

A Closer Look at Teacher-Principal Pairings and Teacher Mobility: Testing

A Model of Teacher-School Fit

by

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## ABSTRACT

Teacher mobility is a policy issue that affects students and school across the country. Despite a long-standing body of research related to teacher mobility, relatively little is known about how teacher-school pairings affect teachers' decisions to stay at or leave their schools. Therefore, this study tested a model of teacher-school fit with a focus on the value that teachers and principals place on standardized test scores. Survey responses were collected from 382 K-8<sup>th</sup> grade public school teachers from 22 schools in two school districts. The results show that teachers who placed higher values on standardized test scores reported slightly higher levels of teacher-school fit and were slightly less likely to leave their schools within five years. Additionally, teachers' self-assessed teacher-school fit showed a strong, positive relationship with teacher retention. These findings suggest that a better understanding of the factors that affect teachers' sense of teacher-school fit may help reduce teacher mobility.

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## **Chapter 1: Introduction**

Having a great teacher is key to a student's academic success. A long-standing body of research supports this notion and indicates that successive years of excellent teachers can help close achievement gaps, particularly among poor and minority students (Hanushek, 2011). Sadly, schools that serve these students often experience higher rates of teacher turnover which can destabilize school communities and leave positions to be filled by less experienced and less effective teachers (Goldring et al., 2014). This kind of "churn" has real consequences for students in that they do not have access to the teachers that they need to be academically successful (Ronfeldt et al., 2013). Consequently, these students' academic progress can be delayed making the already daunting task of upward social mobility even less likely (Wachtel, 1975).

In addition to its impact on students, teacher turnover is problematic for schools. Replacing teachers is costly (Levy, 2012). When a teacher leaves a school, the school must provide additional training to ensure that teachers adhere to common curricula, instructional practices, and discipline policies. Further, administrators and senior teachers must spend time and energy supporting new teachers as they "learn the ropes." Beyond individual schools, teacher turnover is costly at the district level. When teachers leave a school district, the district must spend resources to recruit new teachers, interview them, process newly-hired teachers, and train them to abide by school and district policies (Barnes, 2007; Levy, 2012). The total financial costs associated with teacher turnover vary by district and can range from \$4,000 per teacher in small rural districts to \$18,000 per teacher in large urban districts (Barnes et al., 2007). Research also indicates

that these costs are most damaging in high-poverty school districts where turnover is highest and where scarce resources are needed to provide much needed social and academic support.

Clearly, teacher turnover is a policy issue that has substantial implications for multiple stakeholders. As a result, much research has been devoted to understanding why teachers leave schools. Researchers have identified many factors that are associated with mobility including lack of administrative support, poor working conditions, low student achievement, and racial and socioeconomic differences between teachers and students (Elfer et al., 2006; Feng, 2009). Despite our understanding of these factors, teacher turnover continues to plague school districts across the country (Allensworth et al., 2005). This may be due, in part, to the fact that much of the teacher mobility research has focused on easily observable characteristics of teachers and schools like demographic characteristics of teachers and students or salaries in a particular school district. In contrast, much remains unknown about the psychological processes that underlie a teacher's decision to leave a school. Specifically, little is known about how mobility decisions are made. For instance, are teachers' choices to leave schools a reflection of low self-efficacy with regard to raising test scores? Or perhaps staying at or leaving a school is a result of the strength of social ties with coworkers. Further, little attention has been paid to how pairings of certain kinds of teachers with certain kinds of schools may increase or decrease the risk of teacher attrition. Understanding these aspects of teacher mobility will provide a more complete picture of what drives teacher turnover and may lead to more effective teacher retention policies.

This study seeks to address these shortcomings by testing a novel framework of teacher-school fit. This framework is based on previous research in organizational psychology and is guided by person-environment fit theory. Broadly defined, person-environment fit is the degree of compatibility between an individual and some aspect of his or her environment, most often as it relates to work (Kristof-Brown & Guay, 2011). Although person-environment fit has been well-developed in the psychological literature, only a handful of studies have examined this construct among teachers. In general, these studies have found that congruence between teachers' values, beliefs, and working styles and those of their administrators and coworkers is positively related to job satisfaction, retention, and effectiveness (Cooman et al., 2008; Grogan & Young, 2007; Jackson, 2014; Pyhalto, 2011). While these findings are informative, they do not directly link teacher and school characteristics to teachers' subjective sense of fit nor do they establish a structural link between fit and mobility. With these shortcomings in mind, this study is motivated by the following research questions: "Are teacher-principal pairings related to teachers' self-assessed sense of teacher-school fit?" and "Does self-assessed teacher-school fit mediate the relationship between teacher-principal pairings and teacher mobility?" It is important to note that in the context of this study, I define characteristics as "a distinguishing quality or trait" (Merriam-Webster, 2017). Within this definition, characteristics may take many forms. For instance, characteristics may be easily observed as in demographic traits like age, sex or ethnicity or they may be unobservable or "latent" characteristics like preferences or values. In this study, I focus

on pairings of two specific characteristics: the value that teachers place on standardized test scores and the value that their principals place on standardized test scores.

### **Standardized Test Scores and School Accountability**

School accountability has been a growing trend in U.S. education for over a decade (William, 2010). Although student's academic performance has been used to make decisions about specific programs and students for nearly a century (William, 2010), many view the passage of the No Child Left Behind Act (NCLB) in 2001 as the beginning of the current school accountability movement. NCLB dramatically increased the federal government's role in public education by requiring states to hold schools accountable for their students' standardized test scores (Klein, 2015). In an effort to improve educational outcomes for all students, NCLB required schools to show adequate growth with traditionally underperforming groups of students (e.g. special education students, English language learners, minority students, etc.). NCLB imposed strict penalties on schools that failed to meet its requirements including replacing school administration and school closure. The Obama administration continued this emphasis on test scores with its Race to the Top initiative (RTT). Building on the accountability systems put in place by NCLB, RTT offered competitive grants to states on the condition that they met several federally-mandated requirements. One notable aspect of RTT was its emphasis on teacher evaluations. Specifically, it required schools to evaluate teachers based on their students' standardized test scores and that teachers' salaries be tied to these evaluations (United States Department of Education, 2009). This requirement shifted the

responsibility of student achievement from district and school leadership to individual teachers.

A large body of research describes the effects of the growing emphasis on standardized test scores on teachers and public education, in general. These include narrowing of curricula (Stecher, 2002), increased stress among teachers and administrators (Clark et al., 2003; Hamilton et al., 2007), and an overemphasis of testing regimens (Clark et al., 2003; Hamilton et al., 2007). These seemingly negative effects aside, the logic of NCLB seems straightforward: higher quality schools and teachers will produce greater gains in students' academic achievement as measured by standardized tests. If schools and teachers are held accountable for raising test scores, then they will become better at doing so. Although a thorough analysis of these assumptions is beyond the scope of this study, it should be noted that a significant body of research highlights the challenges associated with using standardized test scores to evaluate school and teacher quality (Amrein & Berliner, 2002; Pivovarova, Amrein-Beardsley, & Broach, 2016). Despite this, policies that rely heavily on students' standardized test scores to determine teacher and school effectiveness continue to be a salient aspect of public education in the U.S. Given the controversy surrounding the role of test scores in public education, it seems likely that teachers and principals will have different beliefs and opinions about standardized tests and how they should be used. As such, the pairings of certain kinds of teachers with certain kinds of principals based on these beliefs may result in different levels of teacher-school fit as well as different levels of teacher mobility.

## **Teacher Mobility**

Studies of teacher mobility are concerned with how and why teachers leave schools. These studies often assign teachers to one of three categories: stayers, movers, and leavers (Goldring et al., 2014). Stayers are teachers who remain in their current teaching position from one year to the next. Because staying in a position results in fewer problems for schools and students, studies of stayers are less common but often fall under the teacher retention literature. Movers, on the other hand, are teachers who leave their teaching position at the end of a school year but remain in the teaching profession. Researchers often classify teachers who move to schools within the same district and those who move to schools in other districts differently. The former are referred to as intradistrict movers and the latter as interdistrict movers (Lankford et al., 2002). These distinctions are made because each kind of mover poses different challenges to schools and school districts. For example, when districts invest in teachers in the form of professional development and benefit packages, intradistrict mobility results in a loss of human capital to individual schools but a redistribution of human capital within the district. Interdistrict mobility, on the other hand, results in a loss of human capital for both schools and school districts. Finally, leavers are teachers who leave the profession entirely and represent a loss of human capital for schools and school districts. In addition to the categories listed above, researchers have identified a group of teachers who are often overlooked in studies of teacher mobility: returners. Returners are teachers who leave the profession for a period of time and return at a later date (Gray et al., 2015). The reason for their departures are diverse and may include things like staying home to raise



young children or taking a leave of absence to care for a sick loved one. Whatever the reason for their decisions to leave, teacher mobility is costly for districts and schools because teachers must still be replaced and new teachers must be recruited, processed, and trained.

Teacher mobility affects schools and school districts across the country. A recent report by the National Center for Education Statistics (Goldring et al., 2014) found that of the 3,377,900 who were teaching in K-12 public schools during the 2011-2012 school year, 16% or just over 500,000 either moved to a different school or left the profession. Of the teachers who moved to another school, 59% moved to another school within the same district, 38% moved to a school in another district, and 3% moved to a private school. As discussed earlier, such high rates of mobility place a large financial burden on schools and school districts as they must recruit, process, and train new teachers. The National Commission on Teaching and America's Future (2012) estimates that teacher mobility costs U.S. schools nearly \$7 billion annually.

Teacher mobility does not affect all schools equally. Research consistently shows that teachers leave schools with large numbers of poor, minority, and low-performing students at disproportionately high rates (Bastian & Henry, 2015; Donaldson & Johnson, 2010; Ingersoll, 2001). When teachers leave these schools, they tend to seek employment in more affluent, higher-performing, suburban schools and frequently cite things like inadequate administrative support, isolated working conditions, poor student discipline, low salaries, and a lack of collective teacher influence over schoolwide decisions as their reasons for departure (Ingersoll & May, 2010).

## **Theoretical Framework**

As discussed previously, this study is guided by person-environment fit theory. Researchers have used many characteristics of people and their environments to study person-environment fit that include personal interests, vocational characteristics, values, organizational culture, goal similarity, group dynamics, and personality match between workers and supervisors (Kristof-Brown & Guay, 2011). Consequently, person-environment fit has suffered from a lack of coherence both theoretically and methodologically (Edwards, 2008). However, most scholars accept the definition of fit as the degree of compatibility between a person and his or her environment because it allows fit to occur across a range of personal and organizational characteristics and reflects the widely-held belief that individual behavior is a function of both the person and his or her environment (Harrison, 2007).

There has been considerable debate over the conditions that constitute fit. The most restrictive view states that fit can only occur when there is a perfect match between person and environment characteristics (Edwards, 2007) and is often referred to as exact correspondence (Kristof-Brown & Guay, 2011). In an exact correspondence framework, both person and environment characteristics can be assessed by the participants or a third-party observer. The characteristics need only correspond directly. Exact correspondence is frequently used by researchers in studies of value or goal congruence (Kristof-Brown & Guay, 2011) and, therefore, is the approach used in this study.

A less restrictive view of person-environment fit allows for fit to occur across a range of characteristics and is referred to as commensurate compatibility (Kristof-Brown

& Guay, 2011). In this view, fit occurs when person and environment characteristics are within a range of compatibility and lack of fit occurs when the level of fit drops below a certain threshold. For instance, when a worker is compensated beyond his or her desired salary, then that person is still well-matched with his or her organization. The person's salary can be within a range of possible salaries as long as it remains at or above the desired amount. However, if the person's salary drops below the desired amount, the person will no longer be well-matched.

Perhaps the least restrictive view of fit is general compatibility (Kristof-Brown & Guay, 2011). In this view, fit can occur on dimensions that are conceptually relevant, but not necessarily commensurate. This allows for some degree of flexibility with regard to measurement as person and environment characteristics need not be measured using the same scales. For example, workers with a desire to be recognized may fit well with organizations that have pay-for-performance policies. Although the proximity of one's desire to be rewarded to a pay-for-performance policy is unclear, it makes sense that the worker's need to be recognized is being met when he or she is rewarded at work. To this end, general compatibility is perhaps the most similar to what people think of when asked "how well do you fit?" and, therefore, has the strongest construct validity. However, the fact that fit can fall along an infinite number of combinations makes defining the construct difficult.

Regardless of whether fit is viewed as exact correspondence or general compatibility, two mechanisms are believed to underlie the concept. These mechanisms are supplementary fit and complementary fit (Muchinsky & Monahan, 1987).

Supplementary fit occurs when a person fits into an environment because he or she possesses characteristics that are similar to other individuals in that environment. This is evident in studies that assume that individuals choose vocations because they have interests that are similar to others in that vocation. Complementary fit, on the other hand, occurs when there is a deficiency in an environment that is met by a worker or when an environment offers something that a worker is lacking. Some have described this kind of fit as making either an environment or an individual “whole” (Kristof-Brown & Guay, 2011). Both kinds of fit have been widely accepted by scholars as meaningful components of person-environment fit (Kristof, 1996). In the current study, I operationalize fit between teachers’ and principals’ value placed on test scores as supplementary since fit is most likely to occur when principals and teachers share similar values.

In addition to the theories of fit described above, this study is guided by Schneider’s (1985) Attraction-Selection-Attrition theory (ASA). Although it falls under the umbrella of person-environment fit theories, ASA differs from the theoretical frameworks described above in that it views organizations as a reflection of the people in them and not independent of them.

ASA posits that the characteristics of organizations develop in stages. In the early stages of an organization, the personality of the founder is projected onto the organization’s goals, strategies, and processes and attracts workers with similar preferences. As an organization grows, it draws greater numbers of potential employees, most of whom share values that are similar to those of current employees. ASA also

proposes that organizations will choose workers that are compatible with the organization's values and goals or that meet the needs of the organization. Further, when employees are not a good fit, they will either change so that they are aligned with the organization or they will leave.

Schneider et al. (2001) point out that although high levels of fit may result in positive outcomes for individuals, fit may be stifling at the organization level. This is because organizations with high levels of fit will necessarily become more homogeneous over time and, in turn, may lack the perspectives needed to perceive and adapt to environmental changes. ASA stands apart from previous theories of person-environment fit in that it provides a framework for understanding how organizations to develop over time.

A substantial body of research supports the attraction and attrition components of ASA theory. For example, researchers have found that workers tend to seek out employment at organizations that share goals and values that are similar to their own (Schneider et al., 2001; Zhang & Gowan, 2011) and that they will leave an organization when they feel that they do not fit (Hult, 2005; Sims & Keon, 1997). Studies that examine the selection component of ASA theory are less common. However, a small, but growing body of research indicates that selection makes organizations more homogeneous with regard to workers' personality types and their life histories (Jordan, Herriot, & Chalmers, 1991).

Building on this research, the present study conceptualizes fit between individual teachers and their principals using a framework similar to ASA. In the case of schools

and teachers, teaching staff may be seen as a key component of the overall organization, much like workers in the ASA framework. Although principals are not a direct analogue of the founders of an organization described by ASA, they do have a significant impact on the culture and values of their schools. Perhaps most importantly, they are able to determine who is hired. Principals with longevity will be able to develop a workforce that reflects their values and, over time, those who no longer align with those values will likely leave. In this study, I examine how pairings of teachers and principals based on the values that each places on standardized test scores potentially affects teachers' sense of fit and their intended mobility. Presumably, when teachers do not share values with their principals, they will feel that they do not fit well at their school and, therefore, seek employment elsewhere.

