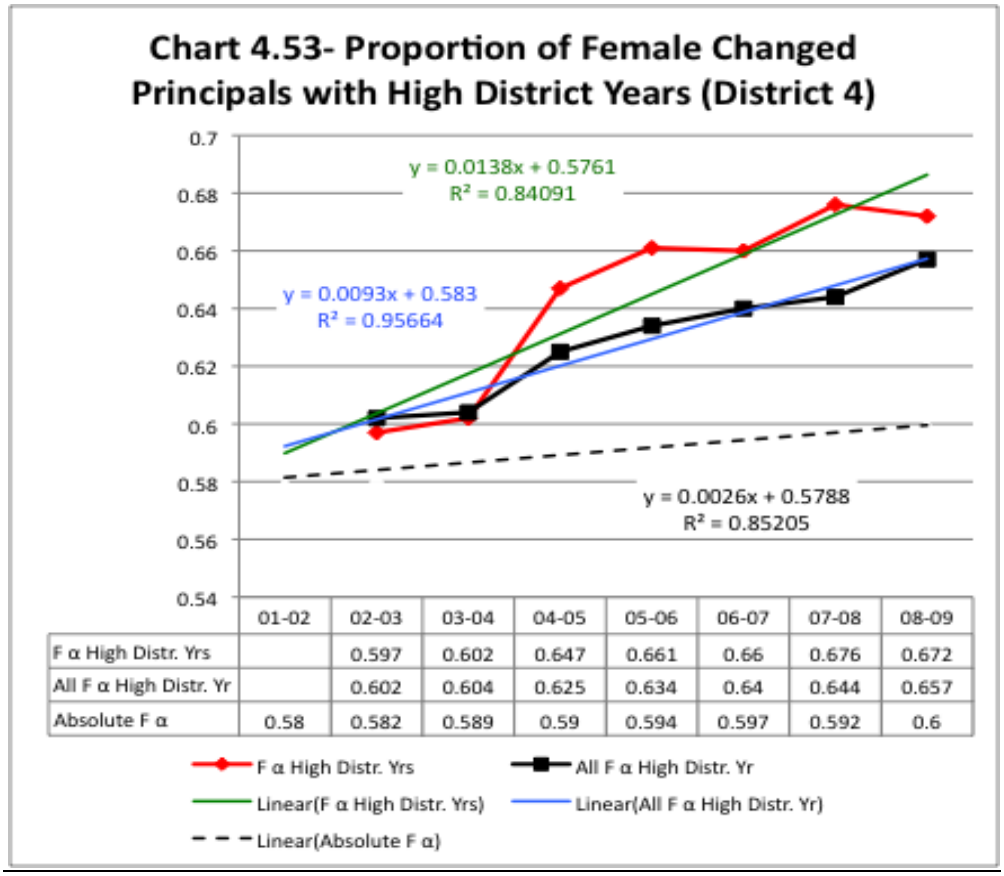
Table 4.62 shows that female principals in the "High Years" category are overrepresented in each year of the study and that the proportion of the "all females" increases from 0.602 in 2002-03 to 0.657 in 2008-09, an increase of 0.055, which is 0.035 higher than the absolute increase of female principals.

Table 4.62 - Changed Principals: Gender by District High Years (District 4)

| Year | Total CHANGED High District (4) PR | Female High District PR | Female Expected High Dist PR | Female Difference | F α High Distr. Yrs | All F α High Distr. Yr | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 417 | 249 | 241 | 8 | 0.597 | 0.602 | 0.018 |
| 03-04 | 603 | 363 | 357.2 | 5.8 | 0.602 | 0.604 | 0.063 |
| 04-05 | 377 | 244 | 222.4 | 21.6 | 0.647 | 0.625 | 0.003 |
| 05-06 | 357 | 236 | 210.7 | 25.3 | 0.661 | 0.634 | 0.000 |
| 06-07 | 473 | 312 | 276 | 36 | 0.66 | 0.64 | 0.000 |
| 07-08 | 395 | 267 | 237.2 | 29.8 | 0.676 | 0.644 | 0.000 |
| 08-09 | 472 | 317 | 282.6 | 34.4 | 0.672 | 0.657 | 0.000 |

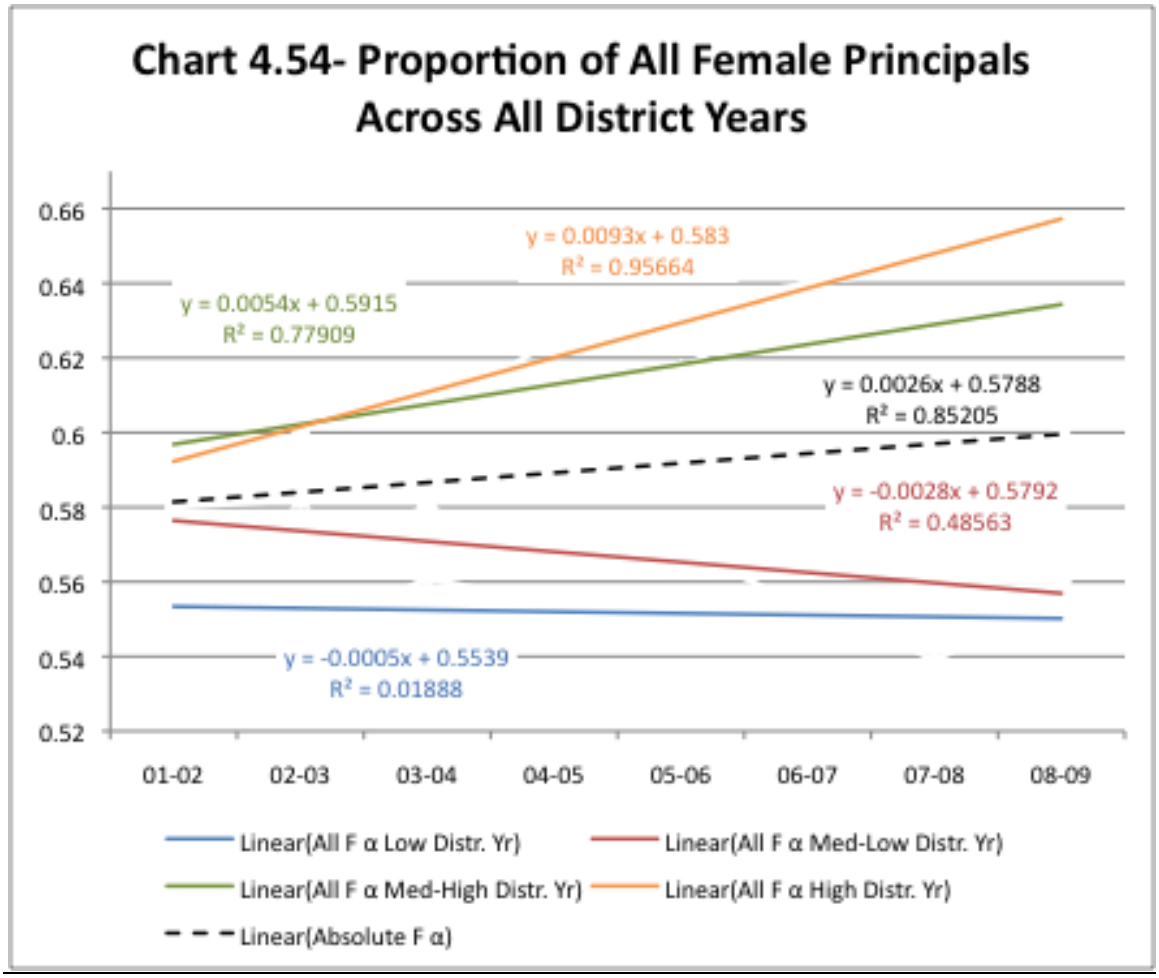
Pink = Overrepresented

Chart 4.53 gives a visual representation of the data and shows that both the $R^2$'s of "all female principals" (0.95664) and "changed female principals" (0.84091) are very strong. Both linear lines have positive slopes. Hypothesis H9d states: Women will maintain or lose proportion in the unfavorable high district years. H9d is denied.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α High Distr. Yrs | | 0.597 | 0.602 | 0.647 | 0.661 | 0.66 | 0.676 | 0.672 |
| All F α High Distr. Yr | | 0.602 | 0.604 | 0.625 | 0.634 | 0.64 | 0.644 | 0.657 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Chart 4.54 gives a visual representation of all the female principals across all the district years' variables. Hypothesis 10 states, female principals will have an equal to or lower number of years in the district than men. As the district year's variables have produced findings that both confirm and deny the hypotheses of this study, in the strictest sense, the overall hypothesis of H9 must be denied for the time being. At first glance, this variable would seem to support assumptions advocated by sexual politics and is therefore further discussed in Chapter V.




Principal's Years in Teaching

The PAIF data supplied the number of years each principal had been in the teaching profession. Table 4.63 gives a brief overview of the statistical make-up of the years in teaching. Notice the much higher mean and median of the teaching years, 21.5 and 22 respectively, compared to the district years mean and median of 14.77 and 13. The years in teaching were broken down into four categories: "Low

Years", (principals that had 0 to 10 years in the district), "Medium-Low Years", (11 to 17 years in the district), "Medium-High Years" (18 to 25 years in the district) and "High Years" (26 or more years in the district). Table 4.64 has a coded breakdown of the "District" variable, total number of principals per status, and percentage of the data for each category. The last two columns were obtained by combining each of the data years into one master data set, called 2CombinedPR, and then sorting by the status.

Table 4.63 - Years in Teaching Statistics for All Study Years

| Figure | |
|---|---|
| Number of Principals | 48837 |
| Missing | 10 |
| Mean | 21.5 |
| Median | 22 |
| Low | 0 Years |
| High | 59 Years |

Table 4.64 - Teach Variable

| Category | Code | Frequency: All Years of the Study | Percentage |
|---|---|---|---|
| Low Years | 1 | 6835 | 14.0 |
| Medium-Low Years | 2 | 10983 | 22.5 |
| Medium-High Years | 3 | 12408 | 25.4 |
| High Years | 4 | 18611 | 38.1 |

Table 4.65 is a breakdown of each of the study years Pearson Chi-Squared test results. Two years, 2002-3 and 2008-09, have results higher than the conventional criteria for statistical significance of 0.01 or 0.005; meaning that the

"Teach" variable is significantly related to gender. What follows is a detailed analysis of each of the status variables.

Table 4.65 - Pearson Chi-Square Results for Each Year for Teach by Gender

| Year | Pearson Chi-Square |
|---|---|
| 02-03 | 0.122 |
| 03-04 | 0.010 |
| 04-05 | 0.005 |
| 05-06 | 0.000 |
| 06-07 | 0.000 |
| 07-08 | 0.000 |
| 08-09 | 0.014 |

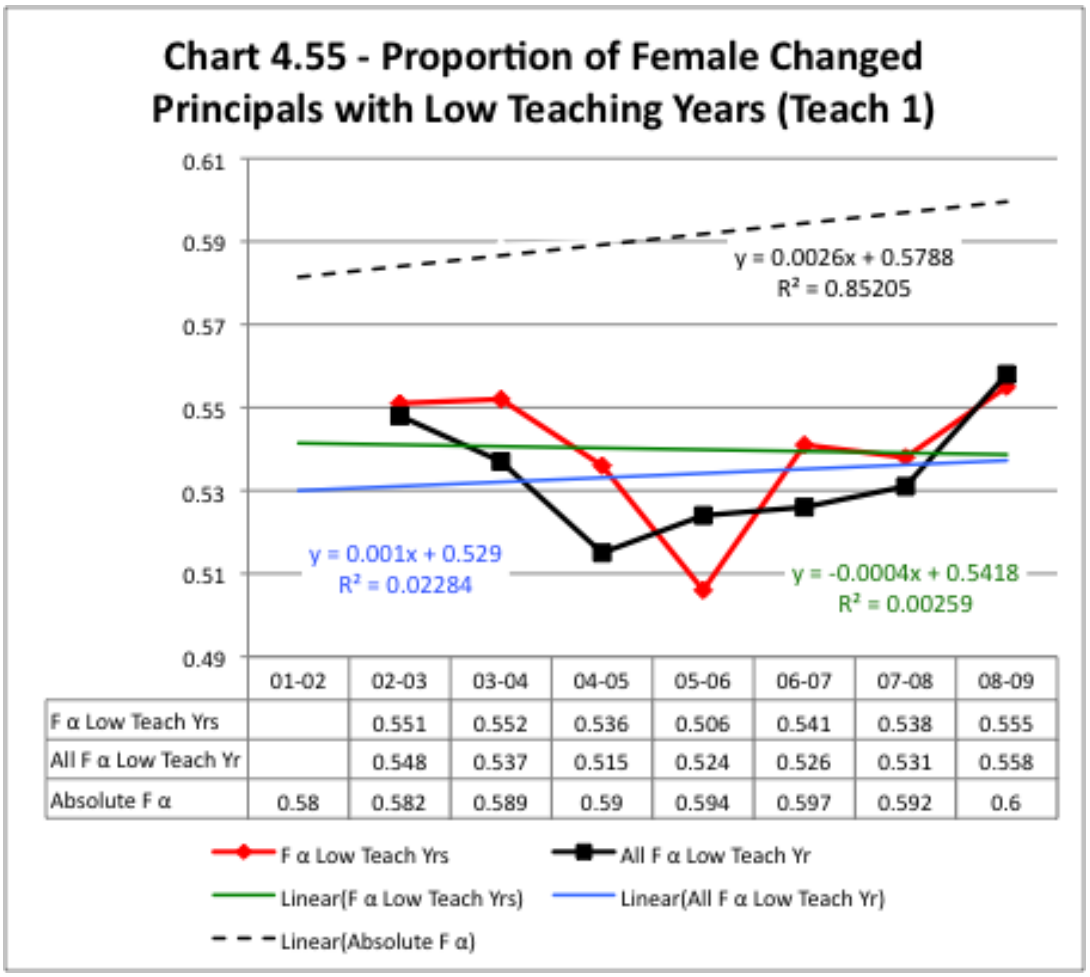
## Low Teaching Years

Table 4.66 shows that female principals in the "Low Years" category are underrepresented in each year of the study and that the proportion of the "all females" increases from 0.548 in 2002-03 to 0.558 in 2008-09, an increase of 0.01, which is 0.01 lower than the absolute increase of female principals.

