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AN INVESTIGATION OF THE RELATIONSHIP BETWEEN SCHOOL LEADERSHIP, TEACHER JOB SATISFACTION, AND STUDENT ACHIEVEMENT

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AN INVESTIGATION OF THE RELATIONSHIP

BETWEEN SCHOOL LEADERSHIP, TEACHER JOB

SATISFACTION, AND STUDENT ACHIEVEMENT

BY

BETH-ANN TEK

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ABSTRACT

This correlational cross-sectional study identifies and tests research-based constructs of school leadership and teacher job satisfaction on the 2012 Tell MASS survey using exploratory factor analyses, confirmatory factor analyses, and reliability analyses. Hierarchical linear modeling is used to examine the relationship between the survey's school leadership and teacher job satisfaction scales. Multiple regression analyses are used to investigate the hypothesis that school leadership and student achievement on standardized tests in English Language Arts and Mathematics are also related, though this relationship is mediated by teacher job satisfaction.

Analyses revealed four major findings. First, EFA, CFA, and reliability analyses determined that the survey scales of two school leadership dimensions and five dimensions of teacher job satisfaction were valid and reliable. Second, HLM analyses confirmed the significant relationship of the dimensions of school leadership to overall teacher job satisfaction. Third, multiple regression analyses confirmed the significant relationships of teacher job satisfaction and school leadership to student achievement on the 2012 MCAS ELA and Mathematics assessments. Fourth, school leadership was indirectly related to student achievement, mediated through teacher job satisfaction, as hypothesized.

Findings from this study are of interest to education policy makers, education leadership preparation program leaders, and school district leaders, as they provide additional evidence regarding the importance of cultivating the soft skills needed for effective school leadership. Findings from this study should also be considered in the design of future research studies in this area, as the use of individual student-level data

that could be linked to individual teacher level data would allow for a three-level

HLM approach to analysis. Therefore, being able to account for the multicollinearity

encountered during the analysis of the relationships between leadership, teachers, and

student achievement. In addition, consideration of the missing dimension of school

leadership, involvement and stakeholder influences, and the extrinsic influences on

teacher job satisfaction should be added to test the fully research-based frameworks.

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DEDICATION

I would like to dedicate this dissertation to the late Dr. Robert Carey. Dr. Carey was the first to see the potential that lay within me and encouraged me to apply to the doctoral program. I miss his mentorship and humor tremendously. Dr. Carey was unique and his style of encouragement made me push myself beyond that which I thought I was capable. Dr. Carey will forever be one of the most influential people on my professional life.

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CHAPTER 1

INTRODUCTION

According to Dornbusch, Glasgow, and Lin (1996), "schools are organizations embedded in an external social context that facilitates or constrains the extent to which organizational goals are successfully realized" (p. 409). Due to the organizational structure of the educational system, the top of the hierarchy has little direct control over what happens at the lower levels of the system, particularly in the classroom (Weick, 1976). Consequently, the level of the educational system that most directly impacts students is only loosely coupled with the system's administrative processes.

Given these organizational constraints, it is difficult for the educational system as a whole to successfully implement programs that contribute to increased student achievement while addressing the various instructional, curricular, and social issues brought on by a changing educational landscape due to a changing society including an increasingly diverse population of students as well as advances in educational technology (Darling-Hammond, 2010). In addition, while there are larger societal issues impacting our educational system and students' ability to achieve, many other issues are specific to individual districts, schools and students, such as the availability of resources, community dynamics, students' transience, students' background, students' pre-existing knowledge, and students' individual learning abilities (Rowan, 1996). Therefore, it is important to understand how leaders can manage the individual context in which they work in order to facilitate organizational success.

To address the challenges associated with diverse school contexts and diverse student needs, many instructional strategies have been researched and determined to be effective with a variety of students. Further, general guidelines for the successful selection of a curricular or social program and the critical components of successful implementation are also well-documented (Coburn, 2003; Elmore, 2000). Given the substantive research base in the areas of curriculum, program implementation, and evaluation, we are left to ponder why substantial and sustainable improvements have not taken hold in schools? Often, the answer lies within the intricacies and uniqueness of the context in which the programs are being implemented.

In the past, researchers often sought to answer the question: "what will improve our nation's schools?" As we have come to understand that the educational landscape is a complex one where no one improvement strategy or program is THE answer, researchers have rephrased their question. Today, researchers ask: "under what conditions are improvement efforts successful?" Answers to this question allow researchers to explore the nuanced context that supports or, inhibits the conditions for success. Often, leadership is seen as a lever for cultivating effective conditions.

Implementation of any improvement effort is a highly contingent and situated process. Honig (2006) states that at the system level people, places, and policies interact to produce effects.
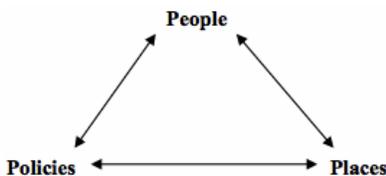
Figure 1. Dimensions of education policy implementation (Honig, 2006)

At the individual level, Spillane, Reiser, and Reimer (2002) state that change is mediated by individuals' understanding of the policy/improvement effort, situational context, and the individual's knowledge and beliefs (Figure 2). From a cognitive perspective, whether efforts at improvement are undertaken and the extent to which these efforts extend depends on whether and in what ways individuals within the system understand what they are doing will reinforce or alter their current understandings (Spillane, 2004; Spillane et al., 2002).
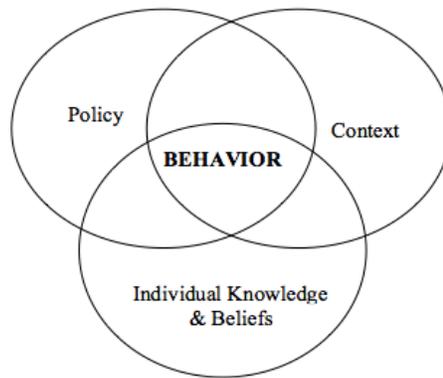
Figure 2. Cognitive framework

Statement of the Problem: Understanding the Influence of Effective Leadership

Across all species, from animals to humans, a natural organizational process happens. Those with a common goal, come together to form a group (Tajfel, Billig, Bundy, & Flament, 1971). Members of the group work together, assuming roles that best fit their talents and completing tasks that move the group as a whole toward its common goals (Sherif & Sherif, 1956). Based on this social theory, we know that all groups have members that perform a variety of roles, including those who act as leaders (Merei, 1949). As discussed by Dornbusch, Glasgow, and Lin, a leader's

activity is often only loosely coupled with the direct actions that lead to the group's goals (1996). It is not as simple as counting the number of widgets produced by one individual that contributed to the group's ability to produce 500 widgets. Leaders engage in tasks that often do not have tangible outcomes. Leaders create and foster the conditions within which other group members produce tangible products. Those involved in public education are no different than that of any other group of individuals with a common goal. Those working within the system of education have one goal in common: to ensure that all those who enter the system achieve success, as measured by each student's ability to succeed academically.

School leaders spend a majority of their time directing other members of the organization who are more directly engaged in the explicit day-to-day tasks that move the organization towards its goals, specifically increased student achievement (Merei, 1949). They are part of Honig's "people," interacting with other people (teachers and other school staff), places and policies to foster improvement (2006). And as Spillane and colleagues point out, a person's behavioral change, i.e. a teacher's implementation of an improvement effort, will only take place when conditions related to policy, context, individual knowledge and beliefs are favorable to the effort (2002).

Spillane, Halverson, and Diamond (2000) state that an education leader's influence is exercised through the actions or tasks that are enacted to accomplish functions for the organization. Due to the nature of the role of leadership, i.e. influence, direction, and support, it is often hard to discern the direct contribution school leaders make towards achieving a discrete organizational goal, as typically teachers are the primary implementers. This issue poses many challenges to the

researcher who wishes to examine and document a school leader's direct impact on the attainment of school goals, specifically, students' improved academic achievement.

Purpose of the Study: Exploring the Relationship between School Leadership and Student Achievement

School leaders develop, refine, and sustain the "places" as described by Honig (2006) and the "context" as described by Spillane et al. (2002). While school leaders are one level removed from the classroom and therefore do not directly interact with students as much as teachers do, they do directly impact the organizational conditions necessary for teachers to be able to effectively carry out instruction leading to increased student achievement. As such, this study will examine the hypothesis that school leadership and student achievement are related, though this relationship is mediated by teacher action. The study will attempt to suggest that effective school leadership leads to a more satisfying context, which leads to more job satisfaction among teachers, thereby strengthening their commitment to their work and to implementing classroom and instructional strategies that support students' learning, which in turn, relates to increased student achievement. Correlational in nature, the results of this study will present the strength of the relationships between the operational constructs of leadership, teacher job satisfaction, and student achievement but will be unable to draw conclusions about causality. The following three questions guide the investigation:

1. What are the dimensions of effective school leadership and teacher job satisfaction?

2. To what extent are school leadership, as well as principals' years of experience overall, and years of experience in current school, related to teacher job satisfaction after controlling for principal demographics, , school characteristics, and student characteristics?

3. To what extent are school leadership and teacher job satisfaction related to student performance in English Language Arts and Mathematics after controlling for teacher, leadership, school and student characteristics?

Importance of the Study

If the relationships between leadership, teacher job satisfaction, and student achievement exist and can be positively correlated, we would expect to see a predictable model emerge from the data when controlling for other possible variables. That is, we would expect to see higher levels of teacher job satisfaction among teachers who are led by effective school leadership (as defined by the literature). We would also expect to see higher levels of student achievement among students who are taught by teachers who are satisfied with their jobs and working conditions and led by effective school leaders (figure 3).

Figure 3. Three-dimensional model of leadership, teacher job satisfaction, and student achievement

If the model depicted in figure 3 emerges from the data analyzed, we would have additional evidence regarding the importance of effective leadership in schools. The findings of this study would be of interest to education policy makers, education leadership preparation program leaders, and school district leadership as they review existing and develop new policies related to the training, certification, recruitment, and selection of school leaders.

This chapter provided an overview of the research problem, questions to be answered by this study, and why the results of this study are important. Chapter two provides an overview of the related literature and chapter three provides the research design and methodology to be employed. Chapter four summarizes findings based on the data analyzed and chapter five will present the conclusions of this study as well as recommendations.