### **Purpose and Significance of the Study**

The first goal of this study is to determine if teacher-principal pairings potentially affect teachers' sense of teacher-school fit. To date, few studies have examined person-environment fit among teachers. Further, little is known about how teachers determine their levels of fit with their schools. If the pairings identified in this study are related to teachers' sense of teacher-school fit, then this study is an important step towards understanding person-environment fit among teachers.

Also, there continues to be much debate surrounding how person-environment fit is measured. Some suggest measuring fit indirectly using observed characteristics of people and their environments while others choose to assess people's sense of fit directly. This study attempts to clarify this relationship by examining how an indirect measure of

fit (i.e. teacher-principal pairings) is related to a direct measure of fit (i.e. self-assessed fit).

Additionally, this study will examine the extent to which teacher-principal pairings and teachers' self-assessed teacher-school fit are related to teacher mobility. Teacher mobility poses several challenges to schools and school districts. Therefore, reducing mobility has been a goal for education practitioners and policymakers for some time. However, little is known about how teacher-principal pairings affect teachers' mobility decisions. Understanding the relationship between teacher-principal pairings and teacher mobility may help schools and school districts make better-informed hiring decisions, thus reducing teacher mobility.

## **Chapter 2: Review of Literature and Conceptual Framework**

In the following chapter, I provide an overview of the research from two bodies of literature: studies of teacher mobility and studies of person-environment fit. The section devoted to teacher mobility is organized by teacher and school characteristics that have been linked to teacher mobility and gives special attention to how these characteristics might influence mobility decisions. The second section is devoted to person-environment fit and is further divided into two subsections. The first subsection describes the levels of fit that researchers have identified (vocation, organization, job, and group/individual) and provides a brief review of studies at each level. Next, I offer an overview of studies that have examined person-environment fit among teachers. In the final two sections, I identify gaps in these two bodies of literature and outline the conceptual framework that guides this study.

### **Teacher Mobility**

Teacher mobility has long been a concern of both policymakers and education practitioners. Consequently, a significant body of research has been devoted to understanding the factors that are associated with a teacher leaving his or her school. These factors can be grouped into three broad categories: characteristics of teachers, characteristics of students, and school contextual factors. The following sections summarize how each of these has been linked to teacher mobility.

**Teacher characteristics.** Several teacher characteristics, like age and sex, have been identified as possible drivers of teacher mobility. Researchers have found that mobility is higher among young and old teachers as opposed to middle-aged teachers



(Barbieri et al., 2011; Elfers et al., 2006; Gilbert, 2011). This has been attributed to the fact that mobility among young teachers often results from a mismatch with either their initial teaching placement or their career choice while mobility among older teachers often reflects a decision to retire. A similar relationship has been observed with regard to teachers' levels of experience with less experienced teachers moving at higher rates due to placement or career mismatch.

Teacher mobility has also been linked to where and how a teacher was trained and their pathways into teaching (i.e. traditional certification vs. fast track certification; Boyd et al., 2006; Boyd et al., 2011). On average, teachers who enter teaching through fast-track or non-traditional teacher preparation programs are more likely to leave than are teachers from traditional teacher education programs. It is unclear if this relationship reflects the fact that many of these teachers are placed in challenging schools or if they are unprepared to meet the demands of their jobs.

Studies have also found that teachers with high SAT and teacher licensure exam scores are more likely to leave teaching (Boyd et al., 2005; Boyd et al., 2011). This is also true of teachers who attend highly competitive colleges (Boyd et al., 2005). Researchers postulate that this is due, in part, to the fact that these teachers are competitive for jobs in other fields that offer higher salaries, better working conditions, and are afforded more respect. Teachers who are effective at raising students' standardized test scores, on the other hand, are less likely to leave the profession (Goldhaber et al., 2007) presumably because they derive satisfaction from doing work that they are skilled at.

**Student Characteristics.** In addition to teacher characteristics, student characteristics have been linked to teacher mobility (Boyd et al., 2011; Barbieri et al., 2011; Elfers et al., 2006). In general, these studies examine how the pairing of different kinds of teachers with different kinds of students impact teachers' decisions to stay at or leave a school. Specifically, schools with large concentrations of low-income, minority, and/or low-achieving students experience the highest rates of teacher turnover, particularly when teachers are white and middle-class (Boyd et al., 2011; Barbieri et al., 2011; Gilbert, 2011). When teachers leave these schools, they tend to move to schools with fewer minority students and higher levels of academic achievement (Hanuschek et al., 2004). In addition to students' demographic characteristics, student behavior has been shown to predict teacher mobility with teachers frequently citing poor student behavior as a reason for leaving a school (Boyd et al., 2011).

**School contextual factors.** Several school-level characteristics have been found to influence teachers' decisions to stay at or leave a school. One consistent finding is the link between teacher autonomy and mobility (Barbieri et al., 2011; Elfers et al., 2006; Gilbert, 2011; Hancock & Scherff, 2010). In general, teachers appear to derive greater satisfaction from their work when they are given control over their classrooms and when they have a say in school policies and practices like curriculum development and scheduling (Kukla-Acevedo, 2009; Loeb, Darling-Hammond, & Luczak, 2005). Consequently, they are more likely to stay in schools that allow them these freedoms. Although the underlying mechanisms that drive this relationship are unclear, researchers

have found that work-related stress is negatively correlated with workplace autonomy and that this may be related to teachers' mobility decisions (Pearson & Moomaw, 2005).

Administrators impact teachers' mobility decisions both directly and indirectly (Boyd et al., 2011). Indirectly, administrators can have an impact on individual teachers by building a sense of community, establishing consistent school routines, and advocating for the school to stakeholders, all of which have been linked to lower rates of mobility (Leithwood et al., 2004). School administrators can also have a direct impact on teachers by providing high-quality professional development, protecting teachers from district office mandates, and being supportive in matters of student discipline. This, in turn, increases teachers' likelihood of staying at a school (Hersch & Emerick, 2007).

The physical and geographic characteristics of schools have also been linked to teacher mobility. Both the physical spaces where teachers work and the resources that are available to them can impact teachers' sense of efficacy and overall morale (Boyd et al., 2011; Gilbert, 2011). Specifically, when teachers feel that their schools have sufficient resources and agreeable facilities, they feel better prepared to do their jobs and, in turn, are less likely to leave. With regard to geography, researchers have noted that teachers, more than people in other professions, are prone to live close to where they grew up (Reininger, 2011) and are more likely to leave a school if it is far from their childhood home. This has led some to posit that teacher labor markets are localized and that high rates of teacher mobility and disproportionate numbers of low-quality teachers may be due, in part, to a lack of homegrown teachers (Jaramillo, 2012).

Finally, teacher mobility appears to be related to teachers' salaries. For instance, a recent study by the National Center for Educational Statistics (Gray & Taie, 2015) found that 20% of teachers who began teaching in the 2007-2008 school year and whose salaries were less than \$40,000 left their schools to pursue a career outside of education within five years of entering the profession. For teachers whose salaries were greater than \$40,000, this number was only 11%. For teachers who leave a school but stay in the profession, salaries appear to reduce mobility across districts but are unrelated to mobility within districts (Fulbeck, 2014). Research indicates that this is largely due to differences in salaries and incentive packages between districts (Feng, 2009).

### **Person Environment Fit**

A principle concern of person-environment fit researchers has been identifying the levels at which fit occurs. For example, fit might be understood differently when it is examined as a relationship between a person and his or her career versus the specific organization where he or she works. In the following sections, I provide a brief overview of the levels of fit that have been identified by researchers and review some representative studies. I then summarize the extant research that examines person-environment fit among teachers.

**Person-Vocation Fit.** The highest level of fit that researchers have identified occurs at the person-vocation level. Perhaps the most commonly cited theory in person-vocation research is Holland's theory of career choice (1997) which posits that workers fall into one of six personality categories: realistic, investigative, artistic, social, enterprising, and conventional. According to Holland, professions can be characterized

by the kinds of work that they require. Therefore, each personality type is most compatible with certain careers. For example, investigative personalities fit well with careers where they are required to work with ideas like academia or research whereas social personalities will find that they fit well in careers that are interactive like teaching or nursing.

Researchers have investigated many aspects of person-vocation fit. For instance, Anthony (1998) examined relationships between Holland's personality types and the characteristics of participants' professions and found that good fit was predictive of majoring in a related field and that poor fit resulted in higher rates of professional attrition. Others have found that person-vocation fit can be influenced by various aspects work. For instance, people are more likely to leave professions where their values are not aligned with the expectations of their jobs (Shanafelt, 2009). Goldberg et al. (2004) highlight another interesting aspect of person-vocation fit in that they find that fit can occur based on people's demographic characteristics and the characteristics of their occupations. This kind of mismatch can result in lower salaries, fewer promotions, and a lower likelihood of achieving managerial status.

**Person-job fit.** Person-job fit is closely related to person-vocation fit because it is based in recruitment and selection research (Kristof-Brown & Guay, 2011). It refers to the compatibility of a person's characteristics with those of a specific job. Studies of person-job fit are relatively few in number (Ehrhart, 2006), although a handful of representative studies shed light on this field of research. For instance, Farzaneh et al. (2014) found that workers' self-assessed job fit was positively related to organizational

citizenship behaviors. Similarly, higher levels of person-job fit have been linked to higher levels of self-reported well-being and job performance (Lin, Lu, & Yi, 2014). Research also suggests that a person's major in college may affect his or her job fit. Specifically, when workers have a degree that aligns with their position, they are more likely to receive a promotion and less likely to leave their company (Starks, 2007). Researchers have also examined person-job fit across cultural contexts. For example, Lee and Atonakis (2014) studied the relationship between social hierarchies and person-job fit and found that person-job fit was positively associated with job structure in cultures where social hierarchies are prominent.

**Person-organization fit.** One of the most frequently studied levels of person-environment fit is person-organization fit (Hoffman & Woehr, 2005). Person-organization fit occurs between an individual and the organization for which he or she works. A large body of research examines corporate values and the values of employees. This research suggests that ethical corporate climates are associated with higher levels of job satisfaction, organizational commitment, and willingness to identify with a company, especially when workers have a strong sense of social responsibility (Cha, Chang, & Kim, 2014; Hult, 2005; Sims & Keon, 1997; Zhang & Gowan, 2011). This relationship has also been found to vary with workers' moral intensity (Andrews et al., 2011).

Researchers have also examined how workers' personality traits affect their sense of organizational fit. For instance, Ahmad (2010) found that workers with high levels of equity sensitivity felt less satisfied in organizations where their work went unnoticed. Similarly, Amiot (2006) surveyed professional hockey players and found that players

who displayed obsessive passion (i.e. uncontrollable tendencies to engage in an activity) reported higher levels of psychological adjustment when they played in highly-competitive leagues.

**Person-group and person-individual fit.** The “lowest” levels of fit that researchers have identified exist between individuals and their coworkers or supervisors. When fit occurs between an individual and a group of people, it is referred to as person-group fit. Person-group fit focuses on interpersonal relationships and the compatibility between an individual and his or her work team (Kristof-Brown & Guay, 2011). Studies of person-group fit have focused largely on group goals and values as in Kristof-Brown and Stevens’ (1998) examination of goal congruence among group members. They report that when group members share common goals, they are more likely to contribute to group conversations and report higher levels of job satisfaction. Similarly, Becker (1992) finds that group members who share similar values also report higher levels of job satisfaction and job commitment.

Person-individual fit exists between an individual and a significant other in his or her work environment. Examples include coworkers, supervisors, and mentors (Antonioni & Park, 2001; Adkins, Russell, & Werbel, 1994). Similar to person-group fit, many person-individual fit studies operationalize fit as the level of congruence between the goals, values, and working styles of worker dyads. For instance, Antonioni and Park (2001) found that coworkers with similar levels of conscientiousness gave positive ratings to each other on a peer evaluation. Similarly, Adkins, Russell, & Werbel (1994) report that recruiters are more likely to recruit a prospective employee when they share

similar values and dispositions. Despite a growing interest in person-group and person-individual fit, studies examining fit at these levels are rare (Kristof-Brown & Guay, 2011).

**Person-environment fit and teachers.** Although studies of person-environment fit are prevalent in a number of fields, only a handful of studies have examined this construct among teachers. Of those, the majority have studied person-environment fit at the organization level. For example, in a study testing Schneider's Attraction-Selection-Attrition theory, Cooman et al. (2008) sought to determine if person-organization fit increased over time and if teachers' level of fit could predict retention. The researchers surveyed 421 teachers in Belgium for two years and found that teachers' values became similar to those of their coworkers the longer that they taught at a particular school. The researchers also found that low levels of person-organization fit as measured by the congruence between a teacher's values and those of his or her coworkers were related to higher rates of turnover. In another study, Grogan and Young (2011) examined the relationship between teachers' level of fit with their school and the likelihood of leaving the school and leaving the profession. Fit was measured as the degree of similarity between the professional goals, values, and teaching styles of a teacher and those of his or her coworkers. They found that teachers with high levels of fit were less likely to leave their schools. A study by Jackson (2014) also examines fit at the organization level and found that school-level fit was negatively associated with leaving a school but not associated with leaving the profession. In one of the few qualitative studies of person-environment fit, Pyhalto et al. (2011) investigated specific aspects of perceived misfit



among 68 public school teachers in Finland. They found that teachers most frequently attributed a lack of fit to pressures of the job or to interactions with students and colleagues.

Researchers have also examined person-environment fit among teachers at the vocation level. In a study of 300 Australian and Scottish teachers, Pithers and Sodden (1999) used Holland's personality types to determine teachers' level of person-vocation fit. The researchers found that teachers with low levels of fit experienced higher levels of psychological stress. In another study, Perkmen et al. (2012) found that alignment between teachers' goals and values and their perceptions of the profession were positively associated with career satisfaction.

A handful of studies have looked at person-environment fit among teachers at the group and supervisor levels. Using a sample of 365 principals and over 14,000 teachers in the U.S. and Canada, Vancouver and Schmitt (1991) found that teachers are more likely to leave their schools and to report lower levels of job satisfaction when their priorities are different from those of their principals. Similarly, Grogan and Youngs (2011) examined the relationship between teachers' professional networks and their intent to leave their current teaching assignment. They found that having a close group of coworkers reduced the risk of turnover. Finally, Bogler and Nir (2014) found that positive relationships with principals increased the likelihood of a teacher staying at his or her school.

Studies of teacher- job fit are perhaps the least common in the research literature. In the previously described study, Bogler and Nir (2014) examined the relationship

between teachers' perceived job fit and their intentions to leave their schools and the profession. They found that teachers who felt that their abilities were matched to the demands of their jobs were less likely to leave their schools and the profession.

### **Research Gaps and Limitations**

Although the research literature provides some insight into what drives teacher mobility, several gaps and limitations remain. First, studies of teacher mobility largely ignore the internal processes that influence teachers' mobility decisions. From a policy perspective, this information is critical. Teacher retention policies are intended to curb turnover by incentivizing a change in teachers' behaviors. Without understanding the processes that drive these behaviors, it is impossible to know if a policy intervention will be effective.

Second, with regard to the person-environment fit literature, only a handful of studies have applied person-environment fit to teachers (Pogodzinsky et al., 2014). Although some aspects of teachers' work environments are similar to those in other professions, many are unique. For instance, the role that students play in teachers' work is uncommon in other professions. Although some might compare students to clients in other work contexts, there are few professions where employees are required to spend eight hours each day working with the same group of people for an entire year. Ignoring the unique aspects of teaching in studies of person-environment fit may mean that important relationships are being overlooked.