Table 4.66 - Changed Principals: Gender by Low Years (Teach 1)

| Year | Total CHANGED Low Teach (1) PR | Female Low Teach PR | Female Expected Low Teach PR | Female Difference | F α Low Teach Yrs | All F α Low Teach Yr | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 356 | 196 | 205.3 | -9.3 | 0.551 | 0.548 | 0.122 |
| 03-04 | 458 | 253 | 271.3 | -18.3 | 0.552 | 0.537 | 0.010 |
| 04-05 | 446 | 239 | 263.1 | -24.1 | 0.536 | 0.515 | 0.005 |
| 05-06 | 362 | 183 | 213.6 | -30.6 | 0.506 | 0.524 | 0.000 |
| 06-07 | 567 | 307 | 330.8 | -23.8 | 0.541 | 0.526 | 0.000 |
| 07-08 | 552 | 297 | 331.5 | -34.5 | 0.538 | 0.531 | 0.000 |
| 08-09 | 506 | 281 | 303 | -22 | 0.555 | 0.558 | 0.014 |

Chart 4.55 gives a visual representation of the data and shows that both the $R^2$'s of "all female principals" (0.02284) and "changed female principals" (0.00259) are very weak. This means that the lines do not predict satisfactorily. While the "changed" linear line is negative, the "all" line is positive, though it is not as steep as the absolute lines slope of 0.0026. Hypothesis H10a states: Women will gain proportion in the favorable low teaching years. H10a is denied.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Low Teach Yrs | | 0.551 | 0.552 | 0.536 | 0.506 | 0.541 | 0.538 | 0.555 |
| All F α Low Teach Yr | | 0.548 | 0.537 | 0.515 | 0.524 | 0.526 | 0.531 | 0.558 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

## Medium-Low Teaching Years

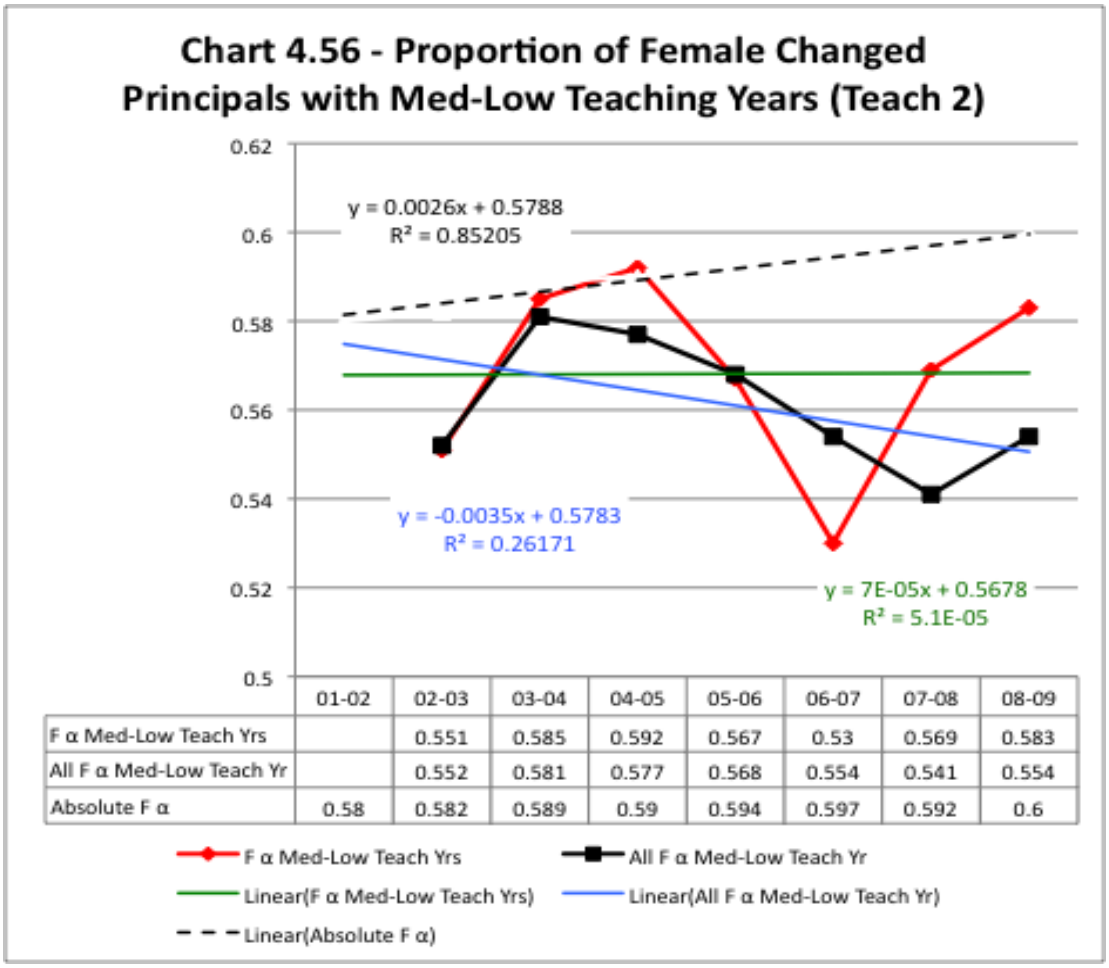
Table 4.67 shows that female principals in the "Medium-Low Years" category are underrepresented in each year of the study, except for the 2004-05 year, and that the proportion of the "all females" increases from 0.552 in 2002-03 to 0.554 in 2008-09, an increase of 0.002, which is 0.018 lower than the absolute increase of female principals.

Table 4.67 - Changed Principals: Gender by Teach Med-Low Years Teach 2)

| Year | Total CHANGED Med-Low Teach (2) PR | Female Med-Low Teach PR | Female Expected Med-Low Teach PR | Female Difference | F ø Med-Low Teach Yrs | All F ø Med-Low Teach Yr | Change Chi-Square Test |
|---|---|---|---|---|---|---|---|
| 02-03 | 399 | 220 | 230.1 | -10.1 | 0.551 | 0.552 | 0.122 |
| 03-04 | 552 | 323 | 327 | -4 | 0.585 | 0.581 | 0.010 |
| 04-05 | 424 | 251 | 250.2 | 0.8 | 0.592 | 0.577 | 0.005 |
| 05-06 | 413 | 234 | 243.7 | -9.7 | 0.567 | 0.568 | 0.000 |
| 06-07 | 587 | 311 | 342.5 | -31.5 | 0.53 | 0.554 | 0.000 |
| 07-08 | 608 | 346 | 365.1 | -19.1 | 0.569 | 0.541 | 0.000 |
| 08-09 | 662 | 386 | 396.4 | -10.4 | 0.583 | 0.554 | 0.014 |

Pink = Overrepresented

Chart 4.56 gives a visual representation of the data and shows that both the $R^2$'s of "all female principals" (0.26171) and "changed female principals" (5.1E-05) are weak. This means that the lines predict unreliably. While the "changed" linear line is nearly level, the "all" line is declining. Hypothesis H10b states: Women will maintain or gain proportion in the favorable medium/low teaching years. H10b in denied.



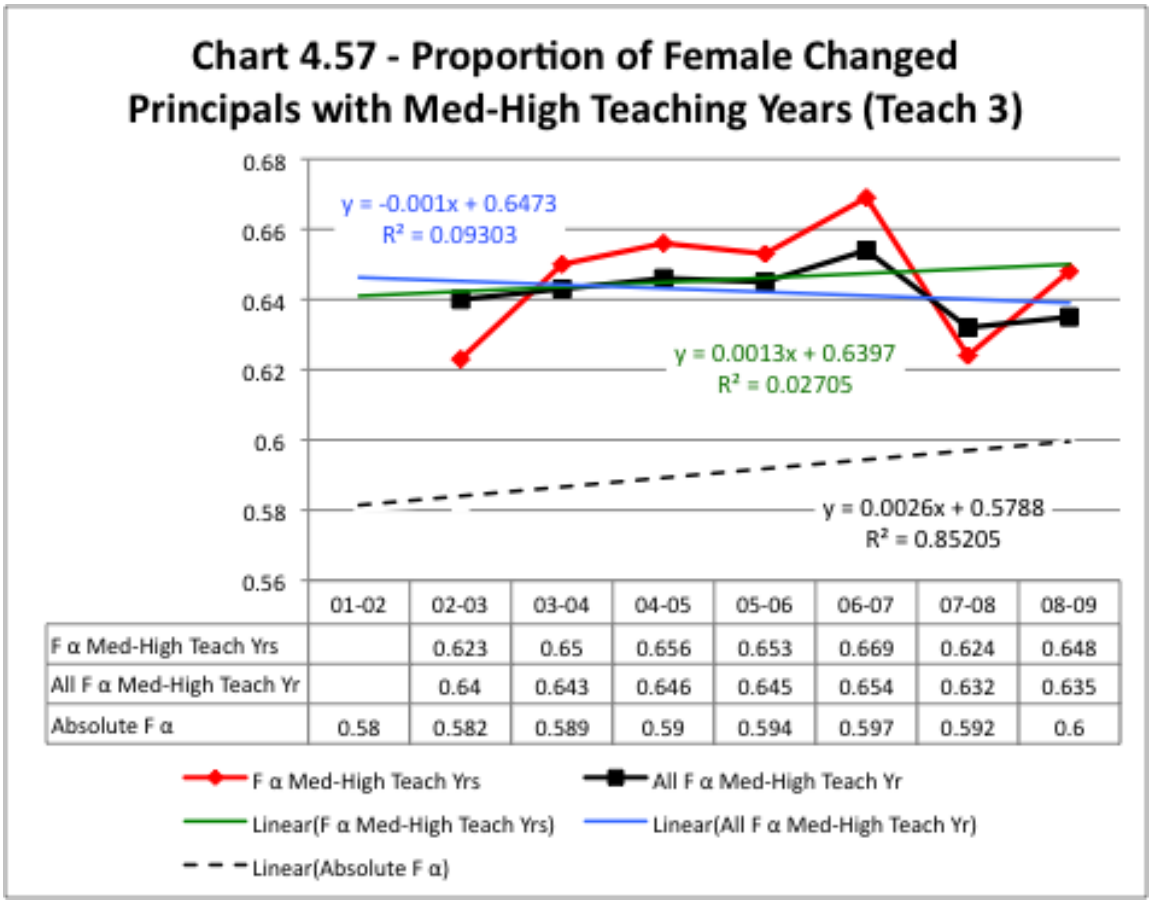

| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Med-Low Teach Yrs | | 0.551 | 0.585 | 0.592 | 0.567 | 0.53 | 0.569 | 0.583 |
| All F α Med-Low Teach Yr | | 0.552 | 0.581 | 0.577 | 0.568 | 0.554 | 0.541 | 0.554 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Medium-High Teaching Years

Table 4.68 shows that female principals in the "Medium-High Years" category are overrepresented in each year of the study and that the proportion of the "all females" decreases from 0.64 in 2002-03 to 0.635 in 2008-09, a decrease of 0.005.

| Table 4.68 - Changed Principals: Gender by Teach Med-High Years Teach 3) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED Med-High Teach (3) PR | Female Med-High Teach PR | Female Expected Med-High Teach PR | Female Difference | F ø Med-High Teach Yrs | All F ø Med-High Teach Yr | Change Chi-Square Test |
| 02-03 | 432 | 269 | 249.2 | 19.8 | 0.623 | 0.64 | 0.122 |
| 03-04 | 560 | 364 | 331.7 | 32.3 | 0.65 | 0.643 | 0.010 |
| 04-05 | 401 | 263 | 236.6 | 26.4 | 0.656 | 0.646 | 0.005 |
| 05-06 | 395 | 258 | 233.1 | 24.9 | 0.653 | 0.645 | 0.000 |
| 06-07 | 504 | 337 | 294.1 | 42.9 | 0.669 | 0.654 | 0.000 |
| 07-08 | 532 | 332 | 319.5 | 12.5 | 0.624 | 0.632 | 0.000 |
| 08-09 | 563 | 365 | 337.1 | 27.9 | 0.648 | 0.635 | 0.014 |
| | | | | | | Pink = Overrepresented | |

Chart 4.57 gives a visual representation of the data and shows that both the $R^2$'s of "all female principals" (0.26171) and "changed female principals" (5.1E-05) are very weak. This means that the lines do not predict very well. Hypothesis H10c states: Women will maintain or lose proportion in the less favorable medium/high teaching years. While the "changed" linear line is positive, the "all" line is declining. Since women are overrepresented in the category and the proportion is moving more in line with the absolute proportion, H10c is confirmed.