CHAPTER 2

REVIEW OF LITERATURE

Chapter two is organized according to the bodies of literature pertinent to this dissertation study. The chapter begins with a review of the research related to the identified components of the effective school leadership framework. Following the review of effective school leadership research is a review of research related to the impact and influence of school leadership on teacher motivation, job satisfaction, and commitment. A review of the research on the relationship between school leadership, teacher job satisfaction, and student achievement follows the review of the teacher-related research. The three bodies of research are followed by a summary of the analytical approaches used to study the relationships between these phenomena to date.

A Research-based Framework for Effective School Leadership

As discussed in chapter one, a leader's influence is exercised through the actions or tasks that are enacted to accomplish functions for the organization. Due to the nature of the role of leadership, i.e. influence, direction, and support, it is often hard to discern the direct contribution school leaders make towards achieving a discrete organizational goal, such as an increase in student achievement, as typically teachers are the primary implementers (Spillane, Halverson, & Diamond, 2000).

This issue poses many challenges to the researcher who wishes to examine and document a school leader's direct impact on the attainment of this goal.

To date, seven researchers: Ogawa, Bossert, Hallinger, Heck, Leithwood, Louis, and Bryk have played a prominent role in the research on "effective" leadership in schools (Ogawa & Bossert, 1995; Hallinger & Heck, 1998; Leithwood, 1994, 2006; Leithwood, Jantzi, Silins, & Dart, 1991; Leithwood, Steinbach, & Jantzi, 2002; Leithwood, Louis, Anderson , & Wahlstrom, 2004; Leithwood & Jantzi, 2005; Bryk & Schneider, 2003; Bryk, Sebring, Allensworth, Luppescu, & Easton, 2010; Louis, Leithwood, Anderson, & Wahlstrom, 2010). Their studies have spanned the methodological continuum from qualitative case studies to quasi-experiments. Hallinger and Heck's earlier framework of effective leadership informed the work of Leithwood and colleagues' refined framework developed between 2002 and 2010. Furthermore reviews of the literature on education leadership over the past forty years by Waters, Marzano, and McNulty (2003) and Leithwood and Sun (2012) both provide evidence that the dimensions of effective principal leadership can be operationalized and measured.

An early framework of effective school leadership. School leaders, specifically principals, engage in a range of activities to develop, refine, and maintain effective organizational and teaching conditions. According to Ogawa and Bossert (1995), these activities can be categorized into four areas and serve as a framework for understanding the influence of principal leadership: (1) purposes and goals; (2) structure and social networks; (3) people; and (4) organizational culture.

Purposes and goals. According to Hallinger and Heck (1998), one of the most

consistent research findings on principals' contribution to school effectiveness between 1980 and 1995 was the principal's ability to frame, convey, and sustain the school's purpose and goals, that is, the school's vision and mission, as well as aligned goals from the classroom to the school level. During this period, Brewer (1993) conducted a direct effects study of principal leadership through which he used multiple regression to test the relationship between elements of principal leadership and gains in student achievement in English Language Arts and Mathematics over a two year period. Brewer analyzed data from 2,070 student respondents to U.S. Department of Education's High School and Beyond (HSB) survey, as well as data from the HSB supplemental survey, the Administrator and Teacher Survey (ATS), which gathered data from teachers and principal in over 320 schools. Brewer concluded that the principal's ability to frame, convey, and sustain the school's purpose and goals affected teachers' motivation to and selection of classroom goals. After controlling for environmental influences, Brewer found a statistically significant relationship between principals' high academic goals and students' achievement gains.

Goldring and Pasternak (1994) conducted a mediated effects study using analysis of variance to explore the relationship of principal practice to student achievement, based on teacher and principal surveys from 34 elementary schools and their students' achievement on standardized tests in English Language Arts and Mathematics. Goldring and Pasternak found that principals' ability to frame goals, establish a clear school mission, and gain staff commitment to the effort were statistically significant and therefore stronger predictors of school outcomes than other instructional or managerial activities.

Finally, Hallinger, Bickman, and Davis (1996) also conducted a mediated effects study, but used multiple regression to explore the relationship between students' reading achievement and reported principal leadership characteristics based on responses to teacher and principal surveys in 87 U.S. elementary schools. Davis and colleagues' study concluded that a principal's ability to establish a clear school mission was one of the most effective ways a principal could influence school effectiveness, in this case, students' reading achievement.

Structure and social networks. According to Ogawa and Bossert (1995), leadership enhances the organizational climate and subsequently performance by affecting social structures and relationships. In 1984, Weil, Marshalek, Mitman, Murphy, Hallinger, and Pruyn published their mediated effects study in which they used both structural equation modeling and analysis of variance to test the relationship between principal characteristics as defined by the survey results of principals and teachers in 20 elementary schools and student achievement. Weil and colleagues (1984) found that principal support of teachers and a focus on proactive problem solving distinguished effective elementary schools from the rest of the sample studied. These types of leadership behavior and outcomes were often referred to as aspects of "transformative leadership" in the 1990's. First defined by Burns in 1978, transformative leadership is a proactive approach to leadership where the leader motivates and inspires using higher ideals and morals to guide work (Leithwood et al., 1991; Leithwood, 1994). For example, Bass (1985) notes that transformative leaders provide support to teachers and focus on gaining cooperation and participation for all stakeholders within the school community. In contrast to transformational leadership,

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transactional leadership is responsive rather than proactive in nature and looks to establish compliance through the systematic use of punishments and rewards rather than inspiring individuals (Burns, 1978). For example, transactional leaders are more authoritative, that they are more likely to make decisions on their own and then work to reduce resistance by the staff to their decisions when they are unfavorable. In 1994, Silins published a mediated effects study of transformational and transactional leadership on school outcomes. In the study, Silins examined the relationship between 265 principals' self-reported transformational and transactional leadership characteristics and student achievement using structural equation modeling and found that transformational leadership practices, like those mentioned above, produced significant effects on teacher behavior as well as school, program, and student outcomes.

The remaining feature of leadership activities that can be categorized within structure and social networks is a leader's ability to foster and support collaborative decision-making rather than the authoritative style of decision-making described in relation to transactional leaders by Bass (1985). Evidence of the power of collaborative decision-making can be found in Heck's (1993) study of secondary schools in Singapore published in 1993. Using survey results from 138 teachers in 26 high schools, Heck applied a mediated effects model and used regression to explore the relationship between principal leadership style and school effectiveness. The study concluded that more collaborative decision-making and flexible rule structures were associated with higher-achieving secondary schools.

People. Principals spend a majority of their time directing others within their

schools and there is considerable research support for the importance of this activity.

For example, Leithwood (1994) states that "people effects" was the cornerstone of his

transformational leadership model. Inspired by Burn's (1978) definition of

transformational leadership where leaders are proactive, engaging, and motivate

through collective belief in core values and ideals, Leithwood concluded that

transformational principals demonstrated strong "people effects" by fostering group

goals, modeling desired behavior, providing intellectual stimulation, and

individualizing support were better able to positively influence teachers' perceptions

of school conditions.

Organizational culture. As discussed previously, Spillane and colleagues

(2002) purport a cognitive perspective on change, stating that it is mediated by an

individual's understanding of the problem/issue, their situational context, and their

individual knowledge and beliefs. Leaders operate within the organizational culture

created by a group's collective understanding, knowledge, and beliefs. Therefore,

principals can influence how those within the context/culture interpret

events/problems/issues and act on new information (Ogawa & Bossert, 1995). Given

these statements, effective leaders focus on and understand the importance of

developing shared meaning and values while also developing support or "buy-in"

among staff within the school. One way in which leadership can develop these

features is to include staff in decision-making when appropriate. Using survey data

from over 2,500 Australian high school teachers and 3,500 15-year-old Australian

high school students, Silins, Mulford, and Zarins (2002) used a path model to explore

the relationship between leadership practices that foster organizational learning and

school outcomes, such as students' participation in and engagement with school. Silins and colleagues found that these schools' effectiveness was proportional to "the extent to which teachers participate[d] in all aspects of the school's functioning – including school policy decisions and review – share[d] a coherent sense of direction, and acknowledge[d] the wider school community" (p.618). Further, Silins and colleagues study demonstrated that effective leadership is a function of "the extent to which the principal works toward whole-staff consensus in establishing school priorities and communicates these priorities and goals to students and staff, giving a sense of overall purpose" (p. 620). DePree's (1989) "participative management" through which everyone in the organization "has the right and duty to influence decision making and to understand the results" (p.24) is another label for practices described within the organizational culture component of this framework. In summary, leadership, as described by these four components: purposes and goals; structure and social networks; people; and organization culture, "not only influences individuals – it influences the organizational system in which individuals (e.g. teachers, students, and parents) work" (Hallinger & Heck, 1998, p.171).

A refined framework for effective school leadership. In 2004, the Wallace Foundation commissioned a series of publications as part of its "Learning from Leadership" project. Over the next six years, Leithwood, Louis, Anderson, and Wahlstrom reviewed the literature related to school leadership and independently studied leadership's influence on student learning. They began their review with the research of Ogawa and Bossert (1995) and Hallinger and Heck (1998), Using the frameworks previously published, Leithwood and colleagues built and tested a refined

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framework for effective leadership. Leithwood and colleagues' refined framework presents two core functions of school leadership: one is to provide direction while the other is to exercise influence (Louis et al., 2010). Effective school leaders "emphasize two priorities in the direction they provide and the influence they exercise: they work to develop and support people to do their best, and they work to redesign their organizations to improve effectiveness" (Louis, et al., 2010, p.7). Leithwood and colleagues present a refined framework in which they define effective leadership as the integration of three concepts: (1) expectations and accountability; (2) efficacy and support; and (3) engagement and stakeholder influences.

Expectations and accountability. According to Leithwood and colleagues, expectations are effective only when paired with accountability measures through which observers can determine whether expected outcomes are reasonable and attainable. As such, this component adds a focus on measurability and monitoring to Ogawa and Bossert's (1995) earlier framework, specifically the mission and goals and organizational culture components. A principal's ability to frame, convey, and sustain the school's purpose and goals is not enough. Effective leaders must have high expectations for staff and students that are reasonable and attainable. These expectations must be based on trends in students' past academic performance and a clear and informed understanding of teacher performance, teachers' commitment to the school and its students. For example, at a school where teachers are performing well and the level of student achievement is high, effective leaders would be likely to continue to monitor teacher performance while setting aggressive incremental increases in student achievement as a goal. However, in schools where teacher

performance and student achievement are low, leaders would be more likely to set measurable expectations related to instructional improvement and monitor it through teacher evaluation while simultaneously expecting student achievement to improve accordingly (Louis et al., 2010).