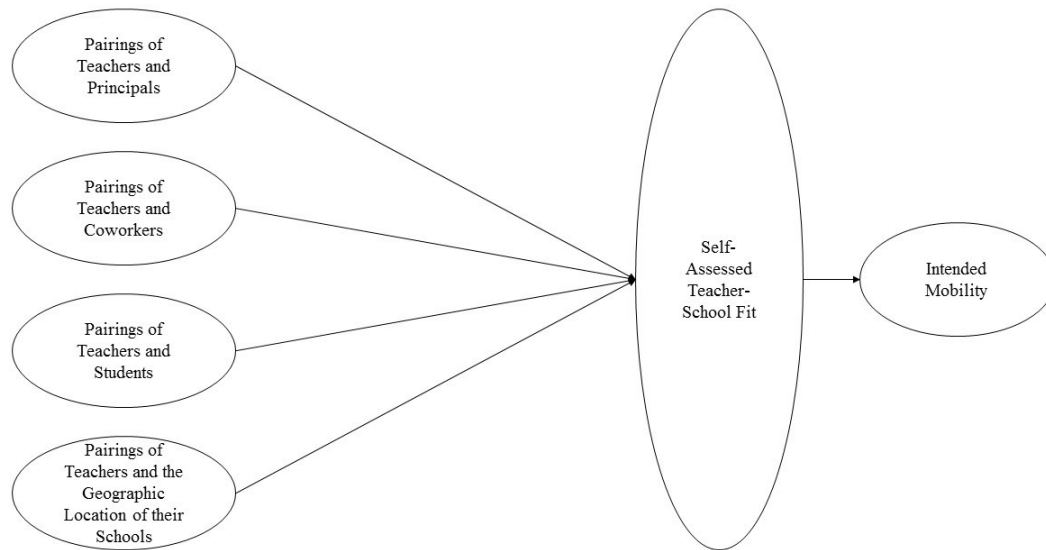
Finally, the vast majority of person-environment fit research examines each level of fit separately. It is unlikely, however, that these levels exist in isolation. For instance,

teachers might find that they fit well with their coworkers but do not fit with their administrators or students. Also, from the perspective of person-organization fit, it may be that teachers' view their schools as a composite of lower levels of fit (e.g. person-job, person-group, and person-individual). If this is the case, then there may be differential relationships between fit at each level and the outcome of interest. Until these relationships can be disentangled, any conclusions drawn from these studies should be viewed in light of these limitations.

### **Conceptual Framework**

In this study, I propose a framework of teacher-school fit that is guided by both the teacher mobility and person-environment fit research literatures. This framework consists of several components including pairings of different teacher and school characteristics, teacher preferences for different aspects of their work, teachers' self-assessed fit, and teachers' intended mobility. I briefly describe each component below and present the entire framework in Figure 1.

This framework reflects the multifaceted nature of schools which are indicated by the four converging lines in Figure 1. In this framework, teachers' sense of fit with their schools is viewed as a composite of the levels of fit described in the person-environment fit literature (i.e. teacher-coworker and teacher-principal). Additionally, I conceptualize fit occurring on two levels not identified in the person-environment fit literature but that figure prominently in teacher mobility research: students and the geographic location of a school. These have both been identified as having a strong influence on teachers' professional decisions in previous research (Boyd, 2011; Reininger, 2012).



*Figure 1.* Conceptual framework.

The first portion of this framework includes pairings of teacher and school characteristics that likely contribute to teachers’ self-assessed sense of teacher-school fit. In this framework, these pairings are hypothesized to contribute to teachers’ subjective self-assessed fit with their schools. In this way, the framework attempts to clarify the often murky relationship between direct and indirect measures of fit. Finally, the framework indicates that teacher mobility is affected by teachers’ self-assessed teacher-school fit.

**Teacher-School Fit and Teacher-Principal Pairings**

Although the data collected for this study allow me to tests many pairings of teacher and school characteristics, only one will be examined in-depth. Specifically, I

will examine teacher-school fit at the principal-level focusing exclusively on pairings based on teachers' value placed on standardized test scores and the value that their principals place on standardized test scores. As discussed previously, numerous studies have linked school administration to teacher mobility (Boyd et al., 2011). This is not surprising since principals have a great deal of influence over their schools. For instance, principals are responsible for setting professional expectations, fostering collegial relationships, and coaching teachers. Despite their importance, little is known about how pairings of different kinds of teachers with different kinds of principals are related to teacher mobility.

Additionally, students' performance on standardized tests have become a key feature of the education landscape in the United States. This emphasis on test scores, however, has been the focus of much criticism (Broach, 2016). Consequently, there is likely a high degree of variability with regard to the value that both teachers and principals place on students' standardized test scores. With such variability, we might imagine a variety of pairings between teachers and principals that result in different levels of fit. For simplicity's sake, it may be informative to imagine how four of these pairings could affect teacher-school fit. The first is the pairing of a teacher and an administrator who both place a high value on students' standardized test scores. In this scenario, we would imagine that the teacher would enjoy working with a like-minded principal and that his or her level of fit would be high. The same would be true for a pairing where both the teacher and the principal do not value standardized test scores. For instance, a principal that does not value standardized test scores likely does not

pressure teachers to focus their instruction on raising standardized test scores. Therefore, a teacher who does not value standardized test scores may feel free to focus on the aspects of teaching that he or she finds most valuable. In the final two pairings, low levels of fit are likely to occur when teachers who value test scores are placed with principals who do not value standardized test scores and vice versa. In the case of a teacher who does not value standardized test scores paired with a principal who does, the teacher may feel that they are being forced to work towards goals that they do not share and, therefore, have lower levels of fit. Similarly, when teachers who value standardized test scores are placed with principals who do not value standardized test scores, these teachers may feel unsupported as they work towards raising students' standardized test scores.

### **Chapter Three: Methods**

In the following sections, I outline the research design, measures, and analyses used to answer the following research questions: “Are teacher-principal pairings related to teachers’ self-assessed sense of teacher-school fit?” and “Does self-assessed teacher-school fit mediate the relationship between teacher-principal pairings and teacher mobility?” I begin by describing my procedures for data collection and choice of instruments. I then describe the sample of teachers and outline the statistical analyses that will be used to answer the research questions.

#### **Participants and Study Sites**

In Arizona, schools most often fall into one of two categories: elementary schools and high schools. Unlike other states, Arizona’s elementary schools include students in kindergarten through the 8<sup>th</sup> grade. As a result, the majority of students (67% during the 2013-2014 school year; Douglas, 2015) are served by these schools making them the most policy-relevant and, therefore, the most suitable for this study. Therefore, the data for this study came from a survey that was administered to 698 teachers and 22 principals employed at 22 K-8<sup>th</sup> grade schools in two urban, Arizona elementary school districts. As Table 1 indicates, these districts serve similar populations of students, the vast majority of whom are minorities and qualify for free- or reduced-price lunch (Arizona Department of Education, 2016). Additionally, these districts serve large shares of English language learners with District 2 enrolling slightly more English language learners than District 1.

Surveys were administered via an online survey using each district’s teacher mailing lists. The survey opened on January 9<sup>th</sup>, 2017 and closed on January 20<sup>th</sup>, 2017. Teachers

Table 1

*Student composition of districts*

<u>Student Subgroup</u>	<u>District 1</u>		<u>District 2</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Minority	6,773	94.3%	6,070	93.3%
Free and Reduced Lunch	6,482	90.3%	6,027	92.6%
English Language Learner	1,056	14.7%	1,428	21.9%
Total Enrollment	7,180	100.0%	6,507	100.0%

and principals were contacted three times during the survey window: once at the opening of the survey, once at the beginning of the following week, and again on the day before the survey closed. Although emails were sent from district staffs' email accounts, the emails clearly stated that the study was not being conducted by the district and that participation was voluntary. In total, 555 teachers provided partial or complete responses for a response rate of 79.5%.

I chose to restrict this sample to teachers who worked as full-time, K-8<sup>th</sup> grade classroom teachers. Because of the structure of the districts' email lists, the survey was also sent to special area teachers (i.e. music, band, physical education, etc.) as well as special education teachers. These teachers likely have relationships with their principals that are systematically different from classroom teachers, particularly as it relates to standardized tests. Therefore, these teachers were excluded from the analysis resulting in a total of 384 responses. Table 2 shows the response rates of K-8<sup>th</sup> grade classroom teachers by school. It should be noted that the participating districts did not provide exact numbers for employment by grade. In order to determine the number of teachers employed in each grade, I went to each school's website and counted the number of staff listed in each position. The percentages in Table 2 reflect the number of responses from



Table 2.

*Response rates of K-8<sup>th</sup> grade teachers by school*

District 1			District 2		
<u>School</u>	<u>Responses</u>	<u>Percent</u>	<u>School</u>	<u>Responses</u>	<u>Percent</u>
School 1	16	84%	School 1	16	47%
School 2	15	60%	School 2	24	73%
School 3	9	69%	School 3	22	69%
School 4	21	88%	School 4	22	100%
School 5	22	100%	School 5	16	46%
School 6	15	56%	School 6	17	57%
School 7	16	84%	School 7	22	65%
School 8	16	67%	School 8	29	100%
School 9	18	86%	School 9	17	74%
School 10	15	79%			
School 11	12	71%			
School 12	9	53%			
School 13	15	83%			
Total	199	75%	Total	185	69%

teachers who said their primary teaching assignment was in either grades “K through 5<sup>th</sup>” or “6<sup>th</sup> through 8<sup>th</sup>.” As Table 2 shows, response rates varied greatly between schools from between 47% to 100%. The sample includes 75% of K-8 teachers from District 1 and 69% of K-8 teachers from District 2.

Table 3 describes the demographic and professional composition of the final sample of teachers. Half of teachers in the sample graduated from high school in Arizona and the overwhelming majority are female (89%). The largest ethnic group is white (64%) followed by Hispanic (17%), two or more (9%), black or African American (6%), Asian (3%), American Indian (1%), and Hawaiian (.2%). With regard to age, the largest group of teachers are between 22 and 30 years old (35%) followed by those who are between 31 and 40 (25%). Nearly equal numbers of teachers were between 41 and 50 years old (17%) and 51 and 60 years old (18%). Only a handful of teachers (5%) were

Table 3.

*Descriptive statistics for the final sample of teachers*

<u>Characteristic</u>	<u>Number</u>	<u>Percent</u>
AZ High School Graduate	188	50%
<u>Sex</u>		
Female	321	89%
Male	48	11%
<u>Ethnicity</u>		
American Indian or Alaska Native	4	1.1%
Asian	12	3.3%
Black or African American	20	5.5%
Hispanic	61	16.9%
Native Hawaiian	1	.2%
Two or More	32	8.9%
White	231	64.0%
<u>Age</u>		
22-30	130	35.4%
31-40	90	24.5%
41-50	64	17.4%
51-60	65	17.7%
61 or Older	18	4.9%
<u>Highest Degree Earned</u>		
Bachelor's	161	43.3%
Master's	210	56.5%
Doctorate	1	.3%
<u>Primary Teaching Assignment</u>		
Kindergarten through 5 <sup>th</sup> grade	249	66.6%
6 <sup>th</sup> -8 <sup>th</sup> grade	127	33.4%

*Note.* These numbers only include teachers who responded to each item.

older than 60. Over half of teachers hold a master's degree (57%) and two-thirds (66%) have a primary teaching assignment in Kindergarten through 5<sup>th</sup> grade.

### Measures

Data for this study were collected as part of a larger study that will examine several aspects of teacher-principal pairings. In addition to measures of the value teachers and principals place on standardized test scores, I also collected data related to

teachers' preferences for autonomy, support, and feedback as well as teachers' perceptions of the amount of autonomy, support and feedback that their principals provide. However, for the purpose of this study, I focus solely on pairings based on the value that teachers and principals place on standardized test scores.

**The value teachers place on standardized test scores.** Standardized tests have become a central aspect of schooling across the country. Consequently, they are likely an important feature in teachers' conception of teacher-school fit. To capture this, I developed five Likert-type items that asked teachers about the value that they place on students' standardized test scores. In line with the recommendations of Crocker and Algina (1986), I chose items that were likely to measure a wide range of levels and aspects of the construct. As Table 4 shows, these included beliefs about the validity of test scores, behaviors related to improving students' test scores, and teachers' value placed on test scores. All items were presented on a six-point Likert scale with response options ranging from "strongly disagree" to "strongly agree." Using a six-point scale increased the likelihood that distributional assumptions made by the measurements models used in the analyses would be met. Specifically, previous research has shown

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Table 4.

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*Items for the value teachers place on standardized test scores*

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- Item 1: Improving students' standardized test scores is something that a teacher should strive for.
  - Item 2: How my students perform on standardized tests is important to me.
  - Item 3: Students' standardized test scores are an accurate indicator of how much students have learned.
  - Item 4: I devote a lot of thought and energy to improving my students' standardized test scores.
  - Item 5: I use my students' standardized test scores to improve my instruction.
-

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Table 5.

*Items for the value principals place on standardized test scores*

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- Item 1: My principal believes that how students perform on standardized tests is important.
  - Item 2: My principal wants me to strive to improve my students' standardized test scores.
  - Item 3: My principal expects me to devote a lot of thought and energy to improving my students' standardized test scores.
  - Item 4: My principal believes that students' standardized test scores are an accurate indicator of how much students have learned.
  - Item 5: My principal expects me to use standardized test scores to improve my instruction.
- 

that when samples are large and when there are five or more response options, responses to Likert items can behave like continuous data rather than ordered categorical data (Rigdon, 1998). The factor structure and internal consistency were assessed during the pilot portion of this study which is described in detail in Chapter 4.

**The value principals place on standardized test scores.** I measured the value principals place on standardized test scores by asking teachers to respond to a set of items that correspond to the teacher-level scale described above. However, these items asked teachers about their perceptions of their principals' beliefs and practices. Using these scores, I computed school-level averages as proxies for principals' enacted values. Like the teacher-level scale described above, this scale included five six-point Likert-type items that asked respondents to agree or disagree with the statements presented in Table 5. As with the corresponding teacher items, the factor structure and internal consistency of these items were assessed during the pilot phase of this study.

**Self-assessed teacher-school fit.** The notion of subjective fit comes from the general correspondence framework. Subjective fit is constructed at the individual level

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Table 6.

*Teacher-school fit items.*

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Item 1: Fitting into this school is easy for me.

Item 2: I believe I fit this school well.

Item 3: I am a good match for this school.

Item 4: I cannot imagine a school that would be a better fit.

Item 5: The characteristics of this school are a good fit for me.

---

and, therefore, is best measured directly (Kristof-Brown, 2005). To measure teachers' self-assessed level of teacher-school fit, I adapted items from Herdman and Carlson's (2009) *Global Perceptions of Person-Environment Fit Scale* (GPFS). The GPFS consists of 14 six-point Likert-type items that ask respondents to agree or disagree with statements like "This is the right work situation for me" and "I believe that my characteristics and those of my organization are a match." Reliability estimates for this measure have been high ( $\alpha = .94$ ; Herdman & Carlson, 2009).

For the purpose of this study, I adapted items from the GPFS to be more appropriate for teachers and reduced the number of items to 5 by excluding items that had low factor loadings in previous studies and items that seemed redundant. These items are included in Table 6. Again, the factor structure and internal consistency of these items were tested in the pilot study described below.