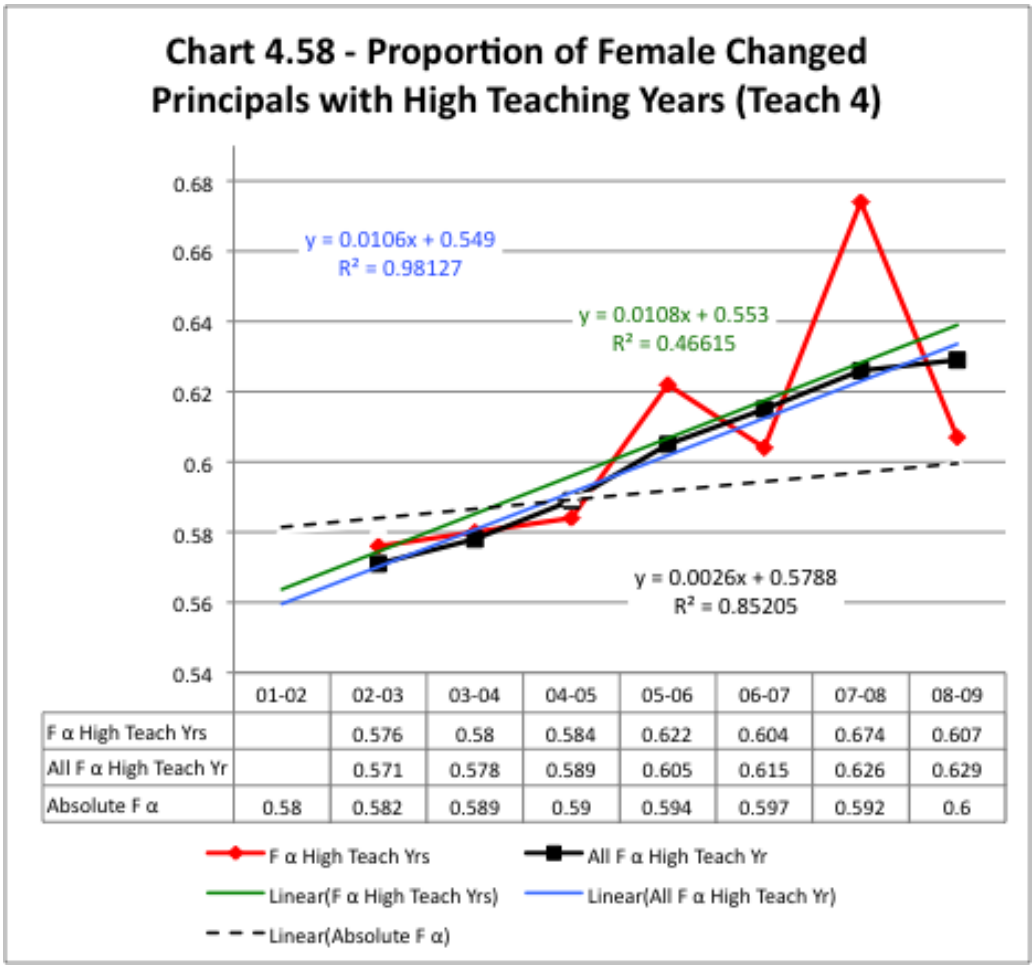

| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α Med-High Teach Yrs | | 0.623 | 0.65 | 0.656 | 0.653 | 0.669 | 0.624 | 0.648 |
| All F α Med-High Teach Yr | | 0.64 | 0.643 | 0.646 | 0.645 | 0.654 | 0.632 | 0.635 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

<u>High Teaching Years</u>

Table 4.69 shows that female principals in the "High Years" category are overrepresented in the last four years of the study, while the proportion of "all females" increases from 0.571 in 2002-03 to 0.629 in 2008-09, an increase of 0.058.

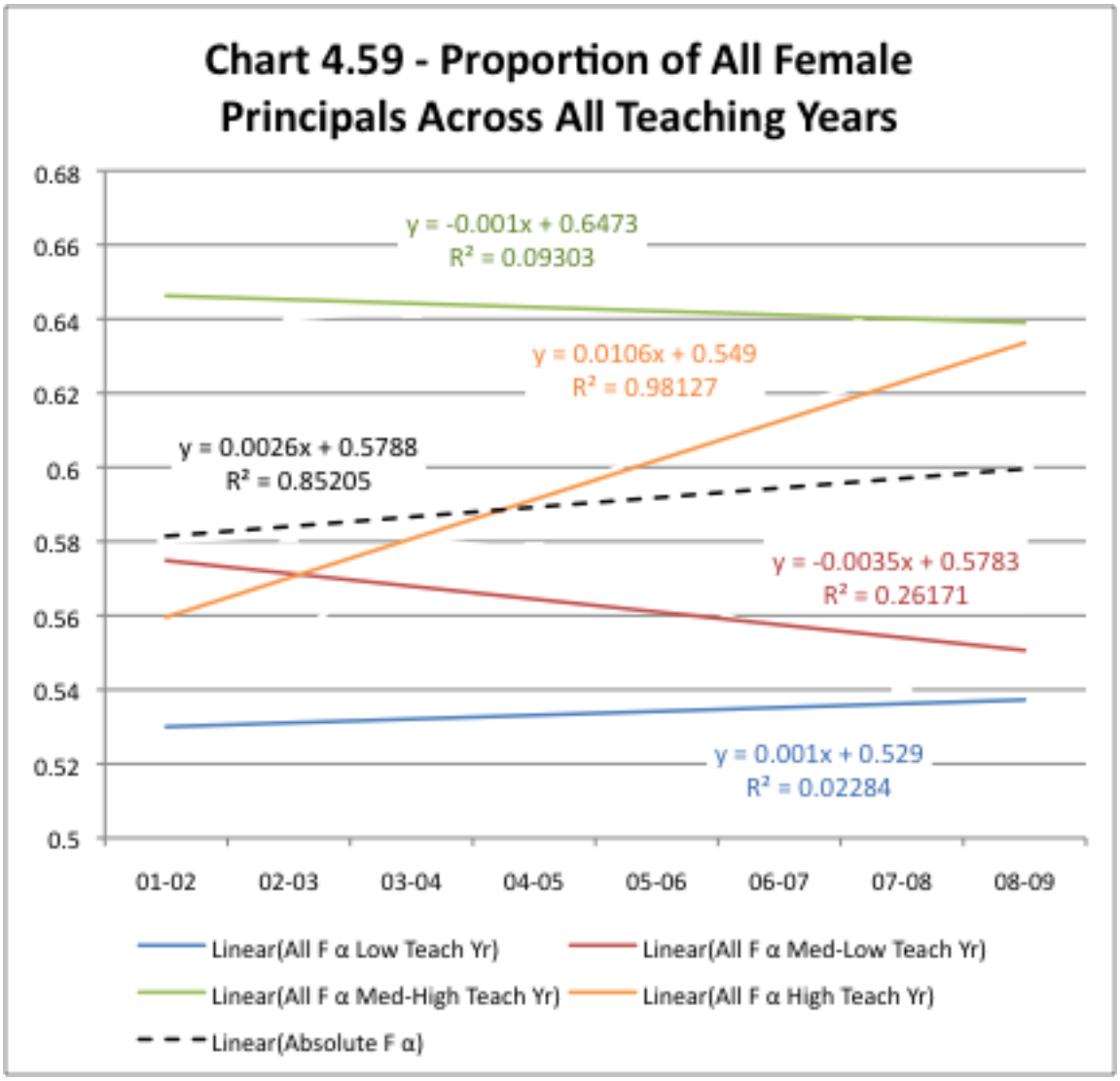
| Table 4.69 - Changed Principals: Gender by Teach High Years Teach 4) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total CHANGED High Teach (4) PR | Female High Teach PR | Female Expected High Teach PR | Female Difference | F ơ High Teach Yrs | All F ơ High Teach Yr | Change Chi-Square Test |
| 02-03 | 597 | 344 | 344.3 | -0.3 | 0.576 | 0.571 | 0.122 |
| 03-04 | 834 | 484 | 494 | -10 | 0.58 | 0.578 | 0.010 |
| 04-05 | 507 | 296 | 299.1 | -3.1 | 0.584 | 0.589 | 0.005 |
| 05-06 | 484 | 301 | 285.6 | 15.4 | 0.622 | 0.605 | 0.000 |
| 06-07 | 606 | 366 | 353.6 | 12.4 | 0.604 | 0.615 | 0.000 |
| 07-08 | 561 | 378 | 336.9 | 41.1 | 0.674 | 0.626 | 0.000 |
| 08-09 | 527 | 320 | 315.5 | 4.5 | 0.607 | 0.629 | 0.014 |
| Pink = Overrepresented | | | | | | | |

Chart 4.58 gives a visual representation of the data and shows that the $R^2$ of "all female principals" (0.98127) is very strong while the "changed female principals" $R^2$ (0.46615) is moderate. This means that the "all" line would predict change very well. Hypothesis H10d states: Women will maintain or lose proportion in the unfavorable high teaching years. H10d is denied.




| | 01-02 | 02-03 | 03-04 | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 |
|---|---|---|---|---|---|---|---|---|
| F α High Teach Yrs | | 0.576 | 0.58 | 0.584 | 0.622 | 0.604 | 0.674 | 0.607 |
| All F α High Teach Yr | | 0.571 | 0.578 | 0.589 | 0.605 | 0.615 | 0.626 | 0.629 |
| Absolute F α | 0.58 | 0.582 | 0.589 | 0.59 | 0.594 | 0.597 | 0.592 | 0.6 |

Chart 4.59 gives a visual representation of all the female principals across all the teach years' variables. As the teach years variables have produced findings that both confirm and deny the hypotheses of this study, in the strictest since the overall hypothesis of H10, that female principals will have an equal to or lower number of years in teaching than men, must be denied. These findings would conform with the sexual politics theory assumption that women will need more years teaching to move into the principalship. This chart is further discussed in Chapter V.




Conclusion

The purpose of this chapter was to give a detailed review of each of the study's variables in relation to sex. The chapter started with a logistic regression analysis of the data that showed that 10 of the 11 variables were significantly related to sex. Next followed individual analysis of the variables around the hypothesis outlined in chapter III. Utilizing rational choice theory, eight of the

study's 10 hypotheses were confirmed ("ethnicity" was removed from the analysis for reasons already explained). The findings suggest that rational choice theory is an appropriate theoretical tool to explain sex stratification within the principalship of public K-12 schools in California. The next chapter has an in-depth and full analysis of the most pertinent data from this chapter and explains *some* rational choices that may be motivating superintendents to hire female principals. Furthermore, rational choice theory is used to explain the findings concerning the principal's years, both in the district and the total years in teaching.

# CHAPTER V

# ANALYSIS AND CONCLUSIONS

This final chapter presents the analysis and conclusions for this study. Having shown in Chapter IV that sexual politics theory is not sustained by the data, this chapter begins by explaining the possible *rational choices* that superintendents might use to increasingly hire female principals. The chapter then looks at each specific variable presented in Chapter IV from the paradigm of rational choice theory. This approach identifies possible preferences superintendents may be seeking to maximize in regard to that particular variable. The chapter concludes with a discussion of possible areas in which these findings and methods could be further studied.

To this point, rational choice theory has been suggested as a theory showing that superintendents maximize their utility by hiring principals who best represent their preferences. Simultaneously, this study concludes that sexual politics theory is no longer the best paradigm to explain sex segregation in educational administration. While it has been maintained that the superintendent's preferences may be pursued regardless of gender, no description of the actual *rational choice* has yet been offered. This has been done purposefully in order to build a case that a new paradigm is needed in which to view sex as a rational criteria in California's K thru 12 public school system. With the results showing that females are gaining the principalship across nearly every variable, in both the school's characteristics and

the individual principal's characteristics, this chapter further illuminates the analysis and show why rational choice theory is appropriate.

In seeking to explain the rational choices of school administrators, the work of Margaret Grogan and Charol Shakeshaft (2011) is called upon. In the authors' book, *Women and Educational Leadership,* an exhaustive review of existing literature was conducted, including targeted studies regarding women in educational leadership. Five themes emerged identifying what women leaders in education give attention to: relational leadership, leadership for social justice, leadership for learning, spiritual leadership, and balanced leadership. These five themes explain the possible rational choices superintendents' may be using when hiring a principal and offer a way to look at the overall findings of this study. Having the rational choices identified may then allow for a deeper understanding of how rational choice theory is employed and may possibly lead to conversations regarding the importance of this study and suggestions for future research regarding sex stratification and rational choice theory.

## The Rational Choices

Grogan and Shakeshaft's five themes are just that-- themes or conceptual ideas that are used to point out ways in which women approach leadership. As themes, they are overarching ideas or conceptualizations and not individual points to be crossed off or accomplished (Carnevale, 1994). In this subsection, the five female leadership themes are explained, along with some of the research that

reveals them. This leads to answers concerning the question, what are the rational choices superintendents are seeking to maximize?

It is critical to point out that the five themes are leadership behaviors that are predominantly found in women, while not saying that men are not capable of leading in this way. These themes have surfaced as being especially found in how women serve in leadership. The two authors argue that these themes are used as a way of conceiving of organizational leadership as a "way of working with and through others" (p. 3). It is assumed that both those in the school (such as teachers, administrators, support staff) and those outside the school (parents, communities) desire to maximize the goal of educating the students. The research concludes that women lead emphasizing these five themes most often and that these themes reflect what superintendents' value most in principals. For the remainder of the dissertation, these five themes are referred to as the five female administrator themes.

## Relational Leadership

The first of the themes Grogan and Shakeshaft identified was the ability of successful administrators to form relationships with those they lead. These leaders see organizations as being horizontal rather than hierarchical. More than typical of men, women are comfortable building coalitions rather than dominions. The authors' point out that often women expressed discomfort with being described as powerful or as having power [the authors cite Formisano (1987), Carnevale (1994),

and Smith (1996)]. In an earlier work, Shakeshaft (1989), as well as others, begin to redefine the meaning of power by calling it power *with* rather than power *over*. It is clear that scholars have found that women think of power and leadership differently than do men. They see their role as building up teams in which to act, rather than acting alone from a place of authority.

Female administrators serve with an eye towards hearing others and collaboration. Sergiovanni calls this "shared purpose" and finds that women lead schools with a paradigm of inclusion and teamwork (1999). Another scholar, Cryss Brunner, has worked for nearly two decades to help explain how women use power to work *with* others rather than to *use* others (see Brunner & Schumaker, 1998; Brunner, 2000; Brunner, 2010; and Ylimaki & Brunner, 2011). Brunner maintains that shared power around consensus is the best way to "move beyond the status quo" of educational leadership (Brunner & Schumaker, 1998 p. 33). Often her work chronicles the role relationships play in the way women view their work as she uses the voices of women who work in school administration. Her more recent work supports a deeper understanding of the complex relationships among collaboration, consensus, conflict, and power (Ylimaki & Brunner, 2011). At the base of all this research is the understanding that women lead in a manner that fosters growth and participation from all levels.

Relational leadership is gained when an administrator puts structures and mechanisms in place that allow them to really hear from others. It is about facilitating the work of others in a combined effort in order to successfully educate

children. This theme seems to be the single largest factor where female education administrators differentiate themselves from their male counterparts.

## Leadership for Social Justice

Leadership for social justice is a theme in the literature focused on the motivations of women in education. Women appear to enter the field of education out of a desire to help children and to make the world a better place (Bogotch & Shields, 2014). Grogan and Shakeshaft write, "Women, more often than men, talk about having entered teaching to change the lives of children, to make the world a fairer place, and to change institutions so that all children have a chance." (p. 11). Research on teachers often indicates that women, more than men, classify educational work as social justice work.

Defining social justice in education is often left to broad statements that invoke agreement but offer little in the way of practical application (Hytten & Bettez, 2011). The social justice theme is grounded in the desire of women to transform the world of the young people they serve. These leaders see the child as a whole person and not just a student. Often educators acting in this mentality will reach out to parents, siblings, neighbors, churches, community leaders, or race. Grogan and Shakeshaft quote from Sanders-Lawson's metaphor of the difficult jump-rope game "Double Dutch" to describe how female educators feel in attempting to negotiate the world of social justice, they are continually jumping and watchful.