Efficacy and support. Efficacy refers to the beliefs people hold about their own ability, or the ability of a group to succeed (Louis et al., 2010). Revisiting Spillane and colleagues' research related to implementation and cognition (Spillane et al., 2002), it can be said that a strong sense of efficacy is required to move a person from a desire to change to actual change in behavior. Leithwood and colleagues state that even those with a strong sense of efficacy can benefit from supportive conditions for action. As such, this component confirms the importance of Ogawa and Bossert's (1995) earlier framework component: structure and social networks. School leadership can support teachers by encouraging proactive problem solving, fostering collaborative decision-making, aligning professional development to school goals, and buffering teachers from unnecessary tasks and duties that take away from instructional time (Louis et al., 2010).

Engagement and stakeholder influences. The final component of Leithwood and colleagues' refined framework is engagement and stakeholder influences. That is, effective leaders understand the importance and influence of outside stakeholders and the extent to which their engagement can contribute to better student outcomes. While Ogawa and Bossert's (1995) people component focused on those within the school, Leithwood and colleagues' *engagement and stakeholder influences* extends to include those outside the school, such as community organizations, parents, and professional

organizations. The researchers found that teachers and parents can assume leadership roles to promote practices that will improve student learning, but their efforts are unlikely to come together in a focused, sustained way without effective school leadership (Louis et al., 2010). Furthermore, it is only through a clear understanding of teacher and student needs that school leadership can determine which professional development organizations and community based organizations with which to work to provide needed services. In summary, Ogawa and Bossert's (1995) earlier framework has been expanded and refined by Leithwood, Louis, Anderson, and Wahlstorm (2010) to include more focus on engaging stakeholders from both inside and outside the school and tying accountability measures to high expectations.

Teacher Commitment and Motivation

Leithwood's (2006) review of the literature on teacher commitment defines general commitment as "a psychological state identifying the objects a person identifies with or desires to be involved with" (p. 27). Leithwood (2006) goes on to further delineate teacher commitment into three areas: (1) commitment to students and their learning; (2) commitment to the teaching profession overall; and (3) commitment to the organization, whereas a teacher has a strong belief in and a willingness to accept the school and district's goals and values and will exert effort to perform according to those goals and values. Dannetta (2002) published a study in which he gathered data on the concept of teacher commitment and factors influencing its strength from teachers in Ontario, Canada through surveys and interviews and analyzed them using factor analyses and multiple regression. Dannetta found that organizational

commitment was strongly influenced by their perceptions of: (1) the meaningfulness of their work; (2) opportunities for ongoing learning and professional growth; (3) effective school leadership; and (3) preferable organizational conditions. That is, if teachers felt their work was meaningful and they were continuing to grow professionally, they were more apt to feel committed to their school. Furthermore, teachers were more apt to report feeling committed to their school if their school's leadership demonstrated such key traits as: employing a flexible enforcement of rules; buffering teachers from external distractions; supporting school staff overall; and having a positive influence on district leaders. However, teachers reported lower levels of organizational commitment when they perceived themselves to have an excessive workload and extra demands imposed by government initiatives that competed with the school's existing priorities.

Closely related to teacher commitment is teacher motivation. According to Geijsel, Sleegers, Leithwood, and Jantzi's (2003) review of the literature, the concept of teacher motivation is most commonly defined as the amount of "extra" effort teachers are willing to devote to school improvement efforts. In their 2003 study, Geijsel and colleagues examined the relationship between school leadership and teacher motivation and commitment. Using structural equation modeling, the researchers analyzed teacher survey data from close to 1,500 teachers teaching in Canada or the Netherlands, two countries that were in the midst of major school reform efforts. The study concluded that principals' ability to build a shared school vision and intellectually stimulate teachers, important pieces in the effective leadership framework presented earlier, were significantly related to the extra amount of effort

teachers were willing to devote and their commitment to improvement initiatives. Furthermore, the "extra" amount of effort often translated into improved student achievement.

Not only do leaders have the ability to motivate teachers to engage in extra efforts to implement school-level improvement initiatives, evidence suggests that leaders also have the ability to mediate negative perceptions of improvement efforts mandated by the district or state. Specifically, Leithwood, Steinbach, and Jantzi (2002) conducted a qualitative study to understand the responses of teachers and school administrators to government accountability initiatives in order to assess the extent to which leadership practices could mediate teacher response/perceptions. Based on interview data from forty-eight teachers and fifteen administrators in five secondary schools, Leithwood and colleagues found that a leader's ability to effectively communicate the accountability mandate and integrate it into existing school goals was positively related to teachers' overall perception of and response to the mandate.

Teacher Job Satisfaction.

Leithwood's (2006) review of the literature on teacher job satisfaction strongly connects teacher motivation and commitment to satisfaction. Other researchers have also investigated this relationship (Blasé, Derrick, & Stratham, 1986; Dinham, 1992, 1993, 1995; Dinham & Scott, 1998, 2000; Hom & Griffeth, 1995; Ostroff, 1992; & Spector 1997). More specifically, the research of Dinham (1992, 1993, and 1995) and Dinham and Scott (1998, 2000) investigated job satisfaction from the perspective of intrinsic versus extrinsic factors. Intrinsic factors were characterized as rewards

intrinsic to teaching (Dinham, 1992), such as student achievement, teacher achievement, and students' displaying more positive attitudes and behaviors about learning. Conversely, external factors included such things as political pressures on the school in the form of federal and state level school improvement initiatives and the national perspective on public education.

In 1998, Dinham and Scott (1998) sought to develop a model of teacher and school executive career satisfaction based on the responses of 892 school staff to a survey on teacher job satisfaction and dissatisfaction in Sydney, Australia. Based on a confirmatory factor analysis (CFA) of seventy-five satisfaction/dissatisfaction survey items, the researchers identified eight factors that could be categorized as intrinsic or extrinsic : (1) school leadership, climate, and decision making; (2) merit promotion and local hiring; (3) school infrastructure; (4) school reputation; (5) status and image of teachers; (6) student achievement; (7) workload and the impact of change; and (8) professional self-growth.

As was predicted by Dinham's earlier research (1992, 1993, 1995), teachers were most satisfied by intrinsic factors, such as, student achievement and positive attitudes towards learning, self-growth, positive relationships with students and peers, mastery of professional skills, and a supportive environment. The major sources of teacher dissatisfaction were extrinsic factors such as political pressure and public perception.

Upon closer examination of the factors, Dinham and Scott (1998) added a third category of factors. In their earlier research, they had employed a dichotomy: intrinsic versus extrinsic. However, further analysis of the survey factors led them to add a

third category: school-based factors. School-based factors fell between intrinsic factors and larger extrinsic factors of which little teacher and school-based control existed. School-based factors include school leadership, climate and decision-making, school reputation, and school infrastructure. School-based factors demonstrated the most variation between schools and were strongly related to teachers' overall reported levels of satisfaction or dissatisfaction. Dinham and Scott (1998) concluded that, while little can be done to impact universal extrinsic factors from the teacher- or school-level, the school-based factors, such as school leadership, climate and decision-making should be considered important and clearly relate to teachers' reported satisfaction or dissatisfaction and subsequent resignation.

In 2003, Scott and Dinham published additional research related to their three factor model (intrinsic, school-based, and extrinsic). In this article, the authors share the results of their survey administered to 2,734 teachers and principals in four countries: Australia (discussed in Dinham and Scott's earlier 1998 study), England, New Zealand, and the United States. Across all four countries, teachers and principals continued to report the greatest level of satisfaction with intrinsic factors (Scott & Dinham, 2003). Varying levels of satisfaction were reported related to school-based factors such as leadership, communication, and decision-making. And, finally, the most dissatisfaction reported was associated with factors extrinsic to schools. This study confirmed the importance of effective leadership in schools and its influence on teacher satisfaction.

In addition to Dinham and Dinham and Scott's research on the relationship between leadership, teacher job satisfaction, and attrition, Brand, Felner, Seitsinger,

Burns, and Bolton (2008); Bogler (2001); and Boyd, Grossman, Ing, Lankford, Loeb, and Wyckoff (2010), have investigated this relationship. Brand and colleagues' research aligns well with Dinham and Scott's (1998) three component framework, as their review of a survey designed to measure school climate identified the following factors related to teacher job satisfaction: extrinsic rewards; intrinsic rewards; input into leadership; student behavior; parent and community support; and instructional measures. Though Brand and colleagues' research separated input into leadership and student behavior from intrinsic rewards, Dinham and Scott (2008) considered these to be part of the array of intrinsic influences. In addition, Brand and colleagues separated instructional resources and parent and community support, while Dinham and Scott considered these to be part of school-based influences.

Bogler's (2001) survey of 745 Israeli teachers found that teachers' job satisfaction, principal's leadership style and decision-making strategies, and teachers' perceptions of more intrinsic factors (similar to Dinham, 1995) were significantly related. That is, teachers who perceived their occupation as a profession were more likely to report they had principals that were visionary, innovative, supportive, and collaborative decision makers. Furthermore, teachers who reported their principals were visionary, innovative, supportive, and collaborative decision makers were more likely to report higher levels of job satisfaction.

Boyd, Grossman, Ing, Lankford, Loeb, and Wyckoff (2010) investigated the influence of school leadership on teacher retention and attrition by analyzing survey data from 4,360 first year teachers in New York City in 2004-2005. Analysis techniques included factor analyses and regression. By identifying teaches who left the

profession at the end of their first year, Boyd and colleagues could follow up with these teachers to determine the factors influencing their decision to leave. Boyd and colleagues found that these teachers most often reported high levels of job dissatisfaction specifically, lack of support from administrators, as their primary reason for leaving.

School Leadership Influence on Student Achievement

There is a body of literature on the relationship between leadership influence and student achievement as mediated by teacher job satisfaction and attrition. Research published by Dinham (2005), Griffith (2003), Guin (2004) and Ronfeldt, Loeb, and Wyckoff (2012) indicates that teacher job dissatisfaction and high incidences of teacher attrition can impact student achievement.