**Intended mobility.** To measure teachers' intended mobility, I included several questions about teachers' future employment. The primary question of interest was "Do you see yourself working at your current school in five years?" Response options to this item included "Yes," "Most Likely Yes," "Most Likely No," and "No." Further, because the focus of this study is on teacher-school fit and not teacher-vocation fit, it was

important to identify people whose mobility decisions were the result of a mismatch with their school rather than the profession. To do this, I asked respondents who responded “No” to indicate whether they would remain in the profession. It is also important to know whether or not teachers’ mobility decisions are voluntary. Therefore, I ask teachers who responded “No” if switching schools was a voluntary decision. Teachers who said they would leave the profession or whose decisions were involuntary were excluded from the analyses.

### **Analysis**

This study will include two sets of analyses that correspond to each of the research questions stated in Chapter 1. To answer the first research question, “Are teacher-principal pairings related to teachers’ self-assessed teacher-school fit?,” I will test whether the value principals place on standardized test scores moderates the relationship between the value teachers place on standardized test scores and teachers’ self-reported teacher-school fit. Specifically, I will use a multilevel model with teachers as the level-1 units and principals as the level-2 units where teachers’ self-assessed fit is the outcome. This model will take the following general form:

Level 1

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + R_{ij}$$

Level 2

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + U_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}Z_j + U_{1j}$$

Combined (Reduced)

$$Y_{ij} = \gamma_{00} + \gamma_{01}Z_j + \gamma_{10}X_{ij} + \gamma_{11}X_{ij}Z_j + U_{1j}X_{ij} + U_{0j} + R_{ij},$$

Where  $Y_{ij}$  is the self-assessed teacher-school fit of teacher  $i$  in school  $j$ ,  $\gamma_{00}$  is the fixed effect of the intercept,  $X_{ij}$  is teacher  $i$  in school  $j$ 's value placed on standardized test scores,  $\gamma_{10}$  is the fixed effect coefficient for the value teachers place on standardized test scores,  $Z_j$  is the principal at school  $j$ 's value placed on standardized test scores,  $\gamma_{01}$  is the fixed effect coefficient for the value principals place on standardized test scores,  $X_{ij}Z_j$  is the cross-level interaction between teacher's value placed on standardized test scores and principal's value placed on standardized test scores,  $\gamma_{11}$  is the fixed effect coefficient for the cross-level interaction,  $R_{ij}$  and  $U_{0j}$  are the level 1 and level 2 residuals, respectively, and  $U_{1j}$  is the residual component in the random level-1 coefficient  $\beta_1$  not accounted for by  $Z_j$ . In these analyses, a statistically significant cross-level interaction, in this case  $\gamma_{11}$ , will indicate that teacher-principal pairings are related to teachers' self-assessed teacher-school fit.

The second portion of the analysis will address the second research question: "Does subjective teacher-school fit mediate the relationship between teacher-principal pairings and teachers' mobility decisions?" To do this, I will use multi-level structural equation modeling where teachers are assumed to be nested within schools. Structural equation modeling (SEM) is a theory-driven analytic approach that tests causal relationships between observed and latent variables (Byrne, 2012) and is, therefore, well

suites to answer this research question. The structural model will take the following general form:

$$Y_{1ij} = \gamma_{00-1} + \gamma_{01-1}Z_j + \gamma_{10-1}X_{ij} + \gamma_{11-1}X_{ij}Z_j + X_{ij}U_{1-1j} + U_{0-1j} + R_{1ij}$$

$$Y_{2ij} = \gamma_{00-2} + \gamma_{01-2}Z_j + \gamma_{10-2}X_{ij} + \gamma_{11-2}X_{ij}Z_j + \gamma_{20-2}Y_{1ij} + U_{1-2j}X_{ij} + U_{0-2j} + R_{2ij},$$

where  $Y_{1ij}$  is the self-assessed teacher-school fit of teacher  $i$  at school  $j$ ;  $Y_{2ij}$  is teacher  $i$  in school  $j$ 's intended mobility;  $\gamma_{20-2}$  is the fixed effect coefficient predicting intended mobility from teacher-school fit;  $\gamma_{00-1}$  and  $\gamma_{00-2}$  are the fixed effects of the intercepts for teacher-school fit and intended mobility, respectively;  $X_{ij}$  is the value that teacher  $i$  in school  $j$  places on standardized test scores;  $\gamma_{10-1}$  and  $\gamma_{10-2}$  are the fixed effect coefficients for the value that teachers place on standardized test scores predicting teacher-school fit and intended mobility, respectively;  $Z_j$  is the value that the principal at school  $j$  places on standardized test scores;  $\gamma_{01-1}$  and  $\gamma_{01-2}$  are the fixed effect coefficients for the value principals place on standardized test scores predicting teacher-school fit and intended mobility, respectively;  $X_{ij}Z_j$  is the cross-level interaction between teacher's value placed on standardized test scores and principal's value placed on standardized test scores;  $\gamma_{11-1}$  and  $\gamma_{11-2}$  are the fixed effect coefficients for the cross-level interaction predicting teacher-school fit and intended mobility, respectively;  $R_{1ij}$ ,  $U_{1-1j}$ , and  $U_{0-1j}$  are the level-1 and level-2 random components for the model with teacher-school fit as the outcome; and  $R_{2ij}$ ,  $U_{1-2j}$ , and  $U_{0-2j}$  are the level-1 and level-2 random components for the model with intended mobility as the outcome. It should be noted that the notation used in this structural model is adapted from Snijder and Bosker's (2012) multilevel modeling



notation. In this study, it is applied to the structural model so that the coefficients from the first and second analyses are more easily compared.

In order to answer the research question described above, I will test the indirect effect of the cross-level interaction on mobility via teacher-school fit. This is done by multiplying the direct effects along the mediated path. In this case, the indirect effect of the cross-level interaction on teacher mobility is  $\gamma_{11-1} * \gamma_{20-2}$ . If this product term is statistically significant, then there is evidence that teacher-school fit mediates the relationship between teacher-principal pairings and mobility (Cheong & MacKinnon, 2012).

## Chapter 4: Analysis and Results

### Pilot Study

Because expressions of latent constructs can be impacted by the characteristics of respondents (Millsap & Olivera-Agilar, 2012), it was important to test the validity and reliability of the items prior to officially administering the survey. Data for the pilot portion of this study came from a convenience sample of 92 full-time, certified public school teachers who reported that they would remain in the teaching profession during the following school year. Teachers in the pilot study were recruited using a snowball method with the first teachers recruited from the researcher's social network. The surveys were administered online during May of 2016 and teachers were contacted via email and Facebook.

In order to understand the dimensional structure of the responses, I conducted an exploratory factor analysis using promax rotation in SPSS 23. Additionally, I computed coefficient alpha for each of the scales to assess their internal consistency. I examined descriptive statistics for each item (Table 7) and determined that all items should be included since all fell below conventional thresholds of skew (i.e. +/- 2) and kurtosis (i.e. +/- 7) (West, Finch, & Curran, 1995). Using the scree test (Bartholomew et al., 2008), I determined that a three-factor solution was consistent with the data (Figure 2) since three factors preceded the "elbow" in the scree plot. Additionally, these factors had eigenvalues greater than one (i.e. 4.3, 2.6, and 2.1). This solution accounted for 66.35% of the total variance. Tables 8 and 9 present factor loadings after oblique rotation and

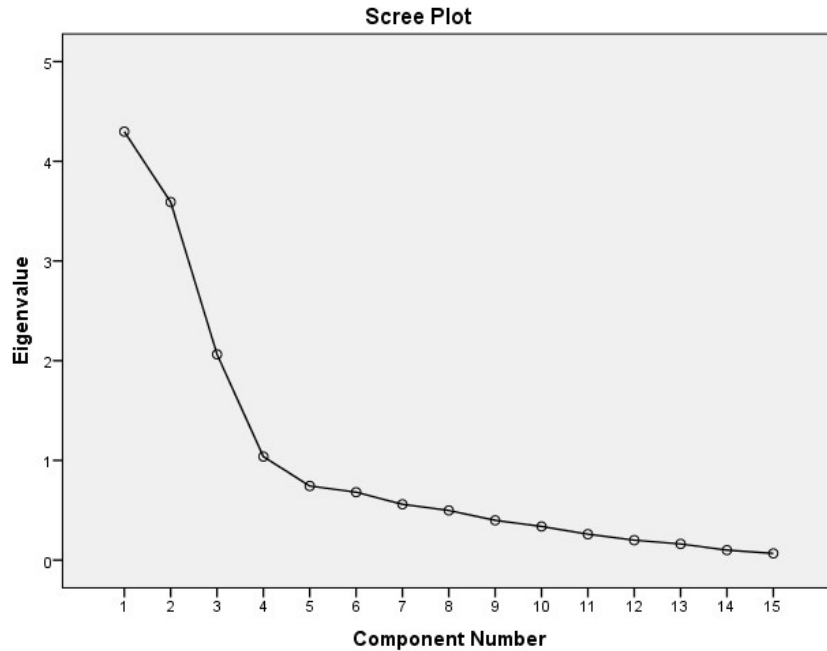


Figure 2. Scree plot for the value teachers place on standardized test scores, the value principals place on standardized test scores, and teacher-school fit items.

correlations/internal consistency estimates for each factor. As Table 8 shows, all items loaded on their respective factors with low overall cross-loadings (i.e. between -.10 and .30). Only Teacher Item 5 has a low loading of .39 on its respective factor. Because this item still loads on its respective factor and the sample size is fairly small, I chose to retain it in the final survey. Taken as a whole, these results suggest that the three scales used in this study have a satisfactory dimensional structure that is consistent with the hypothesized structure.

Table 9 contains the factor correlations with estimates of coefficient  $\alpha$  in the diagonal. Coefficient  $\alpha$  is a commonly used measure of internal consistency (Crocker & Algina, 1986). Coefficient  $\alpha$  is computed as the mean of all possible split-half

Table 7.

*Descriptive statistics for test score and teacher-school fit items*

	Mean	Std. Dev.	Skew	Kurtosis
<u>Values Test Scores</u>				
Teacher Item 1: “Improving students’ standardized test scores is something that a teacher should strive for.”	4.12	1.15	-.68	.51
Teacher Item 2: “How my students perform on standardized tests is important to me.”	4.00	1.27	-.72	.15
Teacher Item 3: “Students’ standardized test scores are an accurate indicator of how much students have learned.”	2.73	1.21	.10	-1.07
Teacher Item 4: “I devote a lot of thought and energy to improving my students’ standardized test scores.”	3.55	1.25	-.41	-.38
Teacher Item 5: “I use my students’ standardized test scores to improve my instruction.”	3.60	1.25	-.66	-.33
Principal Item 1: “My principal believes that how students perform on standardized tests is important.”	4.90	.92	-1.05	1.63
Principal Item 2: “My principal wants me to strive to improve my students’ standardized test scores.”	4.79	1.01	-1.35	3.01
Principal Item 3: “My principal expects me to devote a lot of thought and energy to improving my students’ standardized test scores.”	4.34	1.14	-.58	.08
Principal Item 4: “My principal believes that students’ standardized test scores are an accurate indicator of how much students have learned.”	4.28	1.04	-.46	-.09

Principal Item 5: “My principal expects me to use standardized test scores to improve my instruction.”	4.40	1.15	-.51	-.06
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Teacher-School Fit

Fit Item 1: “Fitting into this school is easy for me.”	4.59	1.32	-1.07	.69
Fit Item 2: “I believe I fit this school well.”	4.68	1.34	-1.11	.72
Fit Item 3: “I am a good match for this school.”	4.72	1.35	-1.27	1.25
Fit Item 4: “I cannot imagine a school that would be a better fit.”	3.73	1.65	-.26	-1.15
Fit Item 5: “The characteristics of this school are a good fit for me.”	4.53	1.29	-.75	.03

n = 92

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*All items are on a 1 to 6 scale with 1 = “Strongly Disagree” and 6 = “Strongly Agree.”*

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Table 8.

*Factor loadings for the value teachers place on standardized test scores, the value principals place on standardized test scores and teacher-school fit items.*

Item	Factor 1	Factor 2	Factor 3
Teacher Item 1	-.04	-.14	<b>.68</b>
Teacher Item 2	-.05	-.03	<b>.90</b>
Teacher Item 3	.11	-.10	<b>.65</b>
Teacher Item 4	-.01	.29	<b>.54</b>
Teacher Item 5	.00	.26	<b>.39</b>
Principal Item 1	.00	<b>.55</b>	.05
Principal Item 2	.17	<b>.71</b>	-.05
Principal Item 3	-.03	<b>.78</b>	.07
Principal Item 4	-.06	<b>.55</b>	-.08
Principal Item 5	-.09	<b>.81</b>	-.10
Fit Item 1	<b>.92</b>	.08	-.02
Fit Item 2	<b>.96</b>	.07	-.01
Fit Item 3	<b>.91</b>	.00	.02
Fit Item 4	<b>.80</b>	-.07	-.01
Fit Item 5	<b>.87</b>	-.10	.02

n = 92

---

Table 9.

*Factor correlation matrix with internal consistency estimates (coefficient  $\alpha$ ) in the diagonal.*

---

Teacher-School Fit	.96		
Value Teacher Places on Test Scores	.08	.81	
Value Principals Place on Test Scores	-.05	.30	.78
n = 92			

---

coefficients and gives an estimate of the reliability coefficient. The estimates of coefficient  $\alpha$  in Table 9 indicate that all three measures have acceptable internal consistency ( $\alpha > .70$ ; Crocker & Algina, 1986). Correlations between the three factors were small to moderate (i.e.  $.30 > \rho > -.05$ ; Cohen, 1988).

### **Main Study**

In the following sections, I describe the main study presented in this dissertation. I begin by describing the results of the measurement portion of the analyses, followed by the analyses associated with research questions 1 and 2, respectively.

**Measurement models.** Structural equation modeling (SEM) is a family of analytic techniques that allows researchers to examine systems of relationships between either manifest (i.e. observed) or latent (unobserved) variables (Hoyle, 2012). SEM models are used to test theories about systems of relationships. As such, it is appropriate for answering the research questions posed by this study. As an initial step in SEM analyses with latent variables, researchers must develop what are known as measurement models. In this study, I take an exploratory approach to developing factor models with the main purpose being to test the factor structure and reliability of the items.

Measurement models are based on “true score theory” or “classical test theory” (Crocker

& Algina, 1986) which posits that observed scores on a set of indicators are comprised of the person's true score and random error. The goal of measurement models is to isolate the true score variance from the random error. To do this, measurement models assess the amount of shared variance among a set of items. This shared variance is referred to as "common variance" and is attributed to the latent construct that the set of items is assumed to measure. The variance not accounted for by the set of items is said to be "unique variance" which is assumed to be some amount of reliable variance specific to each item and random error (Brown & Moore, 2012).

The proportion of common variance contained on each item is represented by a parameter known as a factor loading. These loadings are applied to each item for each observation and can be used to generate factor scores. However, factor scores may be problematic in that they are not the "pure" estimates of the latent construct that they are assumed to be. Several methods exist for estimating latent factor scores. The most common method and the method implemented in Mplus 7 is the regression method (Skrondal & Laake, 2001). The regression method involves two steps: 1) estimating a measurement model and 2) multiplying the factor loadings by the corresponding observed scores and summing them for each observation. The resulting factor scores are then used as manifest variables in regression and structural analyses. Although common, this approach has been shown to produce biased estimates of multiple parameters including coefficients, standard errors, and  $R^2$  (Skrondal & Laake, 2001). One possible solution for some of these problems is to estimate the measurement model and structural models simultaneously. However, the structural models in the analyses that follow are

not identified due to too few level-2 observations (i.e. 22 schools). In other words, there are more parameters to be estimated in the level-2 models than there are level-2 observations. Consequently, I only use the measurement models described here to test the factorial structure and reliability of the items and use mean composite scores where factor loadings of 1 are assumed for all items.