This desire to make a difference in the lives of students is often driven by a recognition that individuals have not been served by the current social structures. Therefore, research regarding discrimination, bias, or prejudice carry a tone of the social justice theme here described. This theme is found in the way in which women serve, as Tom Sergiovanni observed, with principals facilitating the a change in the child's life. Sergiovanni saw this desire in the non-educational tasks he saw principals doing, such as washing students clothing (Brandt, 1992). Sergiovanni concludes that women serve and are more concerned with community and sharing than with self-achievement or self-actualization (Brandt, 1992, p. xi). These principals are willing to do what it takes to right the wrongs and serve youth. Additionally, Grogan and Shakeshaft note the connection between a desire for social justice and the need for hope. The authors note several studies that tie social justice with an individual's reliance on what they describe as a higher power.

## Spiritual Leadership

This reliance on a spiritual dimension is very common in research dealing with women of color, and is discussed as the way women conceptualize and frame their work. Their personal spiritual concepts can be centered on any number of views ranging from religious beliefs, spirituality, consciousness, or simply self-understanding and peace (Ngunjiri, 2010). The research reveals that women have a unique way of relying on spirituality that is not found to the same extent in the data regarding men.

Grogan and Shakeshaft found that female education administrators, both Caucasian and women of Color, discussed the relationship between spirituality and the ways they lead and motivate others. Women acknowledge the role of spirituality in their own lives and in the way it allows them to manage others. These leaders see their spirituality helping them to be able to balance the many facets of their lives.

## Balanced Leadership

From the theme of spirituality, the theme of balanced leadership evolves. Balanced leadership stems from the frequency by which women comment on their desire to balance their careers and work with their home life. Much has been written and said regarding the "second shift", the work that awaits women when they come home from working all day, but the literature in this theme is focused on the *desire* women have to balance home and family. Grogan and Shakeshaft discuss the observation that often women view being successful in their career as going hand-in-hand with success in the home, and vice versa. The authors' write:

> Although women leaders in the twenty-first century are clearly free to choose to concentrate on work in the same way a man does, many prefer to attain a balance between their work lives and their family lives. Balanced leadership includes the notion that women are better able to perform their educational responsibilities if they have found ways to manage their home

> duties as well… Managing households and caring for family members, often seen as the work of women, have brought a dimension to women's leadership that can enhance their performance. (p. 23)

This desire to balance home and work is a uniquely female outlook; Grogan and Shakeshaft chronicle that men do not speak of their responsibilities from this perspective. It is perhaps this theme of balancing that enables women to succeed in the environment of schools, where so much is demanded of those who function in the high stress, chaotic atmosphere that prevails in the school environment.

## Leadership for Learning

The theme of leadership for learning comes from a number of studies noting that instruction is central to the way in which women lead. Women make instruction a part of all they do as they commonly institute staff development programs and focus on curriculum instruction programs. Superintendents believe that women are advantaged by their instructional and interpersonal strengths. (Grogan and Shakeshaft reference Grogan & Brunner, 2005, p. 18). In the current environment of high stakes standardized testing, female principals become especially attractive as administrators as they inherently seem to focus on instructional change and education.

Female school administrators' focus their organizations most often on the improvement of learning. Brunner and Grogan found that women have more time

in the classroom than men before they move into administration, and that perhaps this added time contributes to their focus on learning and instruction once they reach the principalship (2007). This finding, that women have more time in the classroom than men, is also supported by this research. Touching a bit more on the social justice theme, women in educational administration feel a duty to educate students. In quoting a principal from a study by Gardiner and colleagues from 2000, Grogan and Shakeshaft emphasize this point as follows:

> It's not just that somebody has to be the principal of the school and make sure that it all runs smoothly but that children learn. And I think the bottom line is that… It gets back to classroom instruction. I feel a very strong sense of obligation to the parents who entrust their children to us every day to provide them the best that this school can provide (p.18).

Not only are female principals more focused on instruction and learning for the student's sake, but Brunner and Grogan (2007) also found that female administrators were more likely to engage in learning activities for themselves. They found that women superintendents were twice as likely as men to attend professional development activities conducted by the Association of Supervision and Curriculum Development (p. 89). It is clear that learning is central to the way in which women lead schools.

## Rational Choice for Males

In presenting these five themes, suggested by Grogan and Shakeshaft as characteristic of female administrators, a possible base is established for explaining the rational choices superintendents may be making in the hiring of female principals. In saying that there are rational choices that superintendents make to hire female principals, it also stands to reason that there are rational choices for hiring male principals as well. While the sex stratification literature is crowded with the female perspectives, it is somewhat sparse in regards to how men lead. As women have long held the smaller proportion of leadership roles, it is not surprising that the literature regarding sex stratification and leadership styles would predominately be led by female voices expressing their discontent with being the minority. As Dash wrote, "Perhaps the voice of the oppressed is heard a little louder now; stirring our conscience, hopefully; sparking discussion on matters that were always safe, in the attic; and causing action to cause deterrence, thankfully" (2013). While the literature is not as robust, there is research that suggests possible rational choices for hiring men. Often these findings come as somewhat of a surprise as the researchers are often studying leadership roles or women's roles in administration. From the literature four possible rational choices emerge; 1) Figurative Leadership, 2) Discipline, 3) Desire for Position, and 4) Cultural Norms.

One of the five themes of leadership for female leaders is the Relational Leaders theme, where women build coalitions and support groups, and serve as "horizontal" leaders, in the schools they lead. The first of the four possible male

rational choices, perhaps the most often cited, is the direct opposite of the relational leader, it is the figurative leader. It is that "men are just seen as better leaders" (Arnold, 1974). In the literature there is a common response that men are seen as more of a figurative leader. Pirouznia (2013) wrote that there is a preference for masculine leadership styles within the field of secondary administration even among those who profess to like their female administrators. Similarly, Costellow (2011) found that while the majority of male and female teachers reported having no preference in sex regarding the principal, a significant majority actually preferred male principals when tested in part because they "looked like a principal" (p.47). Haase (2010) found that men were more often viewed as being "powerful and distant" and had social expectations of being better at leading. Clifford (2014) surmised that while women may hold advanced degrees and have the credentials to lead, men desire administrative positions more and are "viewed as being leaders." It is this perception of "standing alone at the top" that perhaps draws superintendents to hire male principals at an increased rate. It is reasonable to conclude that perhaps superintendents would hire a male principal for a school that is deemed in trouble and needing a strong figurative leader.

The second possible male rational choice is that men are seen as being better at "discipline." Often repeated in the literature is the idea that men take "control" and are viewed as being disciplinarians. Haase (2010), in somewhat of a harsh rebuke, states that male principals were seen as cold and aloof from the children they serve and more interested in rules than students. Others found that male

principals were seen as more authoritative and demanding on students and their schools (Costellow, 2011; Riehl and Byrd, 1997). However, Schapp (2014) suggests that women may actually be more inclined to discipline though they are not perceived as being such. It is clear from the literature that male principals have a perception of being superior in controlling and maintaining discipline in a school. Both are traits that a superintendent may value and desire in a principal.

The trait of being a disciplinarian leader is not a negative trait, though it may be seen as such in modern vernacular. A disciplinarian in the truest since is firm because they understand that by acting a certain way the greater objective can be reached. A true disciplinarian leader does not discipline out of a desire for power or even control, but because discipline brings about the desired result. Much as the drill instructors in the U.S. Armed Forces are strict and demanding, a disciplinarian will guide students to a greater goal.

The third possible male rational choice is the "desire for position." Many researchers have found that males desire moving into administrative positions at a higher rate than their female counterparts (Riehl and Byrd, 1997; Pounder and Coleman, 2002; Brooking, Collins, & O'Neill, 2003; Costellow, 2011). The exact reason for why males prefer going into administration is hotly debated, with theories ranging from cultural expectations and socialization theories to biological or genetic preferences and predispositions. Regardless of the why, it is generally accepted that male teachers desire to move into administration at a higher rate than female teachers. While desire for position may not change the mind of the

superintendent on who they will hire, it may change the number of applicants that apply for the position. This study has no access to the number of applicants that apply for principal positions, but this seems a fruitful opportunity for future study.

The final possible rational choice for men that will be suggested is the changing cultural norms. At one point in this country's history, women were encouraged to stay home and raise children. The social norm was for a mother to be home and there was a stigma attached to being a working mother. In a dated study from 1974, Arnold suggest that women embrace teaching because it is closely tied to nurturing their own children and shy away from administration because it is too much like "outside work" (p.44). In 1997, Riehl and Byrd, in giving one of their three main reasons why women do not seek school administration, write:

> In the first class of explanations, women's lower participation in educational administration is construed as the result of differential sex-role and occupational socialization. This framework highlights the importance of women's self-perceptions and actions and argues that women have not been socialized to aspire to administrative positions or to prepare for them. (p.46)

This quote is speaking of a past era. Today some little girls are taught that they can be anything. And while we would applaud the beauty of not putting limits on what women can do, the past era was not that way. There was a social norm that

had women staying home and raising children. In the yearbooks of the 1950's and 1960's, it was common to see girls state their life goal as being a mom, a sentiment that would not as likely to be used today (a review of the author's mother's yearbook versus the author's daughter's yearbook confirms this assumption). This changing cultural norm would account for much of the changes in hiring practices and would account for why a male or female principal would be hired.

## Conclusion of the Rational Choices

This study reveals that women are not only being hired as principals at a significantly increased rate over men, but that they are also *retaining* their positions as principals. This data does not allow for absolute conclusions to be deduced on why superintendents act in the manner that they do, but, as Sergiovanni concludes, "being aware allows for informed judgments" (Brandt, 1992. p. xii). The nine themes, five themes for women and four themes for men, here presented act as tools to offer possible explanations as to why this change is occurring. In the following section, the analysis of the findings will be presented along with possible explanations in the context of how each variable may be influenced through one or more of the themes.

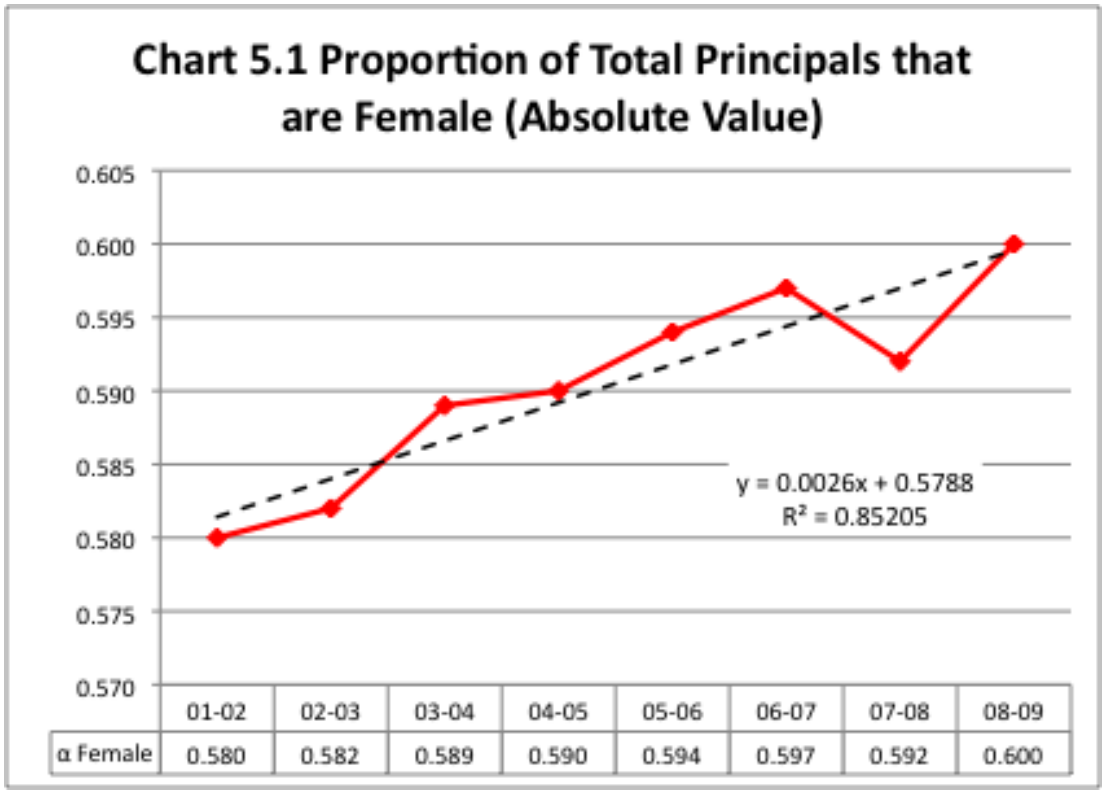
## Analysis of Results

This section of the dissertation analyzes the findings reported in Chapter IV. As the logistic regression section at the beginning of Chapter IV was detailed in the

analysis, further analysis of the logistic regression table will not be discussed in this chapter. Each section of the individual variable analyses will begin with a brief overview of the most pertinent data from Chapter IV, followed by an analysis utilizing rational choice theory (RCT). Each section will explain what findings would be expected if sexual politics theory were employed, why RCT correctly allows for an accurate interpretation, and possible explanations of what choices superintendents are seeking to maximize. The section begins with a look at the absolute number of female principals and will end with a summary table that breaks down the key findings for each variable.

## Absolute

The first variable to consider is the overall, or absolute, number of female principals in California. Chart 5.1 (a copy of Chart 4.2) gives a visual representation of the data and shows the increase of 2.0 % that female principals have gained over the course of this study, ending at 60.0% of all the principalships in California. The strong $R^2$ of 0.85205 tells us that the model is effective in predicting future trends.




While the increase depicted in Chart 5.1 may portend future gains for women, it clearly shows that women still account for only 60.0% of all principalships. As a point of reference, females make up 72.4%[5] of all teachers in California's public schools. And it is this pool from which superintendents hire principals. This gap of 12.4% is often cited as evidence and perhaps "proof" of bias against women desiring to move into the principalship.