Across the United States, close to 30 percent of new teachers leave the profession after five years, and the attrition rate is 50 percent higher in high-poverty schools as compared to more affluent ones (Ingersoll, 2001). Teacher attrition rates also tend to be higher in urban and lower-performing schools (Hanushek, Kain, & Rivkin, 1999).

In 2003, Griffith published his study of the effect of principal leadership on staff attrition and school performance using survey data from 1,791 teachers across 117 suburban elementary schools in a large metropolitan area in the United States, as well as school-aggregated student achievement scores and socio-demographic data for each of the 117 schools. Analytical methods used to examine and interpret the data included structural equation and hierarchical linear modeling. Griffith found that

elements of leadership, such as charisma and inspiration, individualized consideration, and intellectual stimulation, did not directly impact teacher attrition and student achievement progress but were rather mediated through teacher job satisfaction. Specifically, principal leadership related significantly to teacher job satisfaction/dissatisfaction ($p < 0.01$), which in turn, related significantly to teacher attrition ($p < 0.05$) and to student achievement ($p < 0.05$). Griffith's findings support the idea that a principal's ability to be a transformational leader, that is to be inspirational, individualize their support, and provide intellectual stimulation for teachers (Burns, 1978; Leithwood & Jantzi, 2005) had a positive impact on teachers' work environment, which, in turn, reduced teacher attrition and increased student achievement. Being a transformational leader aligns with Leithwood and colleagues' refined leadership framework in which leaders provide direction and exercise influence via expectations and accountability, efficacy and support, and stakeholder engagement and influence (Louis et al., 2010).

In 2004, Guin published a study in *Education Policy Analysis Archives* of her research based on survey and qualitative data from 66 elementary schools in a large urban district. Guin examined the characteristics of elementary schools that had high rates of teacher attrition and the impacts of attrition on the schools' climate and ability to effectively function. Evidence from the surveys and case studies indicated that schools with high teacher attrition faced significant organizational challenges such as difficulty planning and implementing a coherent curriculum and sustaining positive working relationships among teachers. In turn, new teachers were constantly "learning" the school's curriculum and all teachers had to continuously build new

positive working relationships with each other, often making it difficult for progress to be made and student achievement to be improved in a systematic fashion.

In 2005, Dinham published a study that explored elements of principal leadership associated with outstanding educational outcomes. He identified fifty schools to study that demonstrated "outstanding" outcomes from Sydney, Australia. "Outstanding" educational outcomes were defined by using the three interrelated domains outlined in the *Adelaide Declaration on National Goals for [Australian] Schooling in the Twenty-first Century* (MCEETYA, 1999). These domains indicate that schools should: (1) develop fully the talents of all students; (2) attain high standards of knowledge, skills and understanding through a comprehensive and balanced curriculum; and (3) be "socially just."

Results from observations and interviews across the schools found leadership, both positional, such as principals and other school executives, and teachers who had taken on informal leadership roles were a major factor in the outstanding outcomes achievement by students, teachers and schools. Further analysis of data revealed that certain attributes and practices of the principals of these schools created the conditions under which teachers felt satisfied because they could focus more on the core of their work: students and their learning. Referring to Leithwood's refined framework of school leadership discussed earlier (Louis et al., 2010), it can be said that Dinham's (2005) findings support the importance of all three of the framework's components: (1) expectations and accountability ; (2) efficacy and support; and (3) stakeholder engagement and influence. Specifically, Dinham reported the following attributes as contributing to teacher job satisfaction and student achievement: (1) vision,

expectations, and a culture of success; (2) a bias towards innovation and action; (3)

personal qualities and relationships; (4) teacher learning, responsibility, and trust; (5)

student support, common purpose, and collaboration; (6) a focus on students, learning,

and teaching; and (7) external awareness and engagement.

External awareness and engagement refers to the extent to which principals

had an awareness and understanding of the wider educational environment and a

positive attitude towards engaging productively with it. Instead of being

disempowered by external educational changes and political pressures they looked for

ways in which they could adapt what they were already doing to meet new

requirements to align with their school's mission and goals.

A bias towards innovation and action describes principals that use their powers

and the system's rules and boundaries creatively; who like to experiment and take

risks; and exhibit strength consistently but flexibly in decision making and the

application of policies and procedures. Leaders who demonstrated these qualities use

the discretion available to push against administrative and systematic constraints when

needed.

These principals demonstrate high-level interpersonal skills and develop

trusting relationships with others. Often they are reported to be well-liked and

respected. These principals demonstrate empathy and compassion and are available

when needed to work for the school rather than "for themselves" and to model good

professional behavior.

In addition, these principals possess a long-term agenda and vision and are

prepared to work towards it over time with the support of their school staff. They set

meaningful, achievable goals rather than short-term targets. The norm of residency for these principals was six to seven years in their current school; they had often been promoted from within the school, giving them even more credence among the staff because they had been teachers themselves and understood the historical context of the school. These principals understood that quick fixes were unlikely to be successful (Hargreaves & Fink, 2004).

These principals placed value on teacher learning and therefore they funded teachers' professional development both inside and outside the school. They also modeled teacher learning by being prepared to learn from teachers, students, and others. They provided adequate release time for teacher to spend time learning from one another and outside specialists brought into the school by the principal.

In addition to their placement of value on continuous learning for teachers, these principals found support in other areas for students in all areas that helped to improve students' outcomes. The principals often identified and utilized a central focus to guide student outcome improvement, from general assessment practices, to focusing on a specific skill such as literacy, to effective pedagogical practices across the curriculum.

Finally, the main theme that emerged from the data was that the principals in these schools had one central purpose above all: a focus on teaching and learning. The principals and their staff recognized that every effort went towards cultivating and supporting an environment where each student could experience success through academic, personal, and social growth.

Finally, in 2012, Ronfeldt, Loeb, and Wyckoff published a paper on their study

of the effects of grade-level teacher attrition on more than 600,000 New York City fourth- and fifth-grade students over a five-year period from 2002 to 2007. Ronfeldt and colleagues were able to link student test scores in English Language Arts and Mathematics to student, class, teacher, and school characteristics. On average, teachers included in the study had six years of teaching experience. Eighty-two percent of the teachers had stayed in the same school from the previous year (stayers) while 4% transferred schools (transfers) and 12% were first year teachers (new). Therefore it could be estimated that one teacher out of every five teachers in fourth- and fifth-grade classes left the position. Results from the study indicated that students in grade-levels with higher teacher attrition scored lower on assessments in both English Language Arts and Mathematics (Ronfeldt et al., 2012).

Based on the framework of leadership presented, research has provided evidence of the effects proactive, engaging and collaborative leadership can have on teachers. Specifically, school leaders who are proactive, engaging, and collaborative have teachers who are more committed to the organization and its student as well as satisfied with their jobs. Furthermore, research indicates that teachers' overall job satisfaction impacts teacher attrition, which causes disruptions in students' learning and impacts student achievement. Effective leadership showed a strong, positive and significant relationship to teacher job satisfaction, which in turn showed a moderate, positive, and significant relationship to school achievement progress (Griffith, 2003).

The research reviewed concludes that while principals have the ability to directly impact school climate (i.e., organization conditions), their ability to impact/influence the improvement of student achievement is mediated by teacher job

satisfaction and their commitment to stay in their present position.

Summary of the Research

Based on the review of the various bodies of literature discussed above, this study examines the relationships between school leadership, teacher job satisfaction and student achievement using two research-based frameworks. The school leadership framework is defined by Leithwood and colleagues (Louis et al., 2010). This framework defines school leadership by three dimensions: Expectations and Accountability; Support and Efficacy; and Engagement and Stakeholder Influences. The teacher job satisfaction framework is defined by Dinham and Scott (1998) and proposes various aspects of teacher job satisfaction that can be categorized into three dimensions: Extrinsic Influences; Intrinsic Influences; and School-Based influences. The relationships of these phenomena are presented in figure 4.
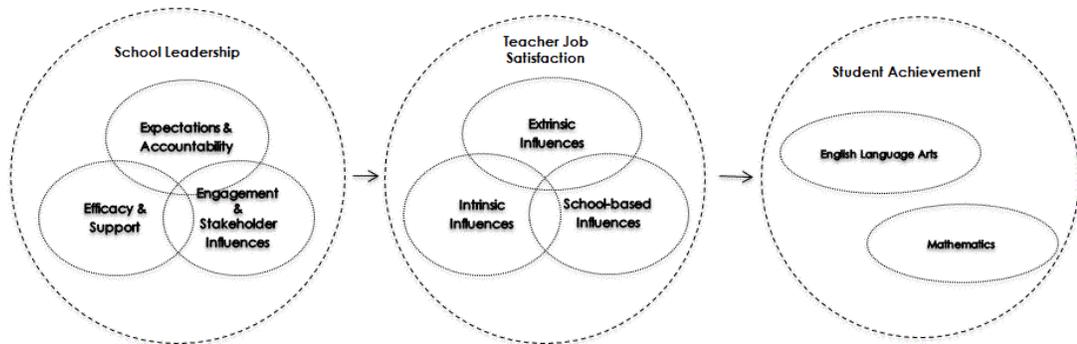
Figure 4. Relationships between school leadership, teacher job satisfaction, and student achievement