Because the data for this study are nested (i.e. teachers within schools), I must account for possible confounding effects of group-level dependency. When observations are nested, factor models can produce biased estimates of factor loadings as well as inaccurate conclusions about the factor structure (Muthén, 1994). Further, it may be of interest to examine a level-2 construct that is expressed at level-1. In this study, teachers (i.e. level-1) responded to items about their principals' value placed on test scores and the school-level averages (i.e. level-2) are assumed to measure principals' enacted values. Because the construct of interest relates to principals, it is important to test the factor structure at level-2 even though the responses are expressed at level-1. To account for these issues, Muthén (1994) developed a method of examining multilevel factor structures that partitions the data into between and within covariance matrices and analyzes the two covariance matrices simultaneously. This approach provides unbiased estimates of both the factor loadings and the factor correlations separately at level =-1 and level-2. In the following analyses, I use Mplus 7's implementation of the method described above. Additionally, where these analyses are used, I refer to estimates at level-1 as occurring at the "within-level" and estimates at level-2 as occurring at the "between-level."



Before describing the results of these analyses, several points are worth noting. First, CFA models assume that data are continuous. Although the data collected for this study used Likert scales and are, therefore, ordered categories, previous research suggests that ordered categorical data behaves like continuous data when there are five or more response categories and the sample is sufficiently large (Rigdon, 1998). Therefore, I will treat these data as continuous. Second, CFA models assume multivariate normality. Violations of this assumption can lead to biased estimates of factor loadings and inaccurate model fit statistics (Bovaird & Koziol, 2012). Recent methodological developments have led to the development of the maximum likelihood robust (MLR) estimator which is robust to non-normal data as well as unequal group size (Byrne, 2012). The MLR estimator gives accurate estimates of the model fit based on an adjusted  $\chi^2$ . I use Mplus' MLR estimator in all of the measurement models described in this study.

Additionally, it is important to decide how to treat missing data. Missing data are assumed to result from one of three possible mechanisms producing three distinct patterns of missingness (Graham & Coffman, 2012). The first, "missing completely at random" (MCAR), assumes that an entirely random process has produced the missing data and that missingness is not systematic in any way. The second kind of missingness is referred to as "missing at random" (MAR). MAR assumes that some systematic relationship between variables has led to missing data but that the variables that led to missingness are observed. In other words, once the variables that led to missingness are accounted for, any residual missingness is assumed to be random (Graham & Coffman, 2012). The final pattern of missingness is known as "missing not at random" (MNAR).

Data that are MNAR are assumed to be missing as a result of the value that would have been observed. In other words, the participants' level on the unmeasured variable is the cause of its missingness. In the analyses, missing data were handled as follows: 1) Missing data on individual indicators that were not the result of dropping out of the survey entirely are assumed to be MAR. Although these data may be missing systematically, participants' responses on the other items should sufficiently account for their missingness. 2) Cases where participants chose not to respond to an entire subscale were excluded from the analyses. Again, these participants' values were likely missing systematically, but their missingness could not be accounted for by other variables in the analysis. Therefore, these missing data are assumed to be MNAR. 3) Cases where participants chose not to answer the question "will you be returning to current school next year?" were dropped from the analyses. Again, these data are likely MNAR since the values that would have been observed are likely the cause of their own missingness and no other variables can account for these missing values. Because full information maximum likelihood (FIML) provides unbiased estimates when data are MAR if the appropriate covariates are included in the analyses (Graham & Coffman, 2012), I use Mplus 7's FIML estimation procedure to address missing data.

**Results from multilevel measurement models.** I follow Byrne's (2012) three-step exploratory approach for determining an appropriate measurement model for nested data. These steps are 1) estimate a CFA model that does not account for clustering to determine the factor structure, 2) estimate a multilevel CFA, and 3) determine if a multilevel CFA is necessary by examining the intraclass correlations of the items.

Therefore, I began by estimating a standard CFA model that ignored nesting. This model followed the hypothesized model tested in the pilot portion of this study. Specifically, each indicator was assumed to load on its respective factor (i.e. value teachers place on standardized test scores, value principals place on standardized test scores, and teacher-school fit) with no cross-loadings. Additionally, all latent factors were allowed to correlate. Finally, I used the marker variable method (Byrne, 2012) to impose a scaling constraint on each factor.

The initial estimates of this model suggested that the model did not fit the data well ( $\chi^2(87), p < .001$ , RMSEA = .09, CFI = .90, TLI = .88, SRMR = .06; West, Taylor, & Wu, 2012). To obtain a better-fitting model, I examined the modification indices to identify changes that would be substantively and theoretically appropriate (Byrne, 2012). The modification indices suggested three changes to the model would improve the fit substantially. The first two changes dealt with cross-loading items. Specifically, the modification indices suggested the items 4 and 5 of the value teachers place on test scores scale (i.e. “I devote a lot of thought and energy to improving my students standardized test scores” and “I use my students’ standardized test scores to improve my instruction”) should load on both value teachers place on test scores and the value principals place on test scores factors. This makes sense since both of these items reflect teachers’ behaviors that would, at least in part, be influenced by the beliefs and expectations of their principals. Therefore, I allowed these items to load on both the value teachers place on test scores and the value principals place on test scores factors. The third change dealt with correlated uniquenesses on the teacher-school fit scale, namely with item 5 (i.e.

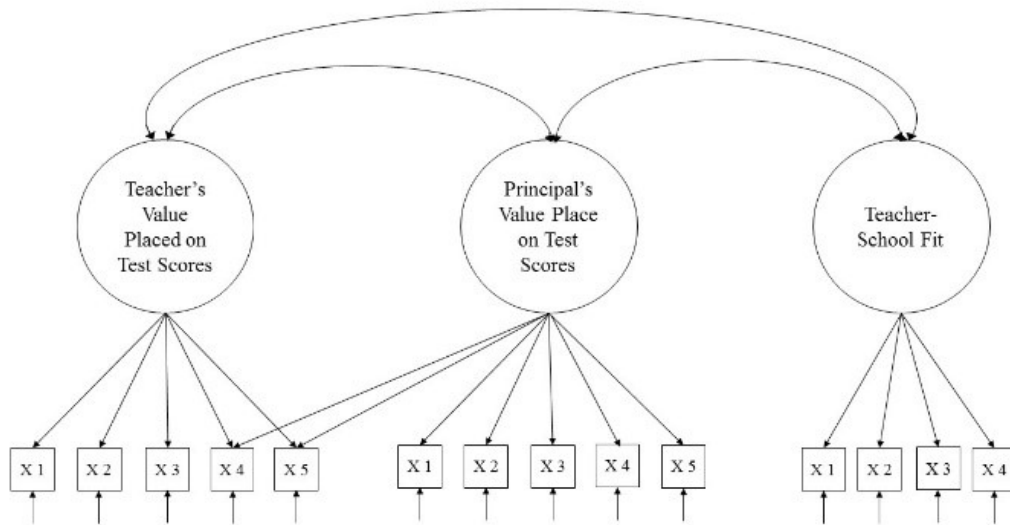


Figure 3. Confirmatory factor analysis model without multilevel structure.

“The characteristics of this school are a good fit for me.”). Because this item was substantively redundant with other items and because it had the weakest loading of all of the items, I chose to eliminate it from the model. The modified model is presented in Figure 3. It should be noted that intercepts were estimated for all of the observed indicators in the model. They are excluded from Figure 3 for simplicity of representation. Fit statistics indicated that the model fit the data well (RMSEA = .06, CFI = .96, TLI = .96, SRMR = .04; West, Taylor, & Wu, 2012). Only the  $\chi^2$  fit statistic indicated the model should be rejected ( $p < .001$ ). However, the  $\chi^2$  test of model fit is sensitive to sample size, potentially rejecting models with close but not perfect fit when the sample size is large. Taken as a whole, the fit statistics suggest that the model fits the data well and that the specified model could serve as the basis for the multilevel analyses.

Figures 4a, 4b, and 4c display the multilevel measurement models that were estimated separately for each of the three latent constructs (teachers' values, principals' values, and teacher-school fit). It should be noted that item intercepts and latent means were also estimated, but were excluded from the diagrams for simplicity's sake. Several important choices were made in the estimation of these models. These were due to the fact that small numbers of level-2 units can pose estimation problems in multilevel latent variable models. Specifically, the models are not identified when there are fewer level-2 observations than there are level-2 parameters being estimated. This was the case in the analyses reported below. To address this, I began by mean-centering each observed item. This allowed me to constrain the intercepts to equal zero at level-2 thus reducing the number of parameters to be estimated and allowing the model to be identified.

Because I took an exploratory approach to this portion of the analysis, modifications were made to the models only if they were substantively or theoretically justified. With regard to the value teachers place on test scores, the initial multilevel CFA suggested the uniquenesses of items 4 and 5 were correlated at level-1 but not at level-2. Because such a model seems to contradict the logic of the relationships (i.e. principals' expectations should influence both teacher- and school-level behaviors), I chose to drop the cross-loading items (i.e. items 4 and 5). The revised version of the value teachers place on test scores scale produced a slightly negative residual variance related to item 2. Since the estimate was close to zero, I chose to constrain this residual variance to zero which resolved the problem. With regard to the value principals place on standardized test scores, the initial multilevel analysis suggested that two important

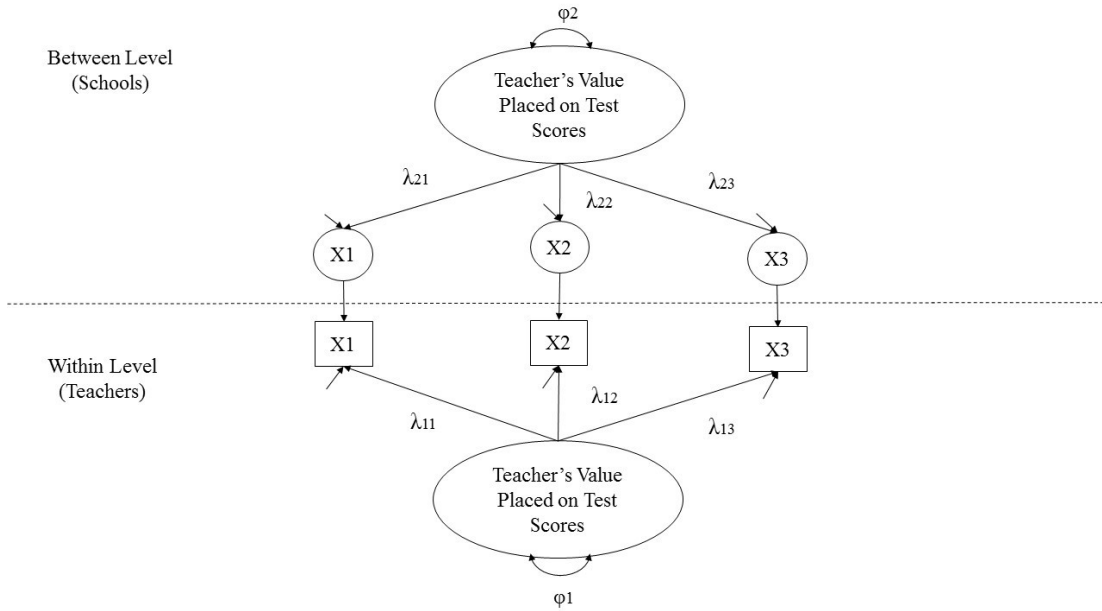


Figure 4a. Multilevel measurement model for the value teachers place on standardized test scores

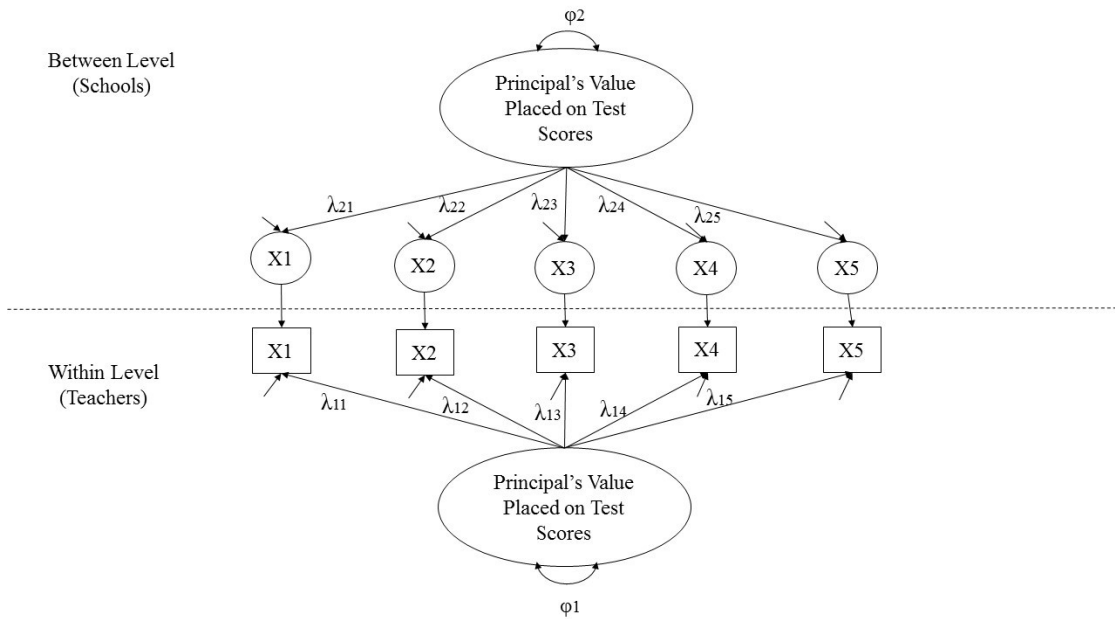


Figure 4b. Multilevel measurement model for the value principals place on standardized test scores.

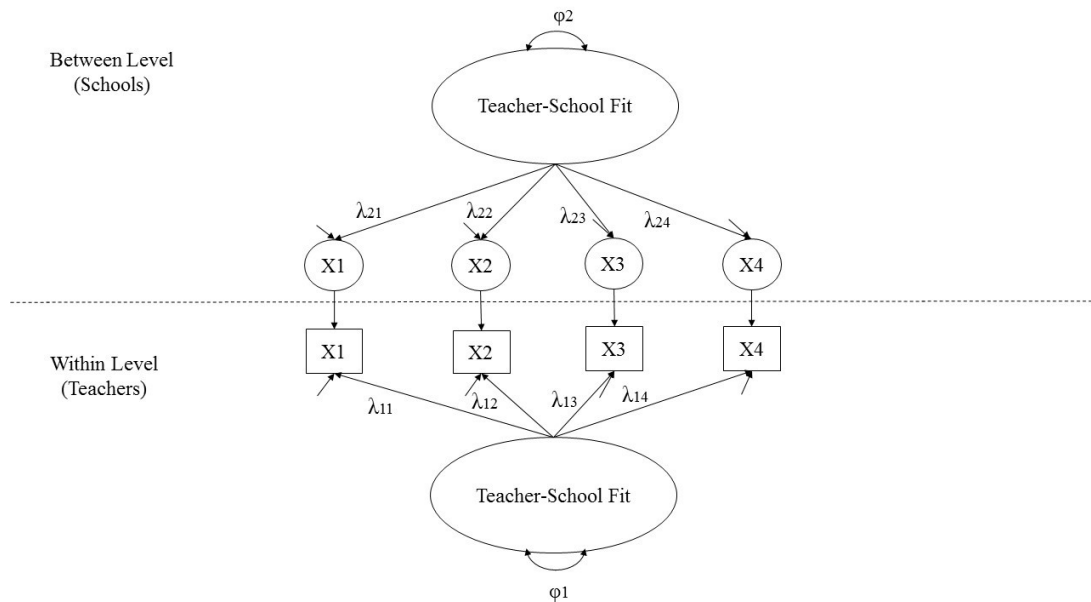


Figure 4c. Multilevel measurement model for teacher-school fit

modifications were needed. First, although items 4 and 5 from the value that teachers placed on test scores scale also loaded on the value that principals placed on test scores scale, the multilevel analysis showed that this was only the case at level-1. The factor loadings at level-2 were not significantly different from zero indicating that while teachers' self-reported behaviors are correlated with their individual perceptions of their principals' beliefs and values, this relationship disappears when we examine these relationships at the school-level. In order to create a more parsimonious model and since the focus of this construct is at level-2, I chose to remove these two items. Finally, the initial estimation of the teacher-school fit model produced a slightly negative estimate of the residual variance of item 2 (i.e.  $\theta = -.001$ ). Since the estimate of the residual was close to zero, I constrained it to equal zero which resolved the issue.