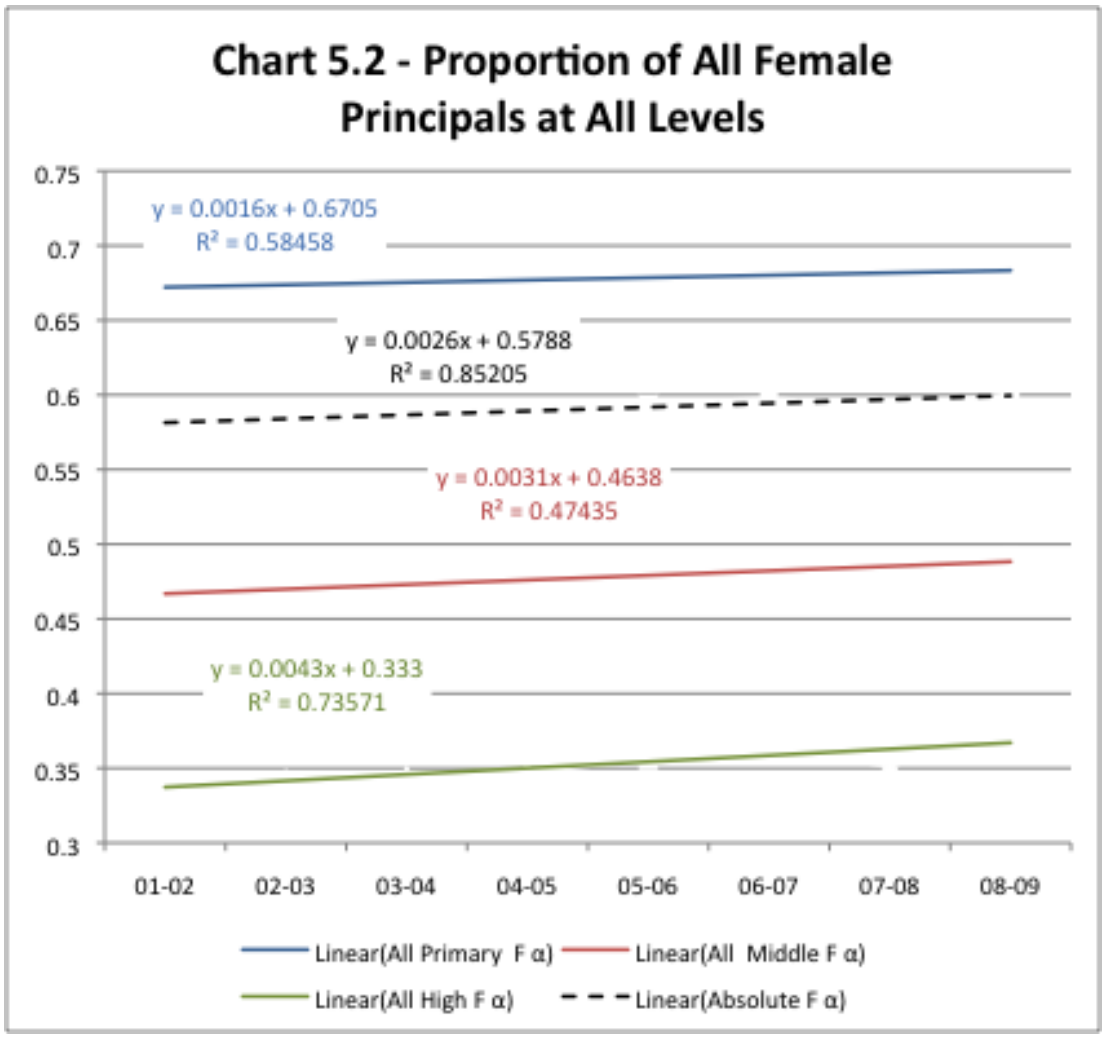
[5] This figure comes from the 2008-09 CDE data. The 2011-12 data available at the CDE website "Fingertip Facts on Education", sde.ca.gov, has the percentage of female teachers at 72.5%. The percentage of female teachers appears to be quite stable in California.

Because further analysis was needed to tell what variables impacted the increase in female principals (thus the need for, and purpose of, this study) the increase appears consistent with what would be expected from a RCT perspective when considering the historic norm of women being kept out of the principalship. Women would be overcoming the bias of the past by gaining access in greater proportion over men. Any or all of the five positive female administrator themes discussed in the earlier section definitely assist in helping to explain the continuing gains in the proportion of female principals. Sexual politics theory would account for this finding as validation that women are winning more political battles and therefore gaining proportion of the principalship.

## Level of School

Chart 5.2 (a copy of Chart 4.7) gives a visual representation of the data across all three-school levels. While women continue to be overrepresented at the primary level, both the middle school and the high school are showing increases in the proportions of female principals. This finding is consistent with what would be expected utilizing RCT; women are increasing their proportion across all levels. In the primary school where women have been historically overrepresented, it would make sense that the rate of change would be slower than at the other two levels. The findings of the study found that female principals are growing the fastest at the high school level, at roughly 1.65 times faster than the absolute rate and 2.69 times faster than the primary school rate. The middle school level also had faster growth

than the absolute rate; 1.19 times faster, as well as faster than primary school rate, 1.94 times faster. Sexual politics, however, would predict that women would continue to meet more resistance at both the middle school and the high schools' job market.




Additionally affecting school levels is the difference in pay that accompanies each level. California Education Code Section 41409(c) requires that the State

Superintendent of Public Instruction provide the statewide salary averages for teachers and administrators and also the statewide proportion of expenditures spent on personnel (cde.ca.gov). The salary average is grouped by district type (elementary, high, and unified) and by size based on regular annual average daily attendance (ADA). Table 5.1 gives a breakdown of the pay difference for each school in the Elementary and High School districts. Table 5.2 gives the pay difference for each school level for the unified districts.

Table 5.1 - Statewide Principal Pay Averages
High School and Elemenrary Districts

| Statewide Averages | Small ADA < 1,000 | Medium ADA 1,000 to 4,999 | Large ADA =/>5,000 |
|---|---|---|---|
| Elementary District (Elementary) | $90,284 | $103,887 | $108,589 |
| Elementary District (Middle) | $94,675 | $107,439 | $111,643 |
| Elementary District (High) | $85,183 | $102,399 | $110,257 |
| High School District (Middle) | $100,642 | N/A | $119,946 |
| High School District (High) | $105,256 | $118,994 | $128,378 |

(CDE.gov.ca)

Table 5.2 - Statewide Principal Pay Averages
Unified Districts

| Statewide Averages | ADA < 1,500 | ADA 1,500 to 4,900 | ADA 5,000 to 9,999 | ADA 10,000 to 19,999 | ADA >/= 20,000 |
|---|---|---|---|---|---|
| Elementary | $88,846 | $95,442 | $102,640 | $106,715 | $107,206 |
| Middle | $92,801 | $98,080 | $109,253 | $111,205 | $111,641 |
| High | $95,916 | $106,787 | $118,527 | $120,506 | $122,628 |

(CDE.gov.ca)

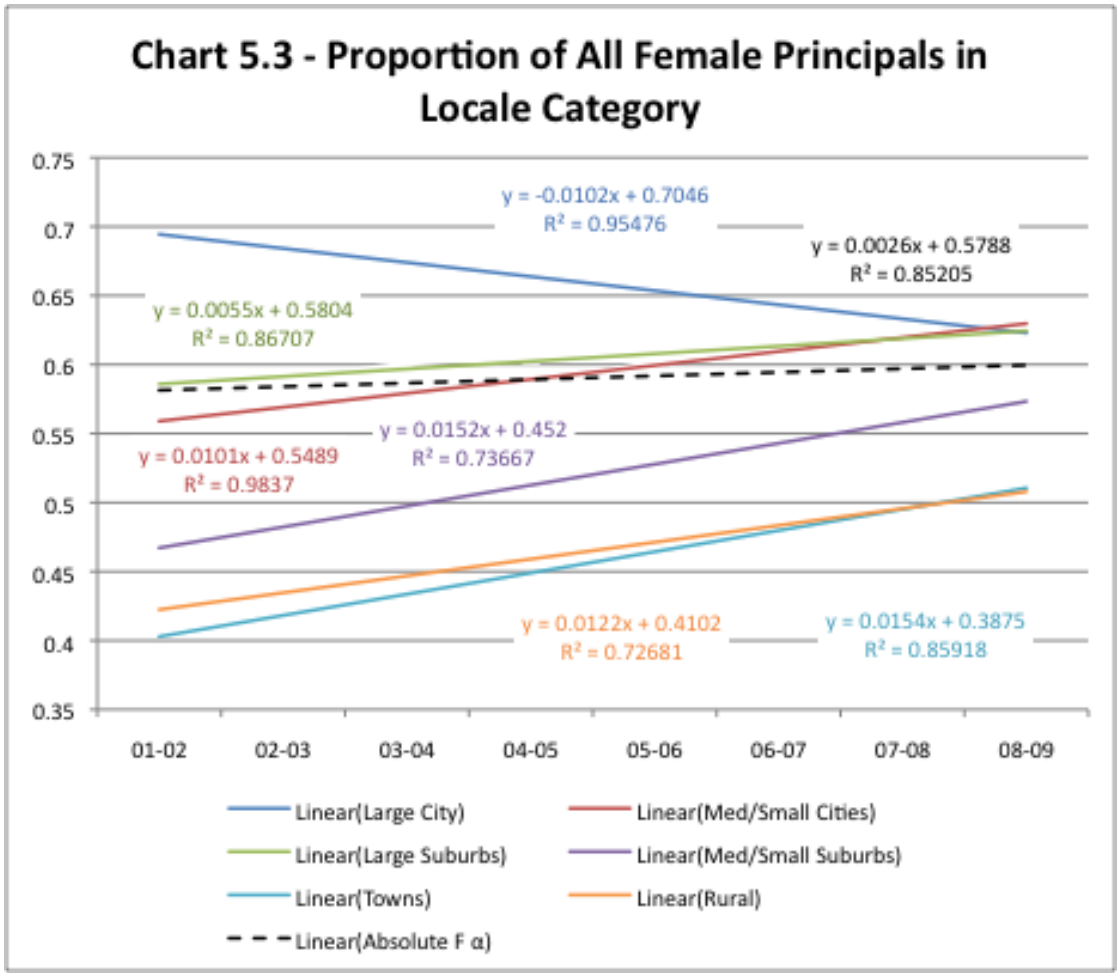
The pay difference for each level would tend to draw individuals who desire higher pay over other considerations to seek after the higher-level jobs in the middle and high schools. Further, the pay scale being higher for large schools would drive these same individuals to seek after the larger schools, creating competition that would further draw individuals towards the high schools, followed by the middle school and then the elementary school. While the middle and high schools remain underrepresented for women principals, the slope of the regression line points to an optimistic future for women if they are indeed gaining these schools at the same rate of pay as their male counterpoints.

While any of the five female administrator themes could be employed in explaining why women are gaining positions the fastest in the high schools, perhaps the increased pressure on students to succeed in the era of the No Child Left Behind Act of 2002 can best explain this change. Additionally, in California all high school students must pass a test to earn a high school diploma. That test, enacted in 1999, is called the California High School Exit Exam (CAHSEE). California created the test

as an incentive for students to improve their academic performance while in high school and for them to demonstrate that a minimum level of competency is achieved prior to graduation. The test helps to ensure that students graduate from high school with grade level skills in reading, writing, and math (cde.ca.gov). As was explained in the last section, female principals tend to focus more on learning and curriculum, and thus may be best suited to help students find success.

## Locale

Chart 5.3 (a copy of Chart 4.14) gives a visual representation of the data across California's six school locales. These locales are (1) Large Cities (2) Medium/Small Cities, (3) Large Suburbs, (4) Medium/Small Suburbs, (5) Towns and (6) Rural. As explained in Chapter IV, female principals are increasing in every category except in the "large city" locale. Not only are female principals increasing numerically overall, but except for the largest cities, as the locale size increases, female principalships also increase at a rate in excess of that of the increase in the absolute female principal population.




This finding is consistent with what would be expected utilizing RCT; women are increasing their proportion across all favorable locales while only losing proportion in the least favorable area. While historically women have been overrepresented in the large cities (Cooper et al., 2000), it is clear that this trend is changing and the proportion is returning to the absolute rate. Sexual politics would predict that women would continue to be overrepresented in the low status, undesirable locale of the large city.

Again while any of the five female administrator themes would help explain why women are declining in the large cities and increasing in every other locale, perhaps the relational leadership theme would best serve to explain what is happening in the various locales. As women foster relationships with individuals, they build coalitions and teams. These teams become valuable and provide a support network for these female principals that lends towards not only retaining positions, but also in gaining positions in the more favorable locales. Perhaps in the large city schools, figurative leadership is more valued as large coalitions are hard to maintain and may be unstable.