Analytical Approaches

The bodies of research presented above demonstrate the various analytical approaches that have been used to study the relationship between leadership, teacher job satisfaction and commitment, and student achievement. Solely qualitative methods, such as interviews and case studies were used least often. Those researchers who did employ qualitative approaches, often included them as part of a mixed methodology design that also employed quantitative measures of survey and achievement data. Most often, the studies cited used principal, teacher, and/or student survey data and aggregated student achievement data to quantitatively explore the relationships of principal leadership, teacher job satisfaction and commitment, and student achievement. Quantitative studies conducted before 2000 most often employed correlation, T-tests, analysis of variance, regression, and structural equation modeling (SEM) as their analytical approaches of choice. For example, the review of research published by Hallinger and Heck (1998) regarding the principal's contribution to school effectiveness concluded that, of the 43 studies reviewed, six studies utilized the T-test; seven studies employed qualitative techniques, such as interviews, and/or observations; seven applied analysis of variance or multivariance; eight used correlation; 11 used regression and/or multiple regression; and 12 studies utilized Structural Equation Modeling (SEM). It is important to note that the total number of studies associated with each analytical technique is more than the total number of studies cited because seven studies utilized multiple analytical techniques. Keselman, Huberty, Lix, Olejnik, Cribbie, Donahue, Kowalchuk, Lowman, Petoskey, Keselman, and Levin (1998) noted that one consistent finding of methodological research reviews

was that a substantial gap often existed between the methods recommended in the statistical research literature, and the techniques actually applied by researchers. For example, many studies ignored the nested structure of data when selecting an analytical technique, that is, that the education system is hierarchical in that students are nested within classrooms/teachers, which are nested within schools, which are nested within districts, etc. (figure 5).
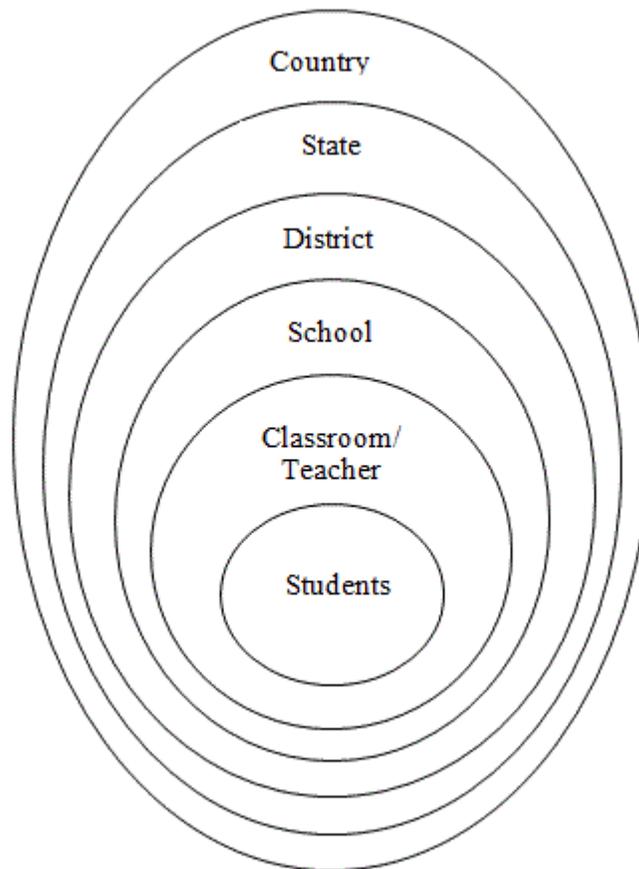
Figure 5. Hierarchical/nested education system

In the 21st century, more researchers are using multilevel modeling instead of multiple regression because of its ability to account for the nested structure of data in social systems. When data is nested the assumption of independent observations is

violated. Challenges to analyzing these data include within-cluster dependencies, homogeneity and with-cluster covariation, and sources of variation within and across clusters predicted from sampling theory (Zhang, 2005). Several programs and approaches have been developed to conduct multi-level modeling, such as Structural Equation Modeling (SEM) and Hierarchical Linear Modeling (HLM) (Wilson & Zhang, 2003). According to Raudenbush and Bryk (2002), HLM can account for the hierarchy of data that comes from a system (i.e., the nesting) and the violation of the independence of observations it creates by accounting for shared variance. HLM simultaneously investigates relationships within and between hierarchical levels of grouped data, which makes it more efficient at accounting for variance among variables at different levels (Raudenbush & Bryk, 2002). Applying HLM to analyses of education data is appropriate because it can account for the influence each level of the education system has on the other. This is best summarized by the following statement from Hallinger and Heck: "when studying the interrelationships among principal, teacher, and student-level variables… the structural features of educational organizations take on particular importance. Principals are likely to influence the school level of the organization more directly than classroom, e.g., how teachers organize instruction, or student levels, e.g., the motivation of particular students" (1998, p. 180). Based on this research, HLM is used as the analytical tool of choice for multi-level analysis in this study because it is appropriate, key researchers have used HLM to investigate the relationship of school leadership and job satisfaction and/or student achievement in the recent past(Lee, 2003; Griffith, 2003) and the researcher's preference.

CHAPTER 3

METHODOLOGY

Chapter three presents the study's subjects, instruments, variables, measures, procedures, and analytical techniques. Examining secondary data provided by the Massachusetts Department of Elementary and Secondary Education (MA ESE) and New Teacher Center (NTC), this study uses a cross-sectional design to explore the existence of relationships between school leadership, teacher job satisfaction, and student achievement in a sample of Massachusetts' public schools. Justification for the selected design and analytic procedures follow the design summary. The chapter closes with a discussion of the implications of the study's findings.

Subjects

The data were collected from a sample of all 1,829 public schools in the state of Massachusetts. These schools include school leadership who oversee 69,270 teachers and where 953,369 students (pre-kindergarten through 12th grade) attended during the 2011-12 school year (MA ESE, n.d.a). Although data included 1,829 public schools in Massachusetts, the achieved sample was constrained by the availability of data related to leadership, teachers, and students within each of the 1,829 schools.

Power analysis. A power analysis was conducted to determine the number of teachers within each school and the number of schools needed to be able to draw meaningful conclusions from the data about school leadership, teacher job satisfaction,

and student achievement. Power analysis provides the minimum number of subjects required to detect any effects that result from the independent variable, in the case of this study "school leadership," based on:

1. the size of the effect of school leadership in the population;

2. the type of statistical tests to be used (HLM and SEM); and

3. the acceptable level of significance of the study ($p \leq .05$).

Power analysis provides the probability of avoiding a Type II error that is, failing to reject a null hypothesis even though it is false (Lee, 2000). In the case of this study, power analysis provided the minimum number of teachers and principals required to detect the effect of school leadership (the independent variable) if it does exist on teacher job satisfaction and student achievement. A power and sample size calculator developed by Russ Lenth (2006-9) was used to calculate power. It was determined that ten schools with at least ten individual teacher survey responses from each school would be required to detect the effect of school leadership at the acceptable level of significance ($p \leq .05$) using HLM. The availability of data to meet the power requirement estimate in this study far exceeded the minimum. Therefore, the following additional constraints were added to increase the strength of the analyses and validity of the associated findings.

Availability of TELL Mass survey data. The total number of schools represented in the survey data was the greatest constraint to the sampling frame, as survey data contain key variables in the study, specifically the independent variable of school leadership and the dependent variable of teacher job satisfaction. Data related to these variables were required for every school included in the analysis. Availability

of these data was constrained by the school-level response rate. That is, only schools where at least ten teachers responded who represented at least a 50% response rate at the individual school level were included. As a result of this constraint, the sample size was reduced to 1,044 schools representing 34,046 individual teacher responses.

Availability of student achievement data. The frame was also constrained by the availability of aggregated student achievement scores on standardized tests in English Language Arts and Mathematics at the school level. Massachusetts' student achievement data are available at the school level for all schools that include grades 3, 4, 5, 6, 7, 8, or 10. Analyses of the data available revealed that 2012 achievement data were only available for 967 out of 1,044 schools where survey data were also available. The remaining 77 schools did not include grades that participated in the state's standardized testing.

Availability of leadership characteristics data. The final constraint involved the availability of data related to school leadership from the MA ESE Education Personnel Information Management System (EPIMS). This system provided data related to individual principal characteristics, such as years' experience as an educator, years' experience as a principal, years' experience as a principal in current school, and demographic characteristics such as gender, race and ethnicity. Years of experience as a principal overall and in their current school are important factors to be considered as controls, as leaders' years of experience overall and in the school being investigated may relate to the extent of effective leadership practices being employed and their influence on the school's organizational culture (Hallinger & Heck, 1998). Individual principal characteristic data were available for 503 out of 967 schools that met the

preceding sampling requirements. As a result, the final sample included data on school leadership in 503 schools from 17,357 teachers and 219,862 students, approximately 28% of the total school sample, 25% of the total teacher sample, and 23% of the total student sample.

As these constrains reduce the sample size, I examined the attrition bias by comparing the achieved sample with the total sample. Table 1 demonstrates that the achieved sample is similar to the total sample in various background characteristics and. Therefore conclusions from this study can be generalized to the state of Massachusetts with confidence.

		Total Sample	Achieved Sample
Table 1. Sample versus Achieved Sample Comparisons			
Overall	Traditional Public Schools (n)	1,757	483
	Charter Schools (n)	72	20
	TOTAL Schools (n)	1,829	503
	Traditional Public Teachers (n)	66,831	16,814
	Charter Teachers (n)	2,439	543
	TOTAL Teachers (n)	69,270	17,357
	TOTAL Students (n)	953,369	219,862
	Urban Schools[1] (%)	13.6	14.3
Level	High Schools (%)	20.4	17.7
	Middle Schools (%)	17.2	17.3
	Elementary Schools (%)	62.3	65
Selected Populations	Mean Low Income (%)	35.2	32.9
	Mean Special Education Services (%)	17.0	16.2
	Mean English Language Services (%)	7.3	7.6
Student Demographics	Mean White (%)	67.0	68.2
	Mean African American (%)	8.3	6.5
	Mean Hispanic/Latino (%)	16.1	16.5
	Mean Asian (%)	5.7	5.4
	Mean Native American (%)	0.2	0.3
	Mean Native Hawaiian (%)	0.1	0.1
Achievement	Mean Adv/Prof ELA MCAS (%)	69%	67%
	Mean Adv/Prof Math MCAS (%)	59%	60%

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[1] Urban schools are schools within MA ESE's designated ten urban districts: Boston, Brockton, Fall River, Holyoke, Lawrence, Lowell, Lynn, New Bedford, Springfield, and Worcester (MA ESE, n.d.a).

Instruments

The TELL Mass survey and MCAS achievement results were used to define and measure the relationships between school leadership, teacher satisfaction, and student achievement. Other data sources provided data related to variables being used as controls. Specifically, the following four data sources inform this study. An in-depth description of each data source can be found in Appendix A.

1. The Teaching, Empowering, Leading and Learning Massachusetts educator survey (TELL Mass) developed and administered in the spring of 2012 by the New Teacher Center (NTC) provided data related to the dimensions of effective leadership, student behavior, instructional practices, availability of resources, and teacher job satisfaction;

2. The Massachusetts Comprehensive Assessment System (MCAS) provided student achievement data in English Language Arts and Mathematics at the school level for all students and specific sub-populations in grades 3, 4, 5, 6, 7, 8, and 10;

3. The Massachusetts Department of Elementary and Secondary Education's (MA ESE) online School Profiles database provided data related to school characteristics (size and location), school context (percentage of highly qualified teachers and student/teacher ratio), students' demographic and socio-economic data, and the percentage of students receiving special services (Special Education services and English Language support and instruction); and

4. The MA ESE Education Personnel Information Management System (EPIMS) provided individual principal's demographic profile, years of experience in their current school, and years of experience as a principal and in the Massachusetts public education system overall.