Table 10 presents the results from these analyses. Looking at the value that teachers placed on standardized test scores (within) scale, we see that all items had strong factor loadings and that no items were overly skewed or kurtotic in the main study sample. Additionally, all model fit indices indicated very good or near perfect fit. Table 10 also presents estimates of reliability in the form of composite reliability or coefficient  $\omega$ . Coefficient  $\omega$  is similar to the more commonly-used coefficient  $\alpha$  in that it is a ratio of a scale's true score variance to its total variance. However,  $\alpha$  assumes that all items represent the construct equally well (i.e. essential tau equivalence or true score equivalent) (McDonald, 1999; Geldhof, Zyphur, & Preacher, 2014). This is often not the case with most Likert scales including the ones used in this study. Coefficient  $\omega$ , on the other hand, allows for heterogenous relationships between items and constructs and, therefore, is most appropriate for the current study (Geldhof, Zyphur, & Preacher, 2014). As Table 10 indicates, 79% of the variance of the value teachers place on standardized test scores items can be attributed to true score variance. Looking at the value principals placed on test scores (between) scale, we see that all items except for item 2 have strong factor loadings. Similarly, all items except for item 2 show acceptable levels of skew and kurtosis. The kurtosis of item 2, however, is not extraordinarily high. Therefore, proper overall model fit tests and standard errors will be provided by the MLR estimator. With regard to model fit, the  $\chi^2$  test for model fit suggests that the model does not fit the data well ( $p < .001$ ). However, this test is sensitive to sample size (West, Taylor, & Wu, 2012). By contrast, the RMSEA, CFI, and SRMR are near or within commonly accepted thresholds for good model fit (RMSEA = .07, CFI = .96, SRMR<sub>between</sub> = .04; West,



Table 10.

*Results from multilevel measurement models*

	Unstandardized	Item	Item	Item	Item	Item
	Factor	Standard	Intraclass	Item	Item	Item
	Loadings	Deviation	Correlation	$R^2$	Skew	Kurtosis
<u>Within-</u>						
<u>Level Value</u>						
<u>Teachers</u>						
<u>Place on</u>						
<u>Test Scores</u>						
Item 1	1.00	1.23	.04	.61	-.71	.16
Item 2	.87	1.11	.04	.57	-.76	.73
Item 3	.84	1.22	.02	.43	.06	-1.03
$\chi^2$ (4)	1.28, $p > .05$					
RMSEA	0.00					
CFI	1.00					
TLI	1.00					
SRMR	.00					
$\omega = .79$						
n = 376						
<u>Between-</u>						
<u>Level Value</u>						
<u>Principals</u>						
<u>Place on</u>						
<u>Test Scores</u>						
Item 1	1.00	0.87	.11	.99	-1.08	1.79
Item 2	.37	0.78	.03	.73	-1.14	2.32
Item 3	1.13	1.04	.10	.99	-.85	.85
Item 4	1.27	1.00	.14	.99	-.57	.87
Item 5	1.00	0.91	.10	.99	-.74	.55
$\chi^2$ (15)	45.19, $p < .001$					
RMSEA	.07					
CFI	.96					
TLI	.94					
SRMR	.04					
$\omega = .98$						
n = 376						

Within-  
Level  
Teacher-  
School Fit

Item 1	1.00	1.22	.03	.76	-1.04	.73
Item 2	1.06	1.16	.04	.95	-1.18	1.34
Item 3	.93	1.12	.07	.83	-1.13	1.24
Item 4	.91	1.58	.13	.42	-.19	-1.14
$\chi^2 (9)$	11.18, $p > .05$					
RMSEA	.03					
CFI	.99					
TLI	.99					
SRMR	.02					
$\omega = .92$						
$n = 376$						

---

*All items are mean-centered. As a result, intercepts for each item were constrained to equal zero and, therefore, are excluded from this table.*

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Taylor, & Wu, 2012). It should be noted that the development of model fit statistics for multilevel CFA and SEM models have been fairly limited (Ryu & West, 2009). As a result, the commonly-used global fit indices reported above are based on an overall assessment of the model and are weighted in favor of the within-level model. SRMR can provide model fit indices for both the within- and between-levels. The SRMR<sub>between</sub> value for the value principals place on test scores scale indicates that the between-level measurement model fits the data well ( $< .06$ , West, Taylor, & Wu, 2012). The estimate for coefficient  $\omega = .79$  suggests that the scale items provide acceptable internal consistency of the underlying dimension. Finally, items on the within-level teacher-school fit scale all loaded strongly and none exceeded traditional thresholds for skew or kurtosis. All fit statistics indicated that the model fits the data well and coefficient  $\omega$  suggested that the item responses exhibit a high level of internal consistency.

The final step suggested by Byrne (2012) requires examining the intraclass correlations for each item to determine if multilevel modeling is appropriate. The intraclass correlation is the ratio of between-group variance to the total variance and ranges between 0 and 1. Muthén (1997) suggests that multilevel measurement models are appropriate when ICCs exceed .10. Since each scale has at least one item with an ICC greater than or equal to .09, I concluded that the specified multilevel measurement models were appropriate and could be used in the following portions of the analysis.

As described above, I could not estimate the full structural model with measurement models included because of the small number of level-2 observations. Therefore, I created mean scale scores for each observation and used them as manifest variables in the analyses. When choosing the metric of a scale, mean scale scores transform values on scales with different numbers of items into the same metric when the response options are the same (Cohen et al., 1999). As an initial step, I summed the responses for each scale to create composite scores. For the value teachers place on standardized test scores and teacher-school fit, I then divided each composite score by the number of items on its respective scale (i.e. three and four, respectively). For the value principals place on test scores, I began by summing the observed scores for each item at the teacher-level. I then computed the school-level average and divided the school-level average by the number of items on the scale (i.e. five). This ensured that each scale had a possible range of 1 to 6. Finally, it should be noted that these scores were computed manually and resulted in listwise deletion of cases. As a result, 38 observations (i.e. 10.1%) were dropped from the final analyses. To the extent that data were missing

Table 11.

*Descriptive statistics for the value teachers place on standardized test scores, the value principals place on standardized test scores, and teacher-school fit.*

<u>Latent Variable</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Skew</u>	<u>Kurtosis</u>	<u>Min</u>	<u>Max</u>
Teacher Value	3.82	.99	-.32	-.28	1.00	6.00
Principal Value	4.87	.34	.47	-.47	4.28	5.55
Teacher-School Fit	4.51	1.15	-.68	-.01	1.00	6.00

Table 12.

*Correlations between factors.*

	Teacher Value	Principal Value	Teacher-School Fit
Teacher Value	1.00		
Principal Value	.01	1.00	
Teacher-School Fit	.20**	-.09	1.00

*\* indicates  $p < .05$ , \*\* indicates  $p < .01$ , \*\*\* indicates  $p < .001$*

systematically, this may produce biased estimates of parameters (Graham & Coffman, 2012).

Tables 11 and 12 present descriptive statistics and correlations for each factor. From this, we see that teacher-school fit has the greatest amount of variability with a standard deviation of 1.15 whereas the value that principals place on test scores has the least with a standard deviation of .34. None of the scales are highly skewed or kurtotic, although teacher-school fit appears to have a small number of scores at the extreme low

end. Looking at the factor correlations, there is a small to medium correlation between the value teachers place on test scores and teacher-school fit ( $r = .20, p < .01$ ; Cohen, 1988). The other factor correlations did not reach statistical significance at  $p < .05$ .

**Analysis 1.** To answer the first research question (i.e. “Are teacher-principal pairings related to teachers’ subjective sense of teacher-school fit?”), I employed a multilevel model with teacher-school fit as the outcome. This model included the value teachers place on standardized test scores, the value principals place on standardized test scores, and a cross-level interaction between these two variables as predictors. If the interaction is statistically significant, then there is evidence that teacher-principal pairings potentially affect teachers’ self-assessed teacher-school fit. As an initial step in specifying multilevel models, Snijders and Bosker (2012) recommend calculating the intraclass correlation coefficient (ICC) to determine if multilevel modeling is appropriate. The ICC has a potential range from between 0.00 and 1.00 and indicates the extent to which clustering is present in the data. The ICC is calculated by dividing the between-group variance by the total variance. This analysis showed that the ICC is .07. This ICC estimate represents a typical value seen in many school studies (Muthén, 1991; Muthén, 1997). However, the ICC alone cannot be used to determine if multilevel modeling is appropriate (Snijders & Bosker, 2012). Researchers must also consider the design effect. The design effect indicates the effect that clustering has on the adjustment of standard errors in multilevel models. Specifically, it is the multiplier used to adjust the standard

errors (Peugh, 2010). The design effect is calculated using the following equation:

$$Design\ Effect = 1 + (n_c - 1)\rho_{ICC},$$

where  $n_c$  is the average cluster size and  $\rho_{ICC}$  is the intraclass correlation coefficient.

Substituting the average cluster size (15.31) and the ICC (.07) into the equation above, I obtain a design effect of 2.0. Following standard guidelines (Muthén, 1994), a design effect of 2.0 or greater indicates that multilevel modeling should be conducted.

Consequently, I specified the multilevel model described in Chapter 3.

Finally, it should be noted that the schools in this sample are nested within two school districts. To test whether school district affiliation must be accounted for, I estimated a model that included a dummy variable indicating school district membership and compare it to a model without it. The MLR adjusted  $\chi^2$  test for nested models (Satorra, 2000) was not statistically significant ( $\chi^2(1) = 0.32, p > .05$ ) and the parameter estimates did not change substantially. Consequently, I chose to exclude the school district indicator since it did not significantly improve the model fit.

Table 13 presents the results from the final analysis. In this analysis, both lower-order variables (i.e. the value teachers and principals place on test scores) are grand-mean centered. Grand-mean centering has two effects. First, centering the lower-order variables can reduce their covariance with the product term (Cohen, Cohen, Aiken, & West, 2002). Second, it means that the lower-order coefficients can be interpreted as the *average* relationship between the predictor and the outcome at the mean of the other lower-order predictor. Additionally, research has shown that multilevel models with small samples at level-2 (i.e.  $n < 50$ ) often result in an increased Type-I error rate

Table 13.

*Results from regression analysis of the value teachers place on standardized test scores, the value principals place on standardized test scores and their interaction with teacher-school fit as the outcome.*

<u>Variable</u>	<u>Unstandardized Coefficients and Standard Errors</u>
$\gamma_{10}$ (Teacher)	.22** (.05)
$\gamma_{01}$ (Principal)	-.40 (.30)
$\gamma_{11}$ (Teacher x Principal)	-.01 (.24)
$\gamma_{00}$ (Intercept)	.02 (.39)
n	338
$R^2_{within}$	.04
$R^2_{between}$	.26
<u>Random Effects</u>	
$\tau^2_0$ (Var. $U_{0j}$ )	.07
$\tau^2_1$ (Var. $U_{1j}$ )	.00
$\sigma^2_{01}$ = (Cov. $U_{0j}, U_{1j}$ )	-.01
Deviance	1026.11
* $p < .01$ and ** $p < .001$	

(McNeish & Stapleton, 2016). Since this study only includes 22 level-2 observations, I chose to use a conservative threshold for determining statistical significance. Therefore, only estimates with  $p < .01$  were considered statistically significant.

Looking at Table 13, the interaction term is not statistically significant at  $p < .01$  indicating that the teacher-principal pairings included in this model do not affect teachers' self-assessed sense of teacher-school fit. However, the first order effect of the value teachers place on test scores is statistically significant at  $p < .01$ . Specifically, a one unit increase in the value teachers place on test scores was associated with an average

increase of .22 in teacher-school fit. This transforms into a .19 standard deviation increase in teacher-school fit for a one standard deviation increase in the value teachers place on test scores which is a small to medium effect (Cohen, 1988). Also of interest is the fact that the  $R^2_{within}$  estimate is small indicating that the model only accounts for 4% of the level-1 (i.e. teacher-level) variance in teacher-school fit scores. Although the  $R^2_{between}$  estimate is large (Cohen, 1988), the amount of total variance that this represents is still very small (i.e. 2%). So, although there are statistically significant relationships in the data, the model only explained a small percentage of the variance in teacher-school fit scores.

**Analysis 2.** In the second set of analyses, I attempted to answer the question “Does teacher school fit mediate the relationship between teacher-school pairings and teacher mobility?” Cheong and MacKinnon (2012) define a mediator as “a third variable that intervenes in the relation between an independent variable and a dependent variable, transmitting the effect of the independent variable on the dependent variable.” (p. 418) In this study, I theorize that teacher and principal characteristics directly affect teachers’ sense of teacher-school fit and that teacher-school fit is an influential mechanism through which these characteristics affect teachers’ mobility decisions. Therefore, teacher-school fit is a mediator between teacher and principal characteristics and teachers’ intended mobility decisions. In the analyses that follow, I focused specifically on the value teachers place on standardized test scores since this was the only variable that showed a statistically significant relationship to teacher-school fit.



I began by estimating a baseline model (Figure 5a) to determine if there was a statistically significant relationship between the value teachers place on test scores and teachers' intended mobility. This ordered-categorical variable includes responses to the question "Do you see yourself teaching in your current school in five years?" with answers ranging from 1 (i.e. "Definitely yes") to 4 (i.e. "Definitely no"). Following Cohen, Cohen, West, and Aiken (2003), I used an ordinal logistic regression model in these analyses. Ordinal logistic regression assumes that responses on an ordered categorical variable represent levels of an underlying continuous latent construct, but with response options that are not necessarily equally spaced. The ordinal logistic regression model makes the assumption that the relationships between the predictors and the outcome are constant across the range of categories (Cohen, Cohen, West, & Aiken, 2012).

Because the previous analysis suggested that clustering in teacher-school fit must be accounted for and because teacher-school fit serves as the mediator in the mediational models, I chose to estimate these models as multilevel models. The random intercepts in these models are represented by the dots in Figures 5a and 5b. Again, I needed to account for the fact that the schools in this study are nested within two school districts. To determine if it was necessary to account for school district membership, I compared the model described above to the same model with a district membership dummy as a between-level (i.e. school-level) variable. The  $\chi^2$  test comparing nested models with the MLR estimator (Satorra, 2000) was statistically significant ( $\chi^2(1) = 4.64, p < .05$ ) indicating that the inclusion of district membership in the model was necessary.