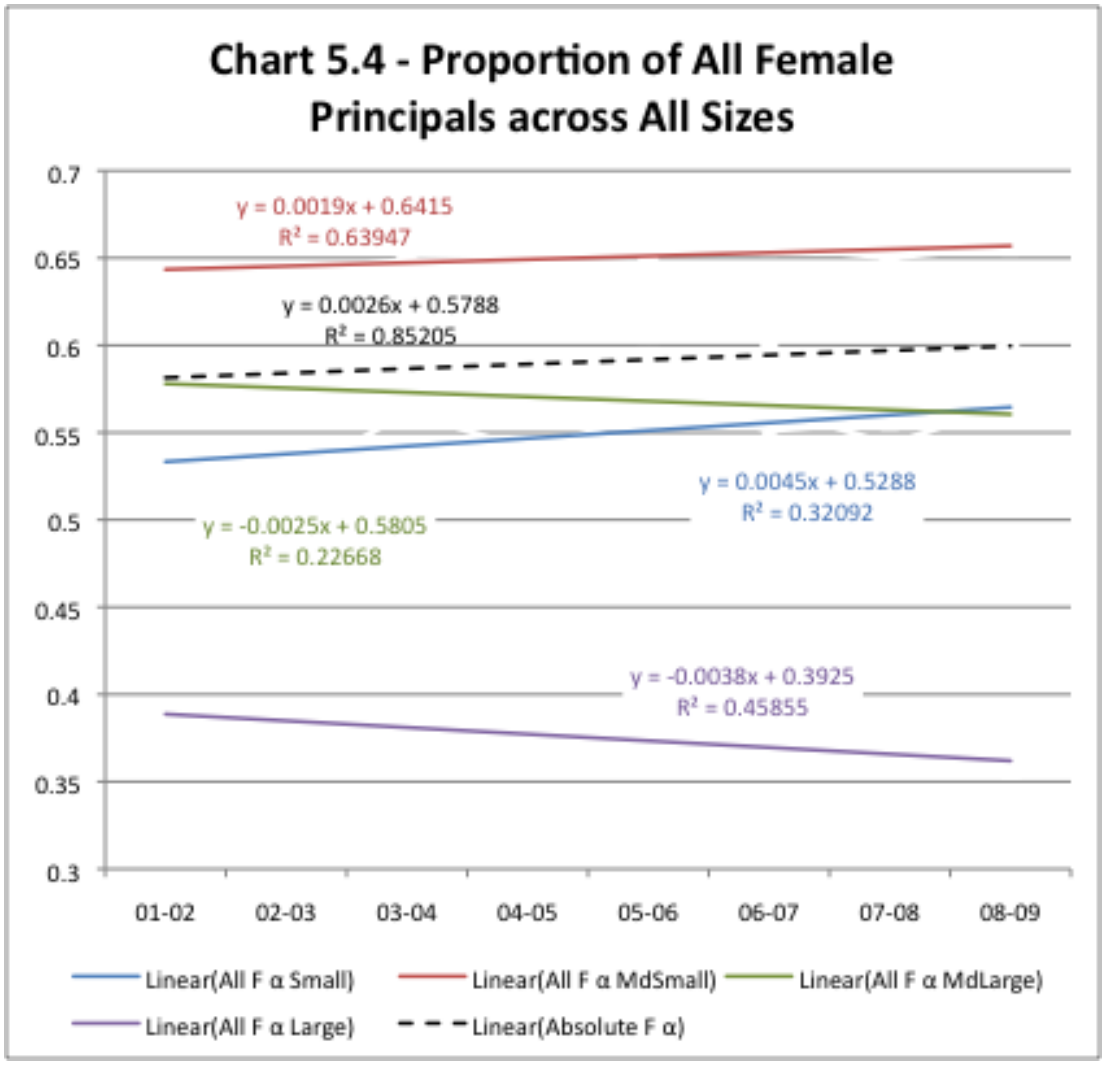
## Size

In order to really understand the size variable, it is necessary to begin by referencing the way the variable is laid out. Table 5.3 (a copy of Table 4.16) shows the percentage of the data that each category occupies. The Small category represents 12% of the data while the Medium-Small category accounts for over 58% of the data; together they constitute over 70% of all the schools in this study.

Table 5.3 - Coding of Size Variable

| Total # of Students | Category | Coded | Total # of Principals over All Years | Average % of Data |
|---|---|---|---|---|
| 0-299 | Small | 1 | 5770 | 12.00% |
| 300-799 | Medium-Small | 2 | 28094 | 58.44% |
| 800-1299 | Medium-Large | 3 | 8676 | 18.05% |
| 1300 + | Large | 4 | 5531 | 11.51% |

Chart 5.4 (a copy of Chart 4.19) gives a visual representation of the data across the four school sizes. The group that has the highest proportion of the data, the medium-small variable, shows that the proportion of female principals is increasing, though at a slower rate (slope of 0.0019) than the absolute female slope (0.0026). These finding are consistent with what would be expected utilizing RCT; female principals are increasing in the small schools where the relationship skills of the principal would be closely viewed by the whole school community.

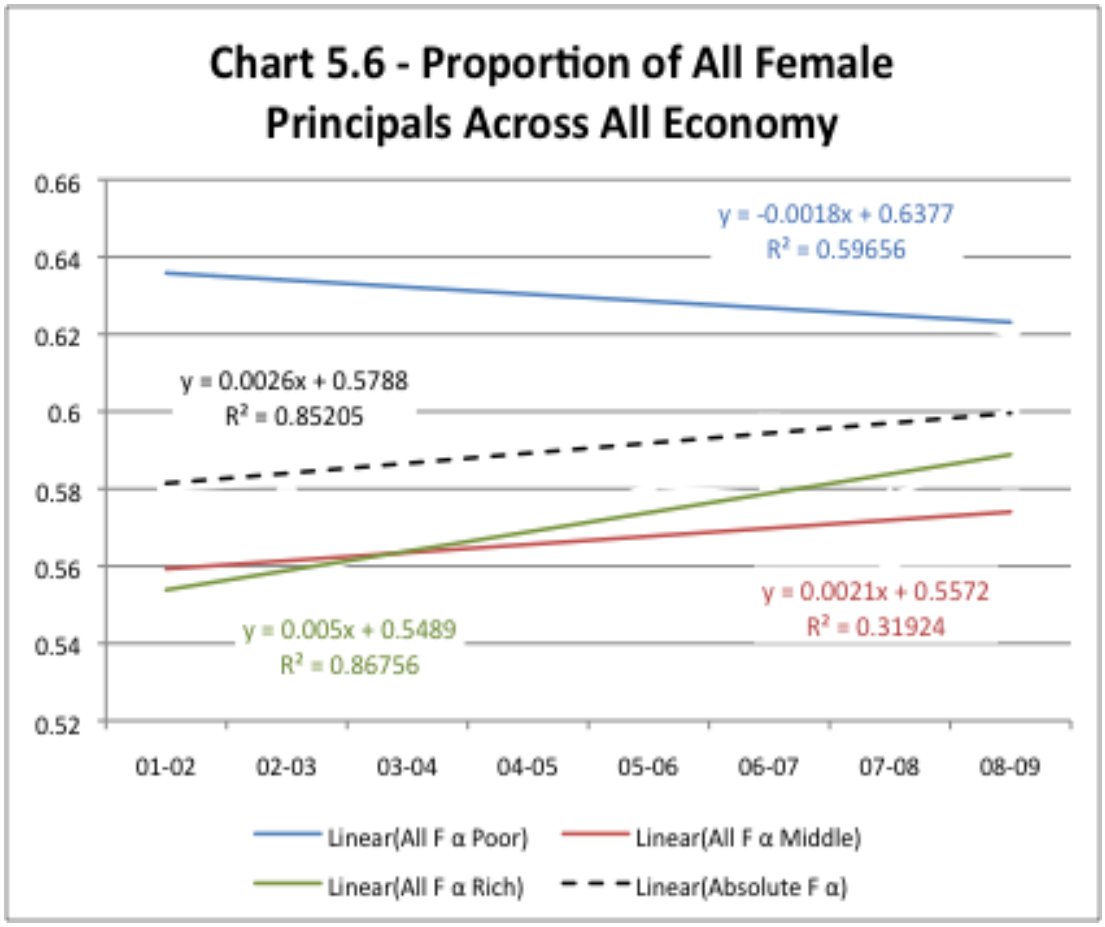



In the large and medium-large schools, women are underrepresented and are decreasing, over the course of the study. This finding is interesting as there is a high correlation between school size and the level of the school. Small schools are generally primary level schools while middle schools are larger and high schools generally having the most students. As the study found that women are gaining across all three levels of schools, and gaining the fastest at the high school level, the

finding of women losing proportion in the larger schools is interesting. Perhaps this finding is due to superintendents making the choice to higher individuals that possess higher disciplinarian or figurative leadership skills, traits that are found more commonly in men, for the larger schools.

Free and Reduced Lunch Students (Economy)

In the "economy" variable as seen in Chart 5.6 (a copy of Chart 4.26) women are overrepresented in the poor schools while being underrepresented in the middle class and rich schools. We can also see that female principals are increasing the fastest in the rich schools (0.005) at roughly twice the rate of the absolute rate (0.0026). While sexual politics theorists would emphasize the existing overrepresentation of women in the poor schools, it would predict the opposite finding regarding change over the nine year study period; specifically, it would expect that women would be gaining ground in the poor schools and losing in the rich schools.

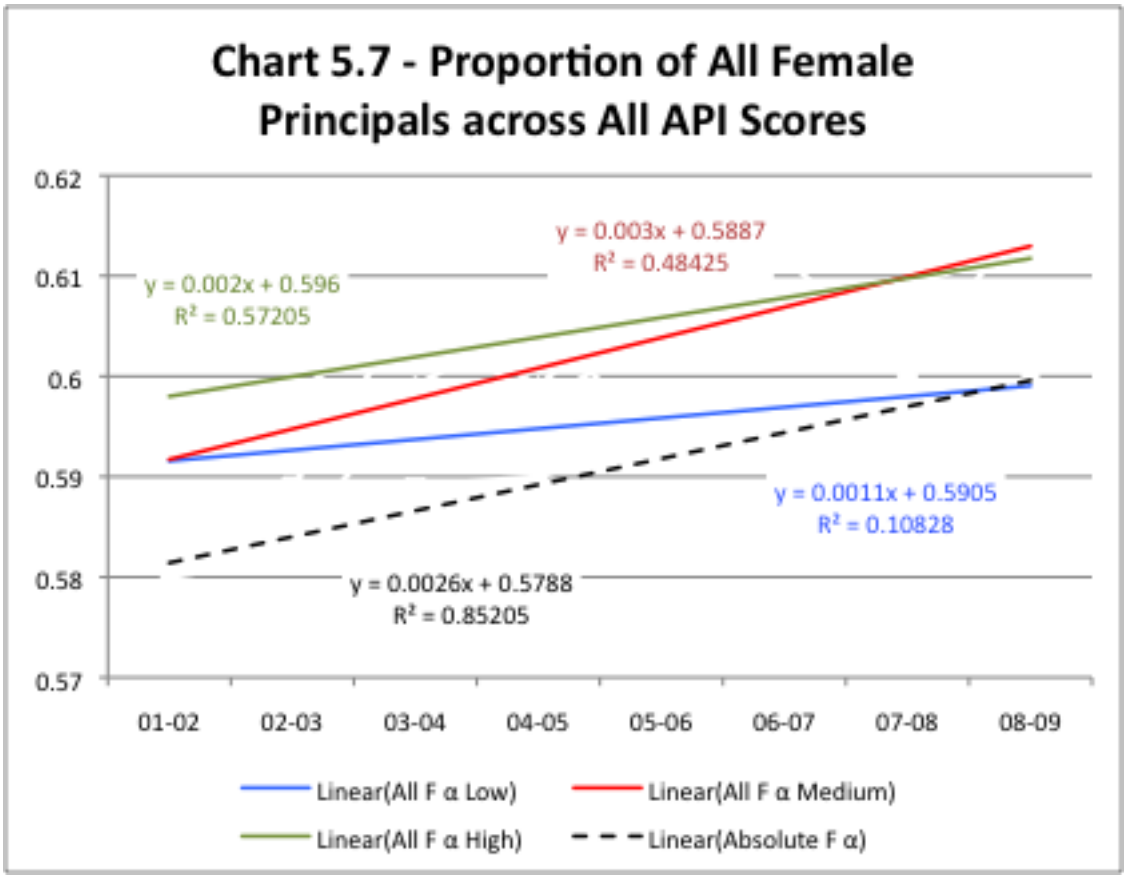



This finding is aligned, however, with utilizing rational choice theory. Rich schools would seek after female principals to lead their schools because of the relational and learning themes. The steepness of the line, along with the high $R^2$ of 0.86756, indicates that the relationship in the rich schools is strong. It is clear from the data that women are gaining ground in the rich schools and losing representation in the poorest schools.

## API Scores

The next variable reviewed is API Scores. Chart 5.7 (originally labeled as Chart 4.30) gives a visual representation of the data across the three API score categories. It is clear that at the start of this study period female principals were disproportionately overrepresented in all three school groups. This is apparently an artifact of the pattern of missing API score data. Over the course of the study period, however, women had increased their representation in both the high performing and medium performing schools. This is contrary to what would be predicted by sexual politics theory. A sexual politics theory would predict that women would had the highest representation in the lowest performing schools at the start of the study and that they would be growing the fastest in the poor performing schools. However, the data clearly reveal that women are gaining significantly in their access to better achieving schools[6].

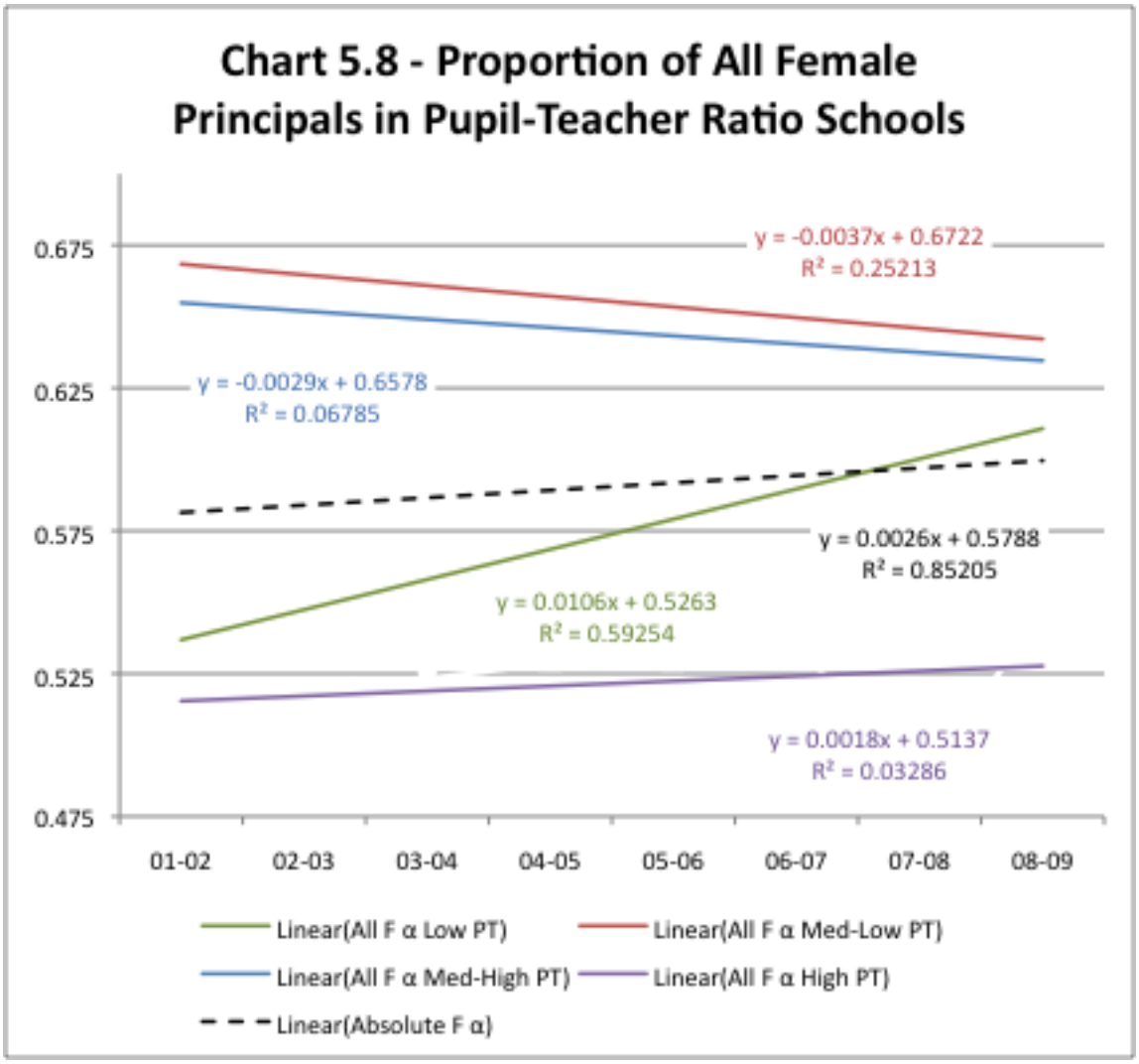
[6] This study found that schools that did not report an API score were overrepresented by men at nearly 70%. While there are several reasons why a school would not report an API score, none of them would be seen as a favorable indication of the school. This finding goes to further suggest that women are gaining the most favorable schools.