Variables

As this study is focused on the effect of school leadership, dimensions of school leadership as perceived by teachers were the independent variables of primary interest. Three dependent variables were examined: teachers' job satisfaction and student achievement in English Language Arts and Mathematics.

School leadership. The dimensions of school leadership, the independent variables, were examined through both exploratory and confirmatory factor analyses. The TELL Mass survey includes 11 questions on the school leadership construct which rated teachers perceptions of school leadership. NTC's selection and inclusion of items were based on their independent review of the literature on school leadership (NTC, 2012). NTC defines the school leadership factor as a measure of "the ability of school leadership to create trusting, supportive environments and address teacher concerns" (2012, p. 2). NTC's validity and reliability analyses of the School Leadership factor found it to be highly reliable ($\alpha = .93$) based on their expansive data set of responses from survey administrations over time in various states and school districts. In the case of this dissertation study, these items were explored conceptually to determine their alignment with Leithwood and colleagues refined framework of effective leadership. This refined framework includes the integration of three

concepts: (1) expectations and accountability; (2) efficacy and support; and (3) engagement and stakeholder influences (Louis et al., 2010). The conceptual review concluded that these items align well with Leithwood and colleagues' expectations and accountability and efficacy and support concepts; however it does not measure engagement and stakeholder influences. Because engagement and stakeholder influences are based on leaders' engagement with and consideration of stakeholders outside of the school building, teachers' perceptions were not able to measure this concept accurately. Table 2 presents the included survey items in NTC's School Leadership factor.

Table 2. TELL Mass Survey Items related to NTC's School Leadership Factor	
Q#	Question
7.1a.	The faculty and leadership have a shared vision
7.1b	There is an atmosphere of trust and mutual respect in this school
7.1c	Teachers feel comfortable raising issues and concerns that are important to them
7.1d	The school leadership consistently supports teachers
7.1e.	Teachers are held to high professional standards for delivering instruction
7.1f.	The school leadership facilitates using data to improve student learning
7.1g.	Teacher performance is assessed objectively
7.1h	Teachers receive feedback that can help them improve teaching
7.1i	The procedures for teacher evaluation are consistent
7.1j	The school improvement team provides effective leadership at this school
7.1k	The faculty are recognized for accomplishments

Teacher job satisfaction. According to the literature, teacher job satisfaction, the dependent variable, includes many aspects that are intrinsic and extrinsic to

teachers, as well as school-based. Extrinsic factors include such factors as promotion, pay, and benefits. Intrinsic factors include satisfaction with: one's own teaching performance, the extent to which teachers are included in school-level decision making; student behavior and their own classroom management; opportunities for professional development and self-growth (Dinham & Scott, 1998). School-based factors include satisfaction with: school infrastructure; instructional supports and resources; parental support and community involvement; and finally satisfaction with community's perception of their professional status (Blasé, Derrick, & Stratham, 1986; Brand et al., 2008; Dinham, 1992, 1993, 1995; Dinham & Scott, 1998, 2000; Hom & Griffith, 1995; Leithwood, 2006; Ostroff, 1992; and Spector, 1997). Several items on the TELL Mass survey (n=60) focus on these aspects. Similar to the school leadership variable, these survey items were classified as representative of teacher job satisfaction on a conceptual basis based on the literature review and results from NTC's confirmatory factor analysis (CFA). The researched-based frameworks of job satisfaction by Dinham and Scott (1998) and Brand et al. (2008) have been conceptually aligned with the factors available on the TELL Mass survey and are presented in Table 3.

Table 3. *Alignment of Teacher Job Satisfaction Framework Components*		
Dinham and Scott 1998	Brand et al. 2008	NTC 2012
Extrinsic influences such as promotion and pay	Extrinsic rewards	--
Intrinsic influences, such as opportunities for professional development/growth; Engagement in school-level decision-making; and Student behavior and attitudes	Intrinsic rewards	Professional development
	Input into leadership	Teacher leadership
	Student behavior	Managing student conduct
School-based influences such as professional reputation, status, image within the community, parental support, and school infrastructure	Parent and community support	Community support and involvement
	Instructional resources	Instructional practices and supports
		Time
		Facilities and resources

Based on the alignment of the two research-based frameworks and the TELL Mass survey factors available, this study measures intrinsic and school-based components/concepts of teacher job satisfaction but does not examine extrinsic factors, such as pay and promotion. All 7 dimensions proved to be very reliable with Cronbach's alpha ranging from .79 to .95. Each survey factor explored as part of teacher job satisfaction follows.

Professional development. "Professional Development" encompasses survey questions in explaining the availability and quality of professional development learning opportunities. It includes 12 items with high reliability ($\alpha = .95$). Examples of items include: "professional development enhances teachers' ability to improve student learning" and professional development deepens teachers' content knowledge."

Teacher Leadership. "Teacher Leadership" refers to teacher involvement in decisions that impact classroom and school practices and includes items such as "teachers have an appropriate level of influence on decision making in this school." This scale includes eight items and is highly reliable ($\alpha = .93$).

Managing student conduct. "Managing Student Conduct" refers to policies and practices that address student conduct issues and ensure a safe school environment, including items such as "the faculty work in a school environment that is safe." It has seven items with high reliability ($\alpha = .89$).

Community Support and Involvement. "Community Support and Involvement" refers to community and parent/guardian communication and influence in the school. The nine-item factor includes such items as "parents/guardians are influential decision makers in this school" and "community members support teachers, contributing to their success with students." The scale is highly reliable ($\alpha = .89$).

Instructional practices and support. "Instructional Practices and Support" refers to data and support available to teachers to improve instruction and student learning. The seven item scale is reliable with a Cronbach's alpha of .79 and includes such items as "teachers are encouraged to try new things to improve instruction" and "teachers have autonomy to make decisions about instructional delivery."

Time. "Time" refers to the available time to plan, collaborate, provide instruction, and eliminate barriers in order to maximize instructional time during the school day. The seven item factor is reliable ($\alpha = .81$) and includes such items as "teachers have the time available to collaborate with colleagues" and "efforts are made to minimize the amount of routine paperwork teachers are required to do."

Facilities and resources. The "Facilities and Resources" factor explains the presence of critical resources such as technology, communication, office supplies, and instructional supplies. The ten-item factor is highly reliable (α=.88) and includes such items as "the reliability and speed of internet connections in this school are sufficient to support instructional practices" and "teachers have sufficient access to office equipment and supplies such as copy machines, paper, pens, etc." Survey items under each of these factors are listed in Appendix B.

Student achievement in English Language Arts and Mathematics. Two student achievement variables were used as the dependent variables in the analysis of the relationship between school leadership, teacher job satisfaction, and student achievement. These variables were defined by the percentage of students within each school scoring at the "Advanced" of "Proficient" level on the MCAS exam in English Language Arts or Mathematics in the spring of 2012. An overall school percentage of students scoring at the Advanced/Proficient for schools that contained MCAS exam results for more than one grade level were used. The English Language Arts and Mathematics variables were treated as continuous variables.

Other variables of interest. In addition to the four key variables, demographic variables at the school, principal, teacher levels were used as controls. They include:

- teacher characteristics: teaching experience, that is, the number of years teaching within the current school and total number of years teaching overall;
- school leadership characteristics: gender; race and ethnicity; total years as a principal in the current school, and total years of education experience;
- school characteristics: type (public or charter); level (elementary, middle,

secondary); total number of students; student to teacher ratio; and location
(urban or not urban); and,

- student characteristics: gender, race, and ethnicity; percentage of students from
low income families; percentage of students receiving special education
services; and percentage of students receiving English language learning
supports.

Analytical Methods

Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA),
Hierarchical Linear Modeling (HLM) and multiple regression have been used to
analyze secondary data in order to explore the extent to which school leadership,
teacher job satisfaction, and student achievement vary in relation to one another. The
following outlines analytical procedures by research question.

Research question one. In examining the question on the dimensions of
effective school leadership and teacher job satisfaction, both exploratory factor
analysis (EFA) and confirmatory factor analysis (CFA) were conducted on the survey
data set to determine whether the items selected represented empirically supported
constructs of school leadership and teacher job satisfaction. Although survey items
were reviewed by conceptual framework (see Tables 2 and 3), it was necessary to
examine whether the items are empirically supported by the data used in this study.
EFA provided empirically distinctive dimensions of school leadership and teacher job
satisfaction and CFA provided evidence on whether the data fit well with the
hypothesized model.

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In addition, reliability analyses were used to determine whether the dimensions were reliably measured by the survey questions. According to Mayer (1999), composite scales that combine items measuring the same latent construct rather than individual items present a more accurate and reliable picture.

Research question two. In examining the relationship between school leadership and teacher job satisfaction, Hierarchical Linear Model (HLM) was employed due to the hierarchical nature of the data, that is, teachers are nested within schools/leadership. Many researchers have identified the problems in using traditional models such as multiple regression or analysis of variance (ANOVA) for nested data and presented analytical models that deal with multilevel data (Raudenbush & Bryk, 2002). They include mixed models, random-effects models, and hierarchical linear models among others. Many statistical programs for multilevel data have also been developed, such as HLM, MPlus, SAS mixed procedure, and R (Zhang, 2005). This study utilizes a two-level HLM to answer research question two. The two-level model is described as follows:

- Level 1 - Teacher level:

    o dependent variables: Seven dimensions of teacher job satisfaction; and,

    o Teacher-level controls: years of teaching experience in current school; and years of teaching experience overall.

- Level 2 – School leadership/school level variables:

    o independent variable of interest: dimensions of school leadership;

- school leadership level controls: years of experience as a principal in current school; years of total educator experience; gender; race and ethnicity;

- school characteristic controls: school size, type, level, location, and student to teacher ratio; and,

- student characteristic controls summarized at the school level: percentage of low students from low income families; percentage of students receiving special education services; percentage of students receiving English language learning supports; percentage of students by gender, race, and ethnicity.