Table 14 presents the results for the baseline model under the heading “Model 1.” Again, because of potential issues related to small sample size and Type-I error, only estimates where  $p < .01$  were considered statistically significant. As in the previous analysis, the value teachers place on test scores showed a significant negative relationship with teachers’ intended mobility ( $p < .001$ ). Specifically, for a one-unit increase in the value teachers place on test scores, there is an average reduction in the odds of leaving of 31%. This transforms into a 30% reduction in the odds of leaving for a one-standard deviation increase in the value teachers place on test scores. Again, this model was only able to account for a small proportion of the within-school variance in teachers’ intended mobility (i.e.  $R^2_{McKelvey \& Zanoiva (within)} = .04$ ). Although the between-school variance estimate was similar in magnitude (i.e.  $R^2_{McKelvey \& Zanoiva (between)} = .04$ ), it was not statistically significant.

Next, I estimated a structural model that included teacher-school fit as the mediating variable between the value teachers place on test scores and teacher mobility. This is presented as “Model 2” in Figure 5b. Additionally, Table 14 presents the results from this analysis under the heading “Model 2.” Looking at these results, the value teachers place on test scores is positively associated with teacher-school fit ( $\gamma_{21} = .22, p < .01$ ). Similarly, higher levels of teacher-school fit are associated with lower probabilities of five-year mobility ( $\beta_{12} = -.99, p < .01$ ). Specifically, a one unit increase in teacher-school fit is associated with an average reduction of 63% in the odds of leaving within five years. This pair of statistically significant estimates suggests that teacher-school fit may mediate the relationship between the value teachers place on test scores and five-

Table 14.

*Coefficient estimates from the structural model testing teacher-school fit as the mediating variable.*

<u>Coefficient</u>	<u>Model 1</u>		<u>Model 2</u>	
	<u>Estimate</u>	<u>Odds Ratio</u>	<u>Estimate</u>	<u>Odds Ratio</u>
$\gamma_{11}$	-.37** (.08)	.69**	-.22 (.09)	.80
$\gamma_{12}$	-.19 (.26)	.83	-.16 (.19)	.85
$\gamma_{21}$			.22** (.05)	
$\beta_{12}$			-.99** (.10)	.37**
99% CI for $\gamma_{21} * \beta_{12}$	[-.36, -.09]			
Loglikelihood	-416.25		-875.74	
$n =$	338		338	
<u>Random Effects</u>				
<i>Level-two</i>				
<i>parameters:</i>				
$\tau^2_{01} = (\text{Var. } U_{\eta 1j})$	.20 (.13)		.00 (.07)	
$\tau^2_{02} = (\text{Var. } U_{\eta 2j})$			.08 (.04)	
<i>Level-one</i>				
<i>parameters:</i>				
$\sigma^2 = (\text{Var. } R_{\eta 2ij})$			1.19** (.13)	
$R^2$ – Teacher-School Fit (within)			.04*	
$R^2$ McKelvey & Zanoiva – Mobility (within)	.04*		.29**	
$R^2$ McKelvey & Zanoiva – Mobility (between)	.04		.63	
<u>Outcome Responses</u>	<u>Number</u>	<u>Percent</u>		
4 = Definitely leaving in five years	40	11.8%		
3 = Most likely leaving in five years	133	39.3%		
2 = Most likely staying in five years	120	35.5%		
1 = Definitely staying in five years	45	13.3%		

\* indicates  $p < .01$  and \*\* indicates  $p < .001$ .

year mobility. To provide a formal test for this, I used the method proposed by Tofighi and MacKinnon (2011) for testing indirect effects. Indirect effects are computed as the product of a set of path coefficients (Bollen, 1987). If the product of coefficients is statistically significant, then we conclude that there is a mediated relationship between the set of variables. Although the most common method of testing indirect effects is the Sobel method, this approach assumes that the standard error for the product of two coefficients is normally distributed; however the product of two normal distributions is not normally distributed so this assumption is almost always untenable (Tofighi & MacKinnon, 2011). Tofighi and MacKinnon (2011) suggested calculating an asymmetric confidence interval around the estimate using the coefficients, their standard errors, and the correlation between the coefficients using statistical theory by Aroian (1948). Because of the increased risk of Type-I error discussed previously, I again estimated a conservative 99% confidence interval for the indirect effect of the value teachers place on test scores on five-year mobility via teacher-school fit. This estimate is presented in Table 14 and does not contain zero. Therefore, I conclude that the indirect effect (i.e.  $\gamma_{21}$  \*  $\beta_{12} = -.22$ ) is statistically significant at  $p < .01$  and that teacher-school fit mediates the relationship between the value teachers place on test scores and five-year mobility.

## Chapter 5: Discussion and Implications

In this study, I sought to answer the following questions: “Are teacher-principal pairings related to teachers’ self-assessed sense of teacher-school fit?” and “Does self-assessed teacher-school fit mediate the relationship between teacher-principal pairings and teacher mobility?” Fundamentally, these questions arose out of a very practical problem: teacher mobility adversely affects schools, school districts, but most importantly, students. While it may be beneficial for some teachers (i.e. those of lower quality) to leave their schools, high rates of turnover can cost schools and school districts precious time and resources. Although much is known about the kinds of schools that teachers leave, relatively little is known about how making informed teacher-school pairings can improve teacher retention. This study sought to address this issue by examining how teacher-principal pairings based on the value that each placed on standardized test scores was related to teacher mobility. If teacher mobility can be reduced simply by placing teachers at schools where they are most likely to stay, then understanding these pairings may lead to cost-effective methods of retaining teachers.

From a scholarly perspective, this study sought to address two notable gaps in the research literature. First, this study addresses a need to better understand how different methods of measuring person-environment fit are related to the study of theoretically-relevant outcomes. Person-environment fit scholars frequently debate how “fit” should be measured (Kristoff-Brown & Guay, 2011). For instance, fit can be measured indirectly by examining how specific person-environment pairings affect theoretically-relevant outcomes like job satisfaction or on-the-job behaviors. However, critics argue that this

approach has questionable construct validity since fit is only being measured indirectly. As a solution, some have argued for measuring fit directly by asking respondents to report the extent to which they feel that they fit with their organization. While this approach has improved construct validity, it is unclear what person and environment characteristics are affecting participants' sense of fit. This study sought to contribute to this debate by examining how an objective measure of fit (i.e. teacher-principal pairings) is related to a subjective measure of fit (i.e. teachers' self-assessed teacher-school fit).

This study is also motivated by a need for a more robust theory of teacher mobility (Vagi & Pivovarova, 2016). Without a strong theoretical basis for why teacher mobility occurs, both scholars and practitioners will struggle to identify effective policy solutions. To date, very few studies have examined how person-environment fit affects teachers' behaviors (Youngs et al., 2015). Despite its lack of use in education, person-environment fit theory has been used to study various phenomena in many fields and has the potential to provide a flexible way of understanding teacher mobility. Therefore, this study sought to make a theoretical contribution to the research literature by applying person-environment fit theory to teacher mobility.

### **Teacher-Principal Pairings and Teacher-School Fit**

The results presented in the previous chapter suggest that teacher-principal pairings based on the value that each person places on standardized test scores (i.e. an objective measure of fit) do not affect teachers' self-assessed teacher-school fit. This study did reveal, however, that the value teachers place on standardized test scores, independently, was positively associated with teacher-school fit. In other words,

regardless of their principals' values, teachers who placed higher values on standardized test scores reported higher levels of teacher-school fit, on average. Although determining the cause of this relationship is beyond the scope of this study, it might be explained by several scenarios. For instance, teachers who value standardized test scores may also be successful at raising students' standardized test scores. If raising students' standardized test scores is considered a desirable skill by coworkers and principals, then these teachers likely feel valued at their schools and, therefore, report higher levels of fit. Similarly, as teachers face pressure to raise students' standardized test scores (Hamilton et al., 2007), teachers who cannot raise these scores are likely to report lower levels of fit in schools with initially low standardized test scores. This is especially likely for teachers who work at high-poverty schools like the ones in this study since students at these schools often perform below their more affluent peers (Gregory et al., 2010; McLoyd, 1998).

Additionally, the variables included in the model (i.e. the value teachers place on standardized test scores, the value principals place on standardized test scores, and their interaction) accounted for only a small portion of the variance in teacher-school fit scores (i.e. 4%). However, in this study, I only examined one aspect of teacher-school fit. Therefore, such a small effect is not surprising considering that teachers' sense of fit is likely affected by a variety of factors like students, coworkers, and principals. For instance, it may be that teachers who have strong beliefs about social justice may report higher levels of fit at low-income schools. Similarly, teachers who prefer to work collaboratively may report higher levels of fit at schools where staff frequently share ideas with each other.



Although this study indicates that teachers' sense of teacher-school fit is likely affected by factors beyond valuing standardized test scores, the fact that this characteristic was positively associated with fit is interesting. As discussed earlier, the current accountability movement has been linked to several negative outcomes for teachers like increased stress and less desirable working conditions (Clark et al., 2003; Hamilton et al., 2007). Some have argued that this has led many teachers to leave the profession. Despite the overall negative effects of the current emphasis on standardized tests, the findings of this study suggest that some teachers may be resilient to these pressures and may potentially prefer them.

### **Teacher-Principal Pairings, Teacher-School Fit, and Teacher Mobility**

In the second set of analyses, I sought to determine if teacher-school fit mediated the relationship between teacher-principal pairings and teachers' intended mobility. As with teacher-school fit, the results from these analyses suggest that teacher-principal pairings based on valuing standardized test scores do not influence teachers' mobility decisions. However, teachers who placed higher values on standardized test scores were less likely to say that they will leave their schools within five years. Again, it is beyond the scope of this study to determine the cause of this relationship. However, the possible explanations from the previous analysis can also be applied to teacher mobility. As with teacher-school fit, this relationship was only able to account for a small portion of the variance in teachers' intended mobility (i.e. 4%) suggesting that a variety of factors likely influence these decisions.

Perhaps most interesting is the fact that teachers' self-assessed teacher-school fit mediated the relationship between the value teachers place on standardized test scores and their intended mobility decisions. Again, the causes of this relationship can only be speculated. As described above, it may be that teachers who value standardized test scores are also more likely to receive positive feedback from their principals and peers. As a result, they perceive that they fit well at their schools and are more likely to stay. Further, the fact that teacher-school fit mediated the relationship between the value teachers place on standardized test scores and teacher mobility suggests that teacher-school fit plays an important role in linking observed teacher characteristics to teacher mobility.

Finally, when all variables were included in the model, teacher-school fit, district membership, and the value teachers place on standardized test scores accounted for 30% of the variance in teachers' intended mobility. Such a large percentage suggests that teachers' sense of teacher-school fit likely plays an important role in whether teachers choose to remain at their schools. While the models were only able to account for a small portion of the variance in teacher-school fit (i.e. 4%), the strength of the relationship between teacher-school fit and mobility suggests that this construct may have important policy implications. Specifically, understanding the factors that affect teachers' sense of fit may lead to policy interventions that could significantly reduce teacher mobility. Therefore, identifying factors that affect teachers' sense of fit should be a priority for those concerned with reducing teacher mobility.

## **Limitations**

Several limitations are worth noting in this study. First, although this study tests a pattern of relationships that are assumed to be causal in nature, the research design does not allow me to make strong causal claims. Most notably, the data are cross-sectional. Since, temporal precedence is considered a requirement for causal inference (Shadish et al., 2002), the cross-sectional nature of the data presents a threat to the internal validity of this study. Related to this, the models used in this study cannot account for the directions of the observed relationships. Therefore, several alternative models might explain the findings. For instance, it may be that teachers first decide that they will leave their schools for other reasons and adjust their sense of fit to reflect these decisions. Similarly, we can imagine that teachers who feel that they do not fit well at their schools develop negative views about important aspects of education like students' standardized test scores. Further, it is possible that a third, unobserved variable is driving the relationships in this study such as teachers' effectiveness at raising standardized test scores as mentioned above. If this is the case, then teacher effectiveness is affecting both the value teachers place on standardized test scores and teacher-school fit, thus producing the observed correlation between these variables. Whatever the case, the findings from this study should be viewed in light of these limitations.

In the future, these limitations can be addressed by collecting longitudinal data. For instance, data could be gathered at multiple occasions during the school year and teachers' mobility decisions observed at the end of the school year. This would address the problem of temporal precedence thus strengthening the internal validity of the study.

Additionally, collecting longitudinal data would provide further evidence for the directions of the hypothesized relationships, particularly if changes in the constructs are able to be observed over time.

This study was also limited by the fact that the objective measure of teacher-school fit (i.e. the value teachers place on standardized test scores) was narrow in scope. Although standardized test scores play a prominent role in education, there are likely many ways in which teachers think about these scores. Perhaps valuing test scores has weaker relationships to fit and mobility than, say, the role that teachers think standardized test scores should play in education, in general. As an initial step towards understanding how teachers' attitudes towards standardized tests affect their fit and mobility, future studies may find it useful to examine this issue using a qualitative approach. This would provide a direct way of identifying the aspects of standardized test scores that affect teachers' sense of fit and their mobility. Regardless of the approach used, the fact that two of the measures used in this study (i.e. the value teachers place on standardized test scores and teacher-school fit) were significantly related to teachers' intended mobility suggests that a well-developed survey instrument may be useful in efforts to reduce teacher mobility in the future.

Additionally, the main outcome in this study (i.e. teacher mobility) was measured as teachers' intended behaviors. Because I was unable to observe teachers' actual mobility decisions, the construct validity of this measure is questionable. Specifically, it is unclear if teachers who say that they will leave their schools will actually do so. To address this, future studies should collect data related to teachers' actual mobility

decisions. Although this approach may be more time-intensive, it would ensure that the findings are both valid and of practical significance to schools and school districts.

The results from this study could also have been affected by social desirability bias. Several survey items asked teachers to provide potentially sensitive information. Although the responses were anonymous, teachers may have felt that providing negative responses on these items (i.e. not valuing standardized test scores, poor evaluations of their principals, or a high likelihood of leaving) could result in punitive actions towards them or their principals. As a result, these responses may be positively biased and could result in biased parameter estimates. Future studies can account for this by collecting social desirability data and including it as a covariate in the models (King & Bruner, 2000).

Additionally, the final models in this study dealt with missing data using listwise deletion. This was required due to the limitations of the software used to manipulate the data. However, this can result in biased parameter estimates when data are missing systematically (Graham & Coffman, 2012). Although I cannot determine how listwise deletion affected the results of this study, future studies can address this by using more robust approaches to missing data like multiple imputation (Graham & Coffman, 2012).

This study was also limited by the fact that the schools were part of one of two school districts which may have reduced the variability in the value principals place on standardized test scores. School districts are responsible for hiring principals. Therefore, it seems likely that principals are hired because they show a commitment to districtwide goals and values. If this is the case, then we would not expect much variability in the

value that principals place on standardized test scores, which is the case in this study. This lack of variability may have made detecting an interaction effect less likely since there was less diversity with regard to teacher-principal pairings. Therefore, future studies should include schools from a greater variety of school districts.

Similarly, the fact that the schools in this study all served large numbers of poor and minority students may have affected the variability in the value that teachers place on standardized test scores. It has been well-documented that students living in poverty and students of color have lower academic achievement than their white and affluent peers (Gregory et al., 2010; McLoyd, 1998). Because of the recent accountability movement's emphasis on raising students' standardized test scores, particularly among poor and minority students, it may be that teachers in high-poverty districts place a disproportionately high value on standardized test scores. If this is the case, then there would be limited variability among teachers with regard to the value they place on standardized test scores thus reducing the number of teacher-principal pairings that can be observed. Therefore, future studies should sample teachers from schools with more diverse student populations.