These findings fall in line with what would be expected utilizing a rational choice model-- female principals may be gaining in high achieving schools at a faster rate because they focus on the increasingly valued student achievement outcomes. This finding supports the theme of leadership for learning as female principals succeed in helping to boost test scores such as the API. It is clear that female principals are increasingly well represented in the high achieving schools.

## Pupil-Teacher Ratio

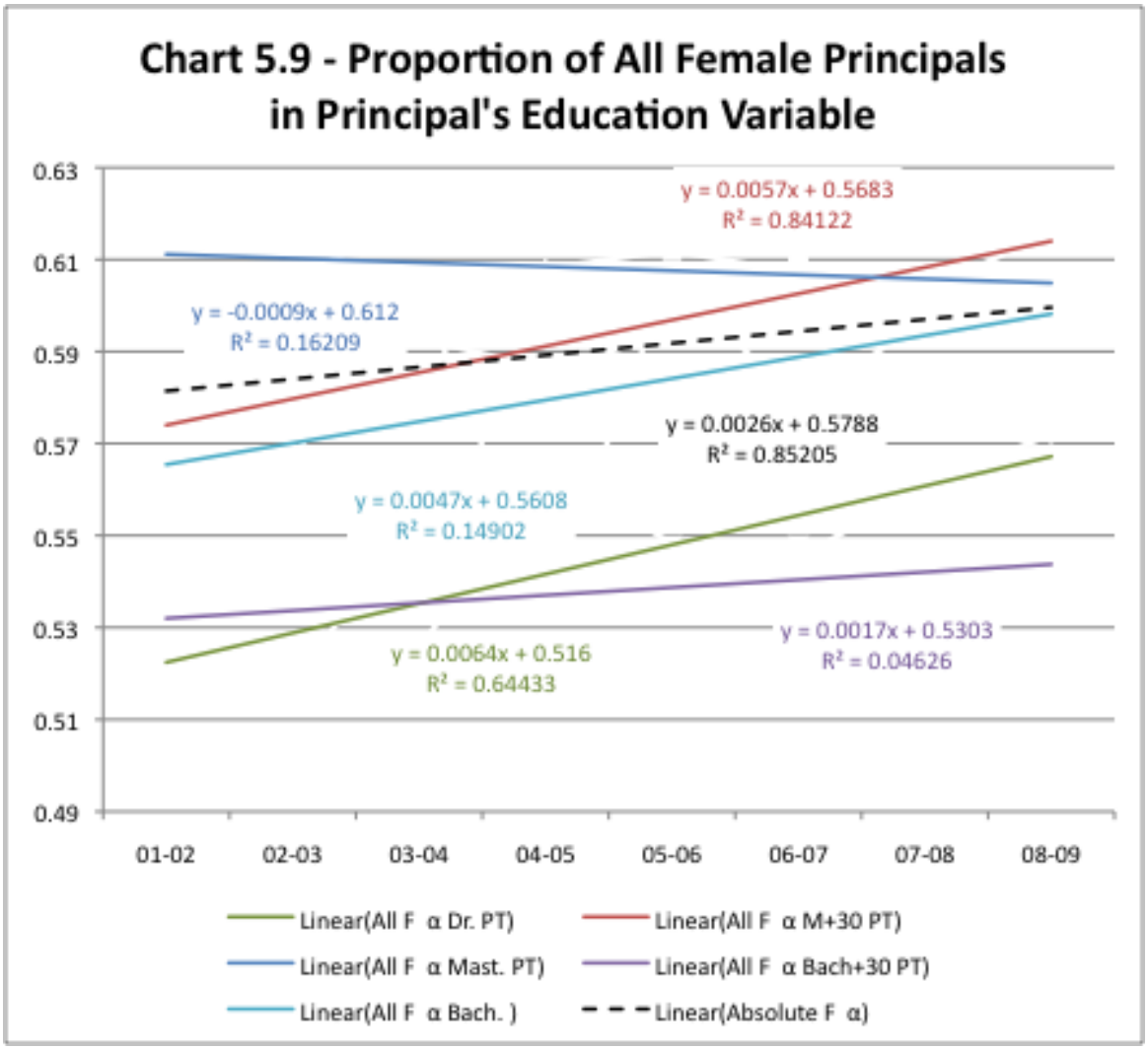
Chart 5.8 (a copy of Chart 4.35) provides a visual representation of the data across the four Pupil-Teacher Ratio categories. The chart clearly shows that relative to the overall proportion of women in the principalship, at the start of the study period female principals were overrepresented in the mediumP/T ratio Schools, but underrepresented in both the low P/T and high P/T groups. They gained most rapidly in the preferred low P/T ratio schools. This is also the only pupil-teacher ratio that returns an $R^2$ that is significant (0.85205) indicating that this is the only change rate with a reliable slope. This finding is opposite to that predicted by sexual politics theory. While women are gaining the fastest in the low ratio schools, they are declining in the two middle range ratios. Note, however, that since the slope $R^2$ values are not statistically significant there may be no real change in these proportions. In the high pupil-teacher ratios schools, which are the least favorable schools, women are underrepresented and are not changing significantly over the study period ($R^2 = 0.0018$, ns). Although the pupil-teacher ratio also highly correlates to the size and level of the school, Table LR4.6 (p. 95) indicates that P/T ratio remains a significant predictor even when controlling for school level and size.




Principal's Education

Chart 5.9 (a copy of Chart 4.41) gives a visual representation of the data across the five principal's education levels. The five levels are (1) Doctorate, (2) Master's Degree + 30 Hours, (3) Master's Degree, (4) Bachelor's Degree + 30 Hours, and (5) Bachelor's Degree. Logistic regression analysis of the education variable reports overall significance for the education factor, but no significant effect for any

one-education level. Thus interpretation is not as simple as for variables, like API and Economy, where each level of these factors can be interpreted separately. This section reports on how the findings can be understood by utilizing rational choice theory including female leadership themes that could be employed to explain what rational choices the superintendents may be making.



The analysis shows that women are underrepresented at the doctorate level, which accounts for 6.6% of the education level variable (see Table 4.40). This means that women are gaining the principalship while having less education compared to men with doctorates. While women are increasing in this level (at a rate of 0.0064 per year), a rate of nearly 2.5 times faster than the absolute female growth rate (0.0026), they are still underrepresented. This analysis suggests that women are increasingly chosen for their advanced degrees, but are still being hired because of something other than education at this level. The $R^2$ for the doctorate level is fairly strong at 0.64433, which means the data are a good fit for the line. This finding is not what would be expected under sexual politics theory. Women are being hired while having less top-level education, and thus are apparently presenting some other added value. Ultimately these data do not allow for a full understanding of what is happening in the hiring of female principals. However, it is clear that at the doctorate degree level, males are overrepresented.

The Master's degree education level is where the bulk of the data is found in this study. Principals with Master's (42.9%) degrees and those with a Master's + 30 hours (38.5%) account for 81.4% of the data (Table 4.40 gives a full breakdown of the proportions). Women are overrepresented and growing at almost twice the rate of the absolute value (0.0057 versus 0.0026). At 0.84122, the $R^2$ for the Master's+30 is the strongest of the education levels.

The Master's data contrast with that at the doctorate level because women are overrepresented in both Master's degree education levels. The over

representation of women at the Master's + 30 level and under representation at the doctoral level, may be the result of two aspects of women's approaches to leadership. First, their preference for balancing home and work life may mean that though they desire doctoral training they do not have the time for it. Second, as female principals observe other females moving into the principalship at an increased rate without having to obtain the doctoral degree, they may feel comfortable in putting off the expense and work associated with achieving the advanced terminal degree.

The principals holding a Master's degree only are the numerically largest group. Women are slightly, but not significantly, overrepresented in this group. However, the degree of overrepresentation appears to be declining over time. As indicated in the logistic regression analysis reported in Table LR4.6, men are significantly likely to have a higher ranked education level than women. Since this variable is reverse coded so that higher levels mean less education, men, on average, have slightly less education than women.

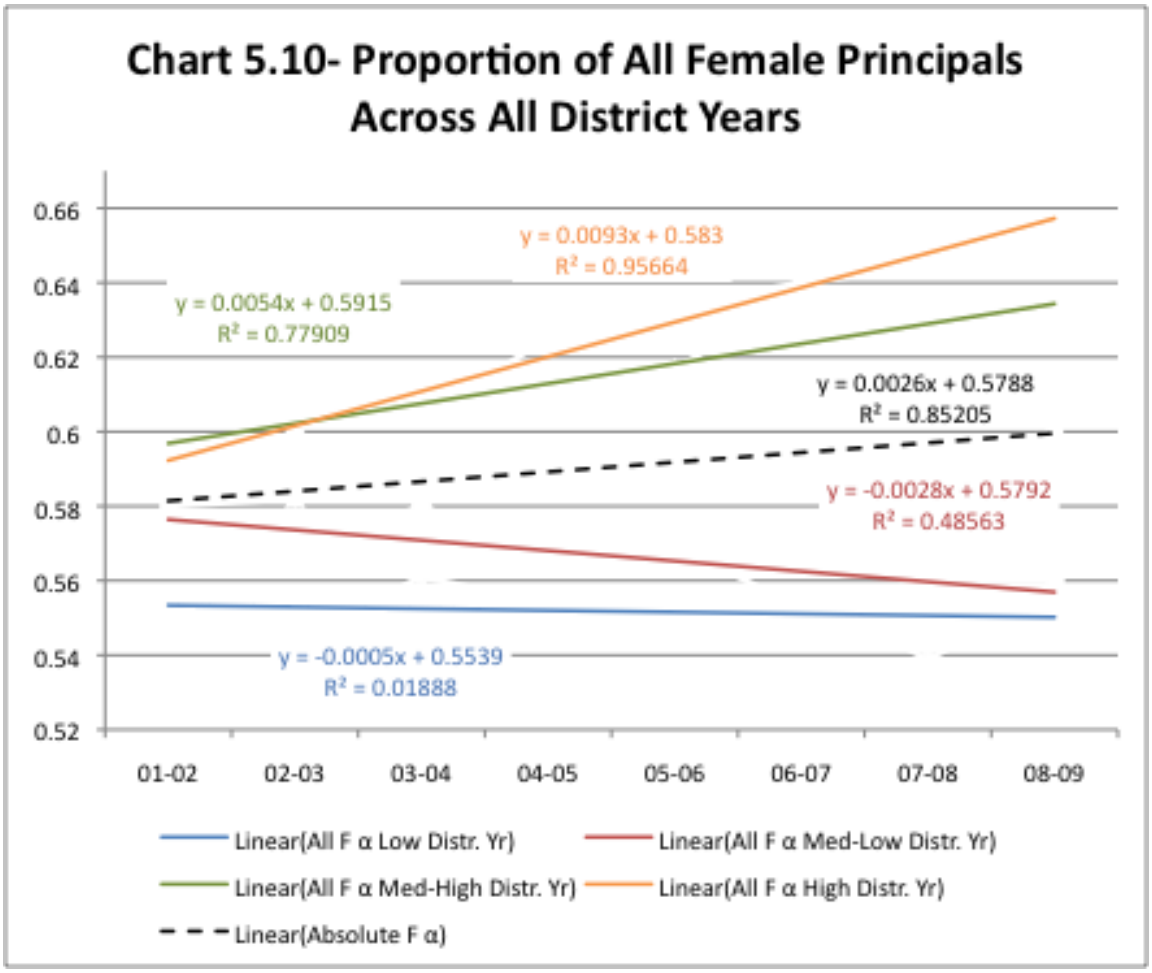
The Bachelor's +30 hours (9.2%) and the Bachelor's degree only (2.7%) levels account for 11.9% of the data in the education variable. These two levels are the lowest levels of education accounted for in this study. Both Bachelor levels show that women are underrepresented, though the Bachelor's degree without additional credits just about reaches the absolute proportional level by the end of the study period. Women with these lower levels of education have few principal positions overall and still fewer than would be expected if they were to reach the

same rate within the overall population of women principals. That is, men with a Bachelor's degree and those with a Bachelor's degree +30 hours are proportionately hired at a higher rate than their female counterparts. This is what is expected in the sexual politics literature, but rational choice theory may also indicate the reason behind these findings. Namely, women's preference for a more balanced leadership style may put off pursuing an administrative appointment while men with a more figurative leadership style would seek administrative status sooner.