Research question three. Question three asks to what extent are school leadership and teacher job satisfaction related to student performance in English Language Arts and Mathematics. The relationship between school leadership, teacher job satisfaction, and student achievement was explored using multiple regression. While the best model would have been a three-level HLM where students are nested within teachers, who are then nested within schools (leadership), this was not plausible for this study, as individual student achievement data were not available. Instead, student achievement data were aggregated at the school level. Therefore, multiple regression was employed with student achievement data as dependent variables, school leadership and teacher job satisfaction as predictors, and specific student, teacher, and leadership characteristics as controls.

Summary

Chapter three presented the study's subjects, instruments, variables, measures, and analytical procedures. Examining secondary data provided by the MA ESE and NTC, this study uses a cross-sectional design to explore the existence of relationships between school leadership, teacher job satisfaction, and student achievement in a sample of 503 Massachusetts' public schools using survey response data from 17,357 teachers and student achievement data from 219,862 students. These 503 schools are representative of the larger Massachusetts' school population, as the schools included span the elementary to secondary level continuum, are located in urban and nonurban areas, and serve a diverse body of students, including students from low income families, students receiving English language learning supports, and students who are receiving special education services. The findings from this study represent an extension to the existing body of research investigating the relationships between school leadership, teacher job satisfaction, and student achievement and will inform future policy and program decisions related to the training, certification, recruitment, and selection of school leaders.

CHAPTER 4

FINDINGS

Chapter four presents the study's analyses and findings organized by research question. Research question one investigates the dimensions of school leadership and teacher job satisfaction using both exploratory and confirmatory factor analyses. I hypothesize that the data will support the dimensions described in the literature and conceptually aligned with the TELL Mass survey. Research question two investigates the extent to which school leadership dimensions and experience relate to teacher job satisfaction after controlling for various principal and school-level characteristics using a two-level hierarchical linear model. I hypothesize that school leadership is positively related to teacher job satisfaction after controlling for principal experience and other school level variables. Research question three investigates the extent to which school leadership and teacher job satisfaction are related to students' achievement in English Language Arts and Mathematics through the use of multiple regression. I hypothesize that school leadership and teacher job satisfaction are positively related to student achievement English Language Arts and Mathematics after controlling for student and school demographic characteristics. Chapter four closes with a summary of the findings.

Question One: The Dimensions of School Leadership and Teacher Job Satisfaction

School Leadership. A review of the literature on school leadership indicated that the dimensions of effective school leadership can be defined as the integration of three concepts: (1) expectations and accountability; (2) efficacy and support; and (3) engagement and stakeholder influences (Louis et al., 2010). Expectations and accountability refer to the ability of school leadership to frame, convey, and sustain the school's purpose and goals while maintaining high expectations for staff and students through the use of an accountability system that considers past performance trends and measures progress towards goals. Efficacy and support refers to the beliefs people hold about their own ability, or the ability of a group to succeed. School leadership can support teachers by encouraging proactive problem solving, fostering collaborative decision-making, aligning professional development to school goals, and buffering teachers from unnecessary tasks and duties that take away from instructional time (Louis et al., 2010). Engagement and stakeholder influences highlights effective leaders' understanding of the importance and influence of outside stakeholders and the extent to which outside stakeholder engagement can contribute to the school's ability to better support student achievement.

The TELL Mass survey included 11 questions related to teachers' perceptions of school leadership. Specifically, these items related to the two dimensions defined by Leithwood and colleagues: leaders' expectations and accountability, and efficacy and support (See Chapter 3, Table 2). Because the third leadership dimension, engagement and stakeholder influences, is based on leaders' engagement with

stakeholders outside of the school building, teachers' perceptions were not able to measure this concept accurately through the survey.

Although NTC conducted factor and reliability analyses for scale development, it is necessary to conduct these analyses with the achieved sample as it includes approximately 500 schools rather than over 1,000 schools included in the original data. The following presents results from exploratory factor analyses, confirmatory factor analyses, and reliability analyses of the school leadership factor from the TELL Mass survey conducted with the achieved sample. These analyses were conducted to determine if the factor, as constructed, represents the empirically supported construct of school leadership, specifically, the efficacy and support and expectations and accountability dimensions.

Exploratory factor analysis of school leadership. Two factors emerged from EFA using the principal component extraction and varimax rotation with the Eigenvalue greater than 1 rule. The two factor model explained approximately 60% of the total variance. Factor loadings are presented in Table 4.

Review of the survey items related to each factor provides empirical evidence of two of the three integrated dimensions of school leadership according to Leithwood and colleagues (Louis et al., 2010). Factor one items describe the efficacy and support piece of the framework, while factor two items describe the expectations and accountability piece. EFA provided empirical support for the conceptually-driven dimensions of school leadership.

Table 4. Factor Loadings for School Leadership	Component	
	1	2
q7.1b. There is an atmosphere of trust and mutual respect in this school	.856	.241
q7.1c. Teachers feel comfortable raising issues and concerns that are important to them	.841	.252
q7.1d. The school leadership consistently supports teachers	.799	.315
q7.1a. The faculty and leadership have a shared vision	.741	.297
q7.1k. The faculty are recognized for accomplishments	.593	.375
q7.1i. The procedures for teacher evaluation are consistent	.196	.777
q7.1g. Teacher performance is assessed objectively	.253	.771
q7.1h. Teachers receive feedback that can help them improve teaching	.278	.755
q7.1f. The school leadership facilitates using data to improve student learning	.231	.627
q7.1e. Teachers are held to high professional standards for delivering instruction	.266	.561
q7.1j. The school improvement team provides effective leadership at this school	.315	.502

Confirmatory factor analysis of school leadership. Confirmatory factor analysis was conducted to determine whether the hypothesized two factor model fit well with the achieved sample. Using MPlus version 6.0, two goodness-of-fit indices were examined to determine model fit: the comparative fit index (CFI) and the Tucker-Lewis index (TLI). Confirmatory factor analysis of the two factor model revealed a CFI of .955 and a TLI of .941. These results demonstrate that the two factor model of school leadership which includes efficacy and support and expectations and accountability is empirically valid, as a CFI and TLI of greater than .9 is generally

acceptable (Bentler & Bonett, 1980). Figure 6 presents the two factor model of school
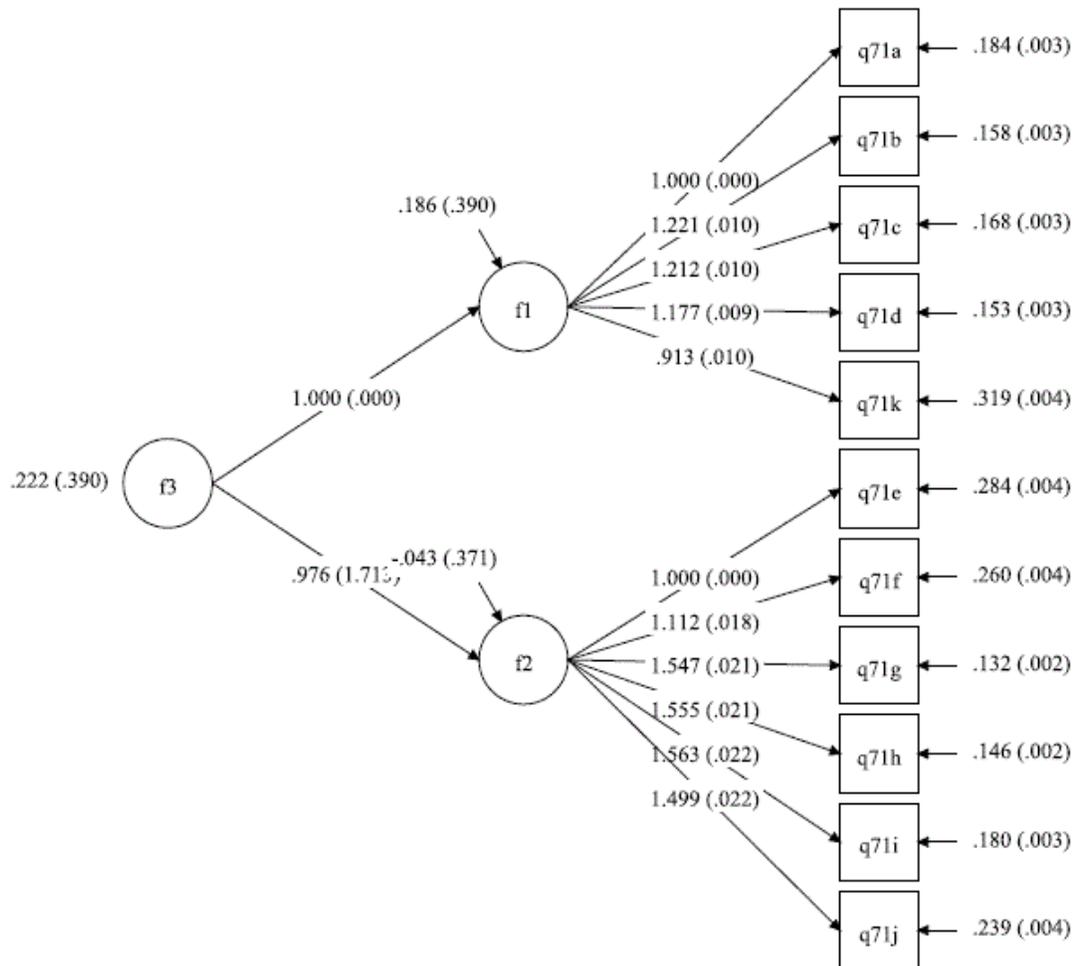
leadership.

Figure 6. Two factor model of school leadership

  Reliability analyses of school leadership factors. Reliability analyses were

used to determine whether the dimensions of school leadership were reliably measured

by the survey questions. According to Mayer (1999), composite scales that combine

items measuring the same latent construct rather than individual items present a more

accurate and reliable picture. Both factors were found to be highly reliable. Reliability

analyses of factor one, efficacy and support, revealed that the five items had a Cronbach's alpha of .882. Reliability analyses of factor two, expectations and accountability, revealed that the six items had a Cronbach's alpha of .801. Finally, reliability analyses of the total model had a Cronbach's alpha of .941. An alpha of .8 or higher is considered to be a good and reasonable goal for scale development (George & Mallery, 2003).