Finally, this study included relatively few schools. While it may be the case that the factors described above limited the variability of teacher and school characteristics, it may also be the case that variability was limited because only 22 schools were included in the study. As a result, the sample may not have had a sufficient number of schools across the range of the constructs to detect an interaction effect. Future studies could address this by collecting data from more schools.

## **Implications for Theory**

As described in chapter 2, relatively few theories have been applied to teacher mobility. Of the handful that have, they are limited in their ability to account for the many factors that likely influence teachers' mobility decisions (Vagi & Pivovarova, 2016). This study suggests that person-environment fit may be at least a partial solution to this problem. Person-environment fit is able to encompass many of the characteristics of teachers and schools that have been found to influence mobility like teachers' age and sex or the support of administrators (Borman & Dowling, 2008; Guarino et al., 2006; Johnson et al., 2005). However, the models described in the previous chapter left roughly 70% of the variance in teachers' intended mobility decisions unaccounted for. Although no model will perfectly account for the data and 30% is quite large (Cohen, 1988), the remaining 70% suggests that there are factors beyond teachers' sense of fit that influence their decisions to stay at or leave a school. Although one can only speculate, these could be related to a variety of things. For instance, most districts use salary schedules that are based on years of experience. If other districts choose not to honor teaching experience gained outside of the district and if there are no desirable schools in a teacher's current district, then they may choose to stay at their current school to maintain their salary. If this is the case, then rational choice theory (Lindenberg, 2006) may prove useful. Rational choice theory posits that people who are faced with multiple options will choose the one that aligns best with their desired outcome. Further, it assumes that people most frequently act in their own best interests. Therefore, rational choice theory may be useful for understanding teacher mobility when teachers must weigh the costs and benefits of

leaving a school. It may also be the case that teachers account for geographic considerations when choosing where to work. Research suggests that teachers tend to work close to where they grew up (Reininger, 2012). Although the reasons for this are unclear, it seems likely that things like proximity to family or a desire to serve one's community may also influence teachers' mobility decisions. Consequently, theories that highlight the relational and social aspects of teachers' mobility decisions like social cohesion theory (Friedkin, 2004) may be useful. Whatever the case, future research should investigate ways that multiple theories, including person-environment fit, can be used to understand teacher mobility.

This study also suggests that more detailed theories related to how teachers construct their sense of teacher-school fit are needed. Interestingly, higher levels of the value teachers place on standardized test scores were associated with both higher levels of teacher-school fit and retention. This finding is not easily explained by any established person-environment fit or teacher mobility theory. Again, the causes of the observed relationships can only be speculated, but it may be that teachers who place higher values on standardized test scores are also more effective at raising students' test scores. As a result, these teachers may receive positive feedback from their principals and coworkers. While this study provides some initial insight, additional research is needed to determine how the value teachers place on standardized test scores is potentially affecting teachers' sense of fit and their intended mobility.



## **Implications for Practice**

The findings from this study also have implications for education practitioners. For instance, if the value that teachers place on standardized test scores is causing higher levels of fit and retention, then increasing the value teachers place on standardized test scores may provide a modest increase in teacher retention. Despite the fact that many have criticized our nation's growing emphasis on standardized test scores, they continue to play a prominent role in public education (Klein, 2015). Although previous studies have found that this emphasis has led many teachers to leave the profession (Clark et al., 2003; Hamilton et al., 2007), the findings from this study suggest that some teachers may be resilient to these pressures and may prefer them. Should the current test-based accountability system continue, then the findings from this study suggest that teaching teachers to value standardized test scores may help improve retention.

Finally, roughly 50% of teachers in this study said that they would likely leave their current school within five years. Although it would be preferable to retain many of these teachers, such high rates of mobility suggest that teacher mobility may be an issue that some schools and school districts cannot fully address. Therefore, it may be helpful to consider ways that schools and school districts can reduce the costs associated with teacher turnover. For instance, school districts might consider ways to keep highly-mobile teachers in the district like offering longevity bonuses. Similarly, if schools in a particular district are relatively homogenous with regard to things like their governance or school culture, then districts might consider ways to provide a greater variety of school options for teachers to choose from. This way teachers can find the right fit without

leaving the district. Similarly, it may be advantageous for smaller school districts (like those in this study) to combine to provide a greater variety of schools for teachers to choose from. Regardless of the solution, schools and school districts should consider ways to reduce the costs associated with teacher mobility by incentivizing teachers who switch schools to stay in the district.

## **Conclusion**

Teacher retention is an important policy issue that impacts a variety of stakeholders. When teachers leave their schools, districts and school leaders must devote resources to replacing them (Barnes, 2007; Levy, 2012). Most importantly, when teachers leave, they are often replaced by younger, less-experienced teachers who may struggle in the classroom. Students in these classrooms are then at risk for falling behind academically, particularly when they already perform below their peers (Hanushek, 2011). Therefore, it is critically important to better understand teacher mobility with the goal of identifying policy solutions that will help increase teacher retention. Although this study did not find evidence that teacher-principal pairings are related to teacher-school fit or teacher mobility, the findings suggest some interesting directions for future research. First, despite the negative impact that test-based accountability policies have had on teachers and public education, in general (Klein, 2015), the findings from this study suggest that not all teachers respond negatively to this pressure. The merits of these policies aside, understanding how the recent emphasis on standardized tests has affected teachers differently based on their beliefs and values is worth exploring further. If these policies do, in fact, cause some teachers to fit well at their schools, then

understanding why this occurs may help efforts to improve teacher retention in both the current policy context and in those to come.

Additionally, the fact that teacher-school fit showed such a strong relationship with teacher mobility suggests that understanding this construct could be important in reducing turnover. Despite a long-standing body of teacher mobility research, relatively few studies have sought to develop a robust or flexible theory of why teachers stay at or leave their schools. Without such a theory to guide them, education practitioners and policymakers are left to guess as to what will work when trying to retain teachers. Looking to the future, studies that seek to understand how teachers construct their sense of teacher-school fit may provide a valuable contribution to teacher mobility research.

Finally, this study shows that data collected using a survey instrument can identify factors that are predictive of teachers' intended mobility. Although the relationship of interest was not present in the data, the findings from this study suggest that a survey instrument could be developed that would help place teachers at schools where they would be most likely to stay. Such a survey instrument, however, would need to measure constructs that are strongly predictive of teacher mobility and would need to be sensitive enough to detect interaction effects based on teacher-school pairings. Although the instrument used in this study was not able to do this, this study was an important first step toward that goal.

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APPENDIX A

SURVEY INSTRUMENT

## Teacher Retention and Fit Survey

Thank you for agreeing to take this survey! The survey will take roughly 20 minutes to complete. Your responses will be used to help better understand how pairings of different kinds of teachers with different kinds of schools affect teachers' professional decisions. It is important that you answer every question to the best of your ability. All responses will remain completely anonymous. In other words, we will not use your responses to identify you and they will not be shared with anyone other than the researcher. Further, we will not use any of the information that you provide to evaluate you or your principal.

## Teacher Retention and Fit Survey

The statements that follow are about your work experiences and what is important to you about teaching. Please read each statement and decide how strongly you agree or disagree.

1. Improving students' standardized test scores is something that a teacher should strive for.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

2. I want my principal to evaluate my performance.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

3. I would like my principal to take part in informal evaluations of my teaching (evaluations meant to help me improve).

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

4. How my students perform on standardized tests is important to me.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

5. I want to work with a principal who shares ideas about how to improve my teaching.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

6. Students' standardized test scores are an accurate indicator of how much students have learned.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

7. I devote a lot of thought and energy to improving my students' standardized test scores.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

8. I enjoy receiving feedback on my teaching.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

9. I want to work with a principal who regularly helps teachers improve.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

10. I use my students' standardized test scores to improve my instruction.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree



11. I want to work with a principal who takes part in formal (high-stakes) evaluations of my teaching.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

## Teacher Retention and Fit Survey

This section deals with how principals' practices affect you, personally. Please indicate the extent to which you feel that each of these principal practices would affect your decision to stay at or leave a school. These questions address your view of the role of a principal in general, and not the principal at your specific school.

I would consider leaving a school if my principal...

12. Did not praise me for a job well done.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

13. Did not give me a great deal of freedom in deciding how to do my work.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

14. Did not ensure that I grow in my job by learning new skills and developing myself.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

15. Did not make it a point to let me know that he or she is confident in my abilities.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

16. Did not support the decisions that I make on my own.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

17. Did not reward me for my contributions to the success of projects.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

18. Did not celebrate my accomplishments.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

19. Did not develop cooperative relationships among the people with whom he/she works.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

20. Did not give me lots of appreciation for my contributions.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

21. Did not publicly recognize me for my commitment to shared values.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

22. Did not actively listen to diverse points of view.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

### Teacher Retention and Fit Survey

The following questions ask about your perceptions of your current principal only (i.e. not your assistant principal). Every principal is unique with regard to his or her beliefs and leadership style. Further, demands placed on principals mean that they must make choices as to where they will invest their time and energy. We understand that no principal will be able meet every need of his or her staff. With this in mind, please read each statement and decide how strongly you agree or disagree with the following statements. Again, all responses will remain anonymous and your responses will not be used to evaluate you or your principal.

My principal...

23. Believes that how students perform on standardized tests is important.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

24. Is involved in informal evaluations of teachers (evaluations that are meant to help teachers improve).

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

25. Gives people a great deal of freedom and choice in deciding how to do their work.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

26. Makes it a point to let people know about his or her confidence in their abilities.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

27. Makes sure that people are rewarded for their contributions to the success of our projects.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

28. Ensures that people grow in their jobs by learning new skills and developing themselves.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

29. Is involved in formal (high-stakes) evaluations of teachers.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

30. Wants me to strive to improve my students' standardized test scores.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

31. Frequently provides feedback on my teaching.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

32. Expects me to devote a lot of thought and energy to improving my students' standardized test scores.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

33. Shares ideas with me about how I can improve my teaching.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

34. Praises people for a job well done.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

35. Supports the decisions that people make on their own.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

36. Finds ways to celebrate accomplishments.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

37. Believes that students' standardized test scores are an accurate indicator of how much students have learned.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

38. Regularly helps teachers improve.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

39. Gives teachers lots of appreciation and support for their contributions.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

40. Publicly recognizes people who exemplify commitment to shared values.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree



41. Develops cooperative relationships among the people with whom he/she works.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

42. Actively listens to diverse points of view.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

43. Expects me to use standardized test scores to improve my instruction.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

44. Regularly evaluates the performance of teachers.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

## Teacher Retention and Fit Survey

The following questions are about your thoughts and feelings towards your current school. Please indicate the extent to which you agree or disagree with each statement. Again, all responses are anonymous.

45. Fitting into this school is easy for me.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

46. I believe I fit this school well.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

47. I am a good match for this school.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

48. I cannot imagine a school that would be a better fit.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

49. The characteristics of this school are a good fit for me.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

### Teacher Retention and Fit Survey

The following questions are about your future plans. Please answer to the best of your ability. Again, all responses are anonymous.

50. Will you be returning to your current school next year?

- Definitely No
- Most Likely No
- Most Likely Yes
- Definitely Yes

51. If you are not returning to your current school, was this decision voluntary?

- My decision to leave this school was voluntary
- My decision to leave this school was not voluntary
- I am definitely returning to my school
- I have not yet decided if I will leave this school

52. If you are not returning to your current school, do you plan on remaining in education?

- Will not remain in education
- I will remain in education but plan on leaving my current school
- I am definitely returning to my school
- I have not yet decided if I will leave this school

53. If you are not returning to your current school, do you plan on remaining in your current district?

- I will not remain in my current district
- I will remain in my current district but plan on leaving my current school
- I am definitely returning to my school
- I have not yet decided if I will leave this school

54. Do you see yourself teaching at this school in five years?

- Definitely No
- Most Likely No
- Most Likely Yes
- Definitely Yes

55. Do you see yourself working in your current district in five years?

- Definitely No
- Most Likely No
- Most Likely Yes
- Definitely Yes

56. Do you see yourself remaining in education in five years?

- Definitely No
- Most Likely No
- Most Likely Yes
- Definitely Yes

**Teacher Retention and Fit Survey**

The following questions are about you. Please answer to the best of your ability. Again, all responses are anonymous.

57. Did you graduate from high school in Arizona?

- Yes
- No

58. Approximately how long does it take you to commute to work on an average day?

- Less than 15 minutes
- 15-30 minutes
- 31-45 minutes
- 46 minutes to an hour
- More than an hour

59. What is your sex

- Male
- Female

60. What is your ethnicity (select all that apply)?

- Hispanic
- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian
- White

61. What is your age?

- 22-30
- 31-40
- 41-50
- 51-60
- 60 or older

62. What is the highest degree that you have earned?

- Bachelor's Degree
- Master's Degree
- Doctorate

63. Do you feel that your current school district is doing its best to make sure that you are compensated fairly?

- Yes
- No
- Not Sure

64. How many years have you been teaching including the 2016-2017 school year?

- 1 year
- 2 to 5 years
- 6 to 10 years
- 11 to 15 years
- 16 to 20 years
- 21 to 25 years
- 26 to 30 years
- More than 30 years

65. In which grade range is your primary teaching assignment?

- Pre-K through 5th grade
- 6th - 8th grade
- Special Areas
- Other

### Teacher Retention and Fit Survey

66. Imagine that you are choosing to work at a new school. You are given 100 points to show how important each of three factors (students, administration, and coworkers) will be in your decision. For instance, if you only value one factor, then that factor will receive all 100 points. Otherwise, the points will be distributed across factors. Using the points described above, please indicate how much each aspect of your new school will influence your decision. Remember, the sum of your responses should equal 100.

Good students	<input type="text"/>
Good administration	<input type="text"/>
Good coworkers	<input type="text"/>

67. As you think to the future of your career, what can the district do to retain you at your current school?

Thank you for completing this survey!

## APPENDIX B

### ESTIMATED COVARIANCE MATRICES FOR ANALYSIS 1



Within-Level

	Teacher-School Fit	Value Teachers Place on Test Scores	Value Principals Place on Test Scores
Teacher-School Fit	1.227		
Value Teachers Place on Test Scores	0.216	0.933	
Value Principals Place on Test Scores	0.000	0.000	0.000

Between-Level

	Teacher-School Fit	Value Teachers Place on Test Scores	Value Principals Place on Test Scores
Teacher-School Fit	0.087		
Value Teachers Place on Test Scores	0.000	0.000	
Value Principals Place on Test Scores	-0.045	0.000	0.113

APPENDIX C

ESTIMATED COVARIANCE MATRICES FOR ANALYSIS 2

Within-Level				
	Teacher-School Fit	The Value Teachers Place on Test Scores	District Membership	5-Year Mobility
Teacher-School Fit	1.239			
The Value Teachers Place on Test Scores	0.225	0.988		
District Membership	0.000	0.000	0.000	
Five-Year Mobility	-0.460	-0.155	0.000	0.709
Between-Level				
	Teacher-School Fit	The Value Teachers Place on Test Scores	District Membership	5-Year Mobility
Teacher-School Fit	0.086			
The Value Teachers Place on Test Scores	0.000	0.000		
District Membership	-0.007	0.000	0.242	
Five-Year Mobility	-.061	0.000	-0.007	0.709