Principal's Years in District

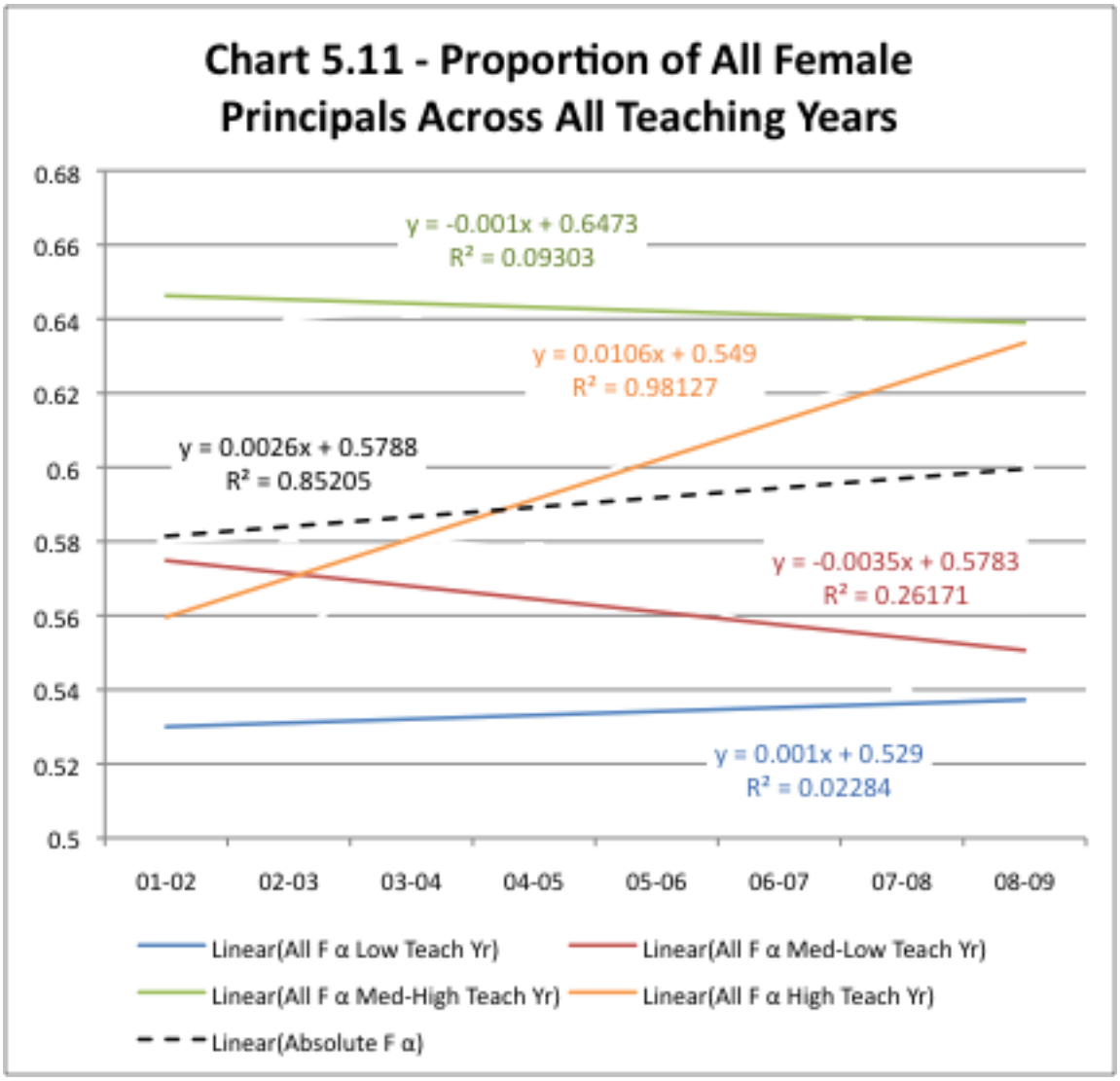
Chart 5.10 (a copy of Chart 4.54) gives a visual representation of the data across four levels of principal's years in the district. It is clear that both high and medium-high years in the district show women to be overrepresented and to be increasing that overrepresentation over the life of the study. Low and medium-low years in the district are more characteristic of male principals and men are becoming more dominant in these shorter district tenures over time.

This dissertation finds that the sexual politics theory of sexual discrimination would be a reasonable assessment of this data, and is perhaps, the best fit to explain why women stay in districts so much longer than men. However, the female social justice theme may account for the trend in an unexpected way and is discussed in the next section.




Principal's Years in Teaching

Chart 5.11 (a copy of Chart 4.59) gives a visual representation of the data across the four levels of principal's years in teaching. Much like the district years just discussed, the data are clearly showing that women need to have more years teaching in order to secure the principal position. This finding clearly fits with sexual politics theory of competition between the sexes and would show that men continue to need less years teaching in order to secure a principal postion.




As Grogan and Shakeshaft explain, women enter the education career in order to fix social justice problems. This desire to change the world through their educational careers may explain why women are less likely to leave their current districts, or even teaching, earlier to seek after appointments as principals. This research again shows that men are leaving districts, and perhaps education all together, at a much earlier point than women. The theme of social justice may help

in reasoning out why women are staying longer in the district when the data appear to indicate that women have more options to move into principal positions across all the other data variables. While the social justice theme may suggest women are staying in education, it would not answer why men are getting appointments with less experience in the district or in teaching. The current data are not sufficient to fully answer the question of why women have more years in the district and more years teaching.

## Summary of Analysis

Having presented each of the variables, rational choice theory adequately accounts for most of the study's variables. However, because of the complexity of the issue, having a total of 26 variables that need individual accounting, the take away from the findings could become a bit complicated to succinctly state. For this reason, Table 5.4 was created to give a quick reference guide to the many variables and findings of this research. While the text size is a bit small, it seemed that getting the information into one page would be a benefit.

Table 5.4 – Summary Table of Study

| Independent Variable | Findings | | Theoretical Accounting | |
|---|---|---|---|---|
| | L.R. | ANOVA | Sexual Politics | Rational Choice |
| Absolute Value | N/A | Female principals have increased 2% from 2001-02 to 2008-09. | Females have fought for increased representation and continue to gain authority through conflict and alliance building. Females are winning the battle. | Because of desirable approaches that women possess at a higher rate than men, women are sought after to guide schools. |
| School Level | All School Level has Sig.= 0.000 | Female principals are gaining at every level. While continuing to be over-represented at the primary level they are gaining the fastest in the high schools and middle schools. | While being pleased that female's are gaining, female principals are still limited to primary level schools. The large gap in high school positions is further proof of continuing discrimination. | Female principals possess desireable approaches that entice superintendents to hire them. Those skills have historically been a part of the primary school level and are becoming increasingly desirable in the middle and high schools as women gain a higher proportion in those schools. |
| School Locale | All School Locale has Sig.= 0.000 | Female principals are losing proportion in the large cities while gaining proportion in every other locale category. | Through coalition building and political activism, females are now gaining positions outside the large city schools, though they continue to be overrepresented in those schools. | The desirable approaches that female principals bring are sought after across all locales. |
| School Size | Sig.= 0.000 Males have the larger schools | Female principals are gaining proportion in the small and medium-small sized schools while losing proportion in the large and medium-large sized schools. | Through coalition building and political activism, females are now gaining positions at a higher rate in small schools yet they are still being held out of the large schools. | The desirable approaches that female principals bring are more sought after in the smaller schools. Other traits that men possess are sought after for the large schools. |
| Title 1 School | Sig.= 0.487 Not Significant | N/A | N/A | N/A |
| School Economy | Sig.= 0.070 Odds are that males are found in the richer schools | Female principals are losing proportion in the poor schools while gaining in the middle class and rich schools. They are gaining the fastest in the rich schools. | Through coalition building and political activism, females are now gaining positions in the rich schools. Females are winning the battle. | The desirable approaches that female principals bring results in the hiring of more females by the rich schools. |
| School API Scores | Sig.= 0.004 Males have the schools with higher Pupil/Teacher Ratios | While female principals are gaining across all areas, they are gaining the fastest in the middle and high achieving schools. | Through coalition building and political activism, females are now gaining positions in the favorable high achieving schools. Females are winning the battle. | The desirable approaches females inherently possess result in females being sought to lead all schools. |
| Pupil-Teacher Ratio Schools | Sig.= 0.000 Males have the schools with higher Pupil/Teacher Ratios | While female principals are gaining proportion in the low and high PT Ratio schools, they are gaining the fastest in the low schools. Females are losing proportion in the two medium categories. | Through coalition building and political activism, females are now gaining positions in the low schools. Females are winning the battle. | The desirable skills females possess result in females being sought to lead all schools. The more favorable medium and low schools are able to secure female principals because of their favorable work environments. |
| Principal's Education Level | Sig.= 0.005 Odds are that female principals will have more education than their male counterparts. | Female principals are gaining proportion across all education lines except at the Master's only level. Females are gaining the fastest in the doctorate level while still being underrepresented. | Female principals continue to need to have more education to be hired for the principal position. There is not accountable reason for the findings at the doctorate and master's only levels. | The findings further highlights that women are being hired for approaches and not for education level. |
| Principal's Ethnicity | All Ethnicity has Sig.= 0.000 | Ethnicity is significant in relation to sex. | N/A | N/A |
| Principal's Years in District | Sig.= 0.000 Odds are that females have more years in district than males. | Female principals have more years in the district than their male counterparts. | Female principals must have more years in the district before they can show they are qualified to be hired as principals. This is a sign of continuing bias. | Females are more inclined to stay in a district longer than men who leave earlier to pursue advancement. |
| Principal's Years Teaching | Sig.= 0.000 Odds are that females have more years in teaching than males. | Female principals have more years in the teaching profession than their male counterparts. | Female principals must have more years in the profession before they can show they are qualified to be hired as principals. This is a sign of continuing bias. | Female principals stay in the classroom longer to fix social justice problems and gain greater technical abilities that serve them well once they become principals. |

## Conclusions and Discussion

Having discussed how rational choice helps to explain the findings of all ten variables included in this study, the significance of the findings can now be addressed. This section begins with a breakdown of where sex stratification in California's public school system stands. The discussion then moves to the limitations of the data, followed by what is not being said within this study. The discussion then concludes with policy suggestions for implementation regarding these findings, with suggestions for future research.

### Significance of Findings

This study suggests that rational choice theory accurately accounts for what is occurring in California's K-12 public school system regarding sex stratification. It has shown that women are increasingly obtaining the principalship overall and across all variables. While women make up 72.4% of all teachers in the public school system during the 2008-09 school year, women account for just 60.0% of the principalships. While this is lower than what might be expected, it has been shown that the trend is upwards by 2.0% over the seven years of this study. This is true even while the proportion of female teachers has remained steady. With the aging of the work force overall, and as baby boomers continue to age and retire, the outlook for female principals suggests an optimistic upwards trend towards increased representation in the principalship role.

The study specifically found that women are being disproportionately promoted over males, as shown by the calculated slopes of the regression lines for all school levels. In summary, the slopes calculate as follows. In the high schools (0.0043); in medium/small cities (0.0101), in medium-small suburbs (0.0152), in towns (0.0154) and in rural locales (0.0122); in small schools (0.0045); in the Title 1 ineligible schools (0.0038); in rich schools (0.005); in medium achieving schools (0.003); and in low pupil-teacher ratio schools (0.0106). This study also found that the individual principal characteristics for principal's education levels was increasing in the Doctorate and Master's degree + 30 hours the fastest (0.0064 and 0.0057 respectively). Additionally, the study found that female principals had more years in the district and more years of teaching than their male counterparts—both of which rational choice theory explains within the context of the social justice theme.

All of the findings can be explained by employing a rational choice theory model that predicts that women will be gaining an increasing proportion of the principalship because of the five female leadership themes: relational leadership, leadership for social justice, leadership for learning, spiritual leadership and balanced leadership. Each of these themes acts independently or in combination. In total, they provide superintendents with rational choices for selecting an increasing number of female principals, to staff their schools to better achieve the superintendent's educational goals for children. This, in turn, results in a greater likelihood that female principals are selected over their male counterparts.

Finally, this study acts as an effective tool to give an accurate snapshot of the current state of sex stratification in California's public school system, as derived from the actual data reported by the States' Department of Education. The findings give clear understanding as to where sex stratification manifests across each of the variables. It further helps to explain the current situation by offering rational choice theory as an effective tool in evaluating the numbers. While clarifying the issues, the study does not address all elements regarding sex stratification. In fact, some glaring inadequacies need to be addressed by future research. The next section discusses some of the study limitations imposed by the data.

## Limitations

Hopefully, this provides a reasonable approach for laying a solid foundation regarding the discussion of sex stratification in California schools, even though the study results may be negatively impacted in several areas. The purpose of this section is to discuss certain limitations, mostly imposed by the data, which may skew the findings of the study so that recommendations for future research can be identified. The section concludes with suggestions for future work.

The first limitation is in the data itself, which comes directly from the California Department of Education and which does not allow for the specific tracking of individuals over time. As a result, this study could only tell if an individual was different than the last individual that was the principal at a particular school. Consequently, accurate discernment between "new" and "returning"

principals could not be made. That is, there was confusion in determining if indeed the principal was new to being a principal or if they were just new to the school. In 2008, at the request of researchers petitioning the state for an identifier such as birthdates, social security numbers, or personal identification numbers to be added to the data, the state began adding social security numbers to the Professional Assignment Information Form (PAIF) data (personal communication with Randy Bonnell, Administrator, Data Reporting Office of California Department of Education, August 2, 2013). With this new ability to track individuals, these identifiers will bring many advantages to future researchers, as they will be able to see the actual sex stratification proportions of newly hired principals and be able to perhaps determine with more certainty the environment prior to the change in the principal position.

Second, the data did not allow for any indication of the motives of the superintendent in hiring a *new* principal. Future research regarding principal sex stratification could use these findings to examine the particular motivating factors a superintendent employs to hire a new principal. While this study could only be used to offer a theoretical explanation, future work could move further by studying the exact motives used to hire principals. Future research could include questionnaires, surveys and/or interviews that build on the superintendent's desire to maximize utility by hiring a principal that fit one of the specific leadership themes here discussed.

The third area of limitation this work experienced was in the number of questions that could be answered. Indeed the data lead to a plethora of possible research questions that had to be curtailed in order to move forward in a timely manner. As was discussed in the text, this data opened wide areas of research that could have been studied. As this study looked at variables by sex, future researchers could possibly employ this same data and methods to examine the variables across race. Another option may look at the interactions of each of the outlined variables upon one another or by interacting two or more variables at once. These possible studies may then shed more light on the role of sex in the principalship. Still another track may be to examine the support staff and assistant principals at the school to assess whether the proportion of female subordinates affects the hiring of a female principal. These are just a few of the many possibilities for future research that the data offer.

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