   Teacher Job Satisfaction. A review of the literature on teacher job satisfaction indicated three categories of satisfaction: extrinsic, intrinsic, and school-based (Dinham & Scott, 1998). The extrinsic category included such dimensions as promotion, pay, and benefits. The intrinsic category included satisfaction with one's own teaching performance, inclusion in school-level decision making, and opportunities for self-growth. The school-based category of dimensions included satisfaction with infrastructure; instructional supports and resources, and parental and community perceptions and support. The TELL Mass survey included sixty questions that comprise seven factors related to teacher job satisfaction: (1) professional development; (2) teacher leadership; (3) managing student conduct, (4) community support and involvement; (5) instructional practices and supports; (6) time; and (7) facilities and resources. Individual survey items related to each factor can be found in Appendix B.

   Exploratory factor analysis of the components of teacher job satisfaction. Several analyses of all sixty items related to teacher job satisfaction were run using the varimax rotation method with Kaiser Normalization. A seven factor model made the

most sense conceptually with greater interpretability that explained 51% of the total

variance. Table 5 presents factor loadings for each survey item.

Table 5. Factor Loadings for Teacher Job Satisfaction							
	Component						
	1	2	3	4	5	6	7
q8.1k. Professional development enhances teachers' ability to implement instructional strategies that meet diverse student learning needs	.769	.147	.085	.075	.123	.112	.090
q8.1l. Professional development enhances teachers' ability to improve student learning	.762	.160	.090	.077	.125	.102	.090
q8.1i. Professional development provides ongoing opportunities for teachers to work with colleagues to refine teaching practice	.730	.192	.101	.082	.118	.172	.039
q8.1f. Professional development deepens teachers' content knowledge	.724	.150	.075	.078	.140	.096	.020
q8.1h. In this school, follow up is provided from professional development	.698	.178	.080	.097	.124	.114	.053
q8.1e. Professional development is differentiated to meet the needs of individual teachers	.678	.133	.105	.090	.076	.145	.032
q8.1j. Professional development is evaluated and the results are communicated to teachers	.670	.173	.052	.106	.092	.129	.040
q8.1a. Sufficient resources are available for professional development in my school	.622	.083	.240	.090	.030	.161	.033
q8.1g. Teachers are encouraged to reflect on their own practice	.615	.208	.112	.071	.123	.069	.149
q8.1b. An appropriate amount of time is provided for professional development	.594	.054	.199	.055	.049	.214	.031
q8.1c. Professional development offerings are data driven	.550	.028	.060	.109	-.013	-.027	.188
q8.1d. Professional learning opportunities are aligned with the school's improvement plan	.483	.011	.056	.097	-.039	-.040	.217
q6.1c. Teachers are relied upon to make decisions about educational issues	.168	.759	.172	.137	.148	.202	.112

q6.1b. Teachers are trusted to make sound professional decisions about instruction	.132	.748	.200	.124	.159	.226	.149
q6.1a. Teachers are recognized as educational experts	.174	.711	.190	.149	.195	.191	.110
q6.1d. Teachers are encouraged to participate in school leadership roles	.199	.656	.162	.149	.152	.099	.127
q6.1g Teachers are effective leaders in this school	.193	.650	.133	.174	.238	.061	.148
q6.1e. The faculty has an effective process for making group decisions to solve problems	.268	.633	.128	.166	.235	.126	.047
q6.1f. In this school we take steps to solve problems	.234	.628	.153	.170	.322	.094	.087
q6.5 Teachers have an appropriate level of influence on decision making in this school	.220	.505	.085	.161	.123	.204	-.031
q3.1c. Teachers have access to reliable communication technology, including phones, faxes, and email.	.131	.108	.719	.100	.026	.112	.078
q3.1b. Teachers have sufficient access to instructional technology, including computers, printers, software and internet access.	.166	.059	.679	.097	.022	.165	.094
q3.1h. The physical environment of classrooms in this school supports teacher and learning	.067	.139	.675	.093	.226	.113	.070
q3.1g. Teachers have adequate space to work productively	.042	.126	.646	.047	.165	.176	.068
q3.1i. The reliability and speed of internet connections in this school are sufficient to support instructional practices	.157	.088	.626	.086	.035	.098	.010
q3.1d. Teachers have sufficient access to office equipment and supplies such as copy machines, paper, pens, etc.	.120	.125	.619	.129	.090	.211	.093
q3.1f. The school environment is clean and well maintained	.047	.099	.612	.108	.231	.052	.023
q3.1j. Teachers and staff work in a school that is environmentally healthy	.103	.176	.604	.149	.188	.091	.030
q3.1a. Teachers have sufficient access to appropriate instructional materials and resources	.180	.093	.528	.146	.088	.267	.168

q3.1e. Teachers have sufficient access to a broad range of professional personnel	.238	.141	.459	.149	.100	.265	.148
q4.1g. Parents/guardians support teachers, contributing to their success with students.	.086	.108	.110	.726	.154	.191	.035
q4.1e. Families help students achieve educational goals in this school	.065	.065	.092	.725	.143	.194	.052
q4.1f. Parents/guardians know what is going on in this school	.116	.131	.117	.701	.201	.080	.091
q4.1h. Community members support teachers, contributing to their success with students	.176	.151	.119	.660	.030	.115	.012
q4.1i. The community we serve is supportive of this school	.156	.160	.172	.627	.059	.100	.023
q4.1a. Parents/guardians are influential decision makers in this school	.036	.023	.046	.611	.009	.045	.095
q4.1b. This school maintains clear, two-way communication with the community	.144	.240	.170	.530	.220	.038	.136
q4.1c. This school does a good job of encouraging parent/guardian involvement	.137	.218	.141	.530	.218	-.012	.183
q4.1d. Teachers provide parents/guardians with useful information about student learning	.082	.097	.105	.425	.204	-.068	.291
q5.1c. Policies and procedures about student conduct are clearly understood by the faculty	.133	.182	.156	.092	.739	.086	.119
q5.1a. Students at this school understand expectations for their conduct	.085	.145	.169	.172	.738	.124	.106
q5.1d. School administrators consistent enforce rules for student conduct	.183	.281	.146	.153	.726	.166	.034
q5.1b. Students at this school follow rules of conduct	.057	.097	.179	.242	.694	.205	.055
q5.1e. School administrators support teachers efforts to maintain discipline in the classroom	.165	.336	.153	.135	.652	.194	.062
q5.1f. Teachers consistently enforce rules for student conduct	.125	.133	.079	.112	.600	-.017	.135
q5.1g. The faculty work in a school environment that is safe.	.065	.212	.306	.195	.561	.118	.150

q2.1d. The non-instructional time provided for teachers in my school is sufficient	.155	.151	.175	.065	.056	.666	.023
q2.1f. Teachers have sufficient instructional time to meet the needs of all students	.107	.056	.175	.107	.096	.628	.172
q2.1c. Teachers are allowed to focus on educating students with minimal interruptions	.104	.182	.192	.138	.234	.606	.061
q2.1a. Class sizes are reasonable such that teachers have the time available to meet the needs of all students	.070	.000	.226	.133	.069	.576	.094
q2.1e. Efforts are made to minimize the amount of routine paperwork teachers are required to do	.155	.285	.119	.110	.049	.556	.030
q2.1b. Teachers have the time available to collaborate with colleagues	.245	.135	.192	.039	.111	.539	-.021
q2.1g. Teachers are protected from duties that interfere with their essential role of educating students	.131	.247	.151	.043	.112	.533	.054
q9.1j. The curriculum taught in this school is aligned with Common Core standards	.130	.043	.061	.051	.047	.009	.661
q9.1k The curriculum taught meets the needs of students	.171	.117	.108	.150	.142	.213	.639
q9.1i. The faculty are committed to helping every student learn	.061	.086	.076	.071	.232	-.042	.613
q9.1l. Social services are available to ensure that all students are ready to learn	.153	.081	.127	.184	.061	.162	.444
q9.1f. Teachers are encouraged to try new things to improve instruction	.243	.344	.127	.091	.085	.174	.403
q9.1h. Teachers have autonomy to make decisions about instructional delivery (i.e. pacing, materials, and pedagogy)	.107	.333	.102	.112	-.045	.312	.382
q9.1g. Teachers are assigned classes that maximize their likelihood of success with students	.236	.196	.103	.166	.074	.295	.309

Factor loadings in Table 5 show that the items are highly loaded on factor one through six with small loadings on all the other factors. However, three items on factor seven double-loaded on other factors (q9.1f, q9.1g, and q9.1h). For example, q9.1g has the factor loading of .309 on factor seven, Instructional Practices and Support, but also has the factor loading of .295 on factor six, Time. Two of the items double load on Instructional Practices and Supports as well as Time, while the remaining double-loaded item loads on Instructional Practices and Supports and Teacher Leadership. These double-loaded items suggest that responses to these items may be inter-correlated. On a conceptual basis, I decided that these items belong to their respective factors. Table 6 presents reliability for the seven factors.

Table 6. Reliability of Seven Factors of Teacher Job Satisfaction		
Factor	Items (n)	Cronbach's Alpha (α)
1. Professional Development (q8.1a-8.1k)	12	.902
2. Teacher Leadership (q6.1a-6.1g, q6.5a)	8	.901
3. Facilities and Resources (q3.1a-j)	10	.872
4. Community Support and Involvement (q4.1a-4.1i)	9	.852
5. Managing Student Conduct (q5.1a-5.1g)	7	.886
6. Time (q2.1a-g)	7	.805
7. Instructional Practices and Supports (q9.1f-9.1l)	7	.724

The seven factor model aligned with NTC's seven factors, as factor one corresponds to Professional Development factor with twelve items. Factor two corresponds to the Teacher Leadership factor with eight items. Factor three

corresponds to the Facilities and Resources factor with ten items. Factor four corresponds to Community Support and Involvement factor with nine items. Factor five corresponds to the Managing Student Conduct factor with seven items. Factor six corresponds to the Time factor with seven items. Factor seven corresponds to Instructional Practices and Supports with seven items.

Confirmatory factor analysis of teacher job satisfaction. In order to determine how well the hypothesized seven factor model fit the data, confirmatory factor analysis was conducted using MPlus. CFA for the fully saturated model revealed a CFI of .844 and a TLI of .838. While this is a weak fit, the model itself is complex with sixty items and possible inter-correlations among items. After examining the modification indices provided by MPlus along with conceptual consideration, I allowed 14 pairs of residuals to be correlated. For example, 4.1b "this school maintains clear, two-way communication with the community" and 4.1c "this school does a good job of encouraging parent/guardian involvement" seemed to be correlated.

With correlated residuals allowed, the seven factor model provided a CFI of .913 and a TLI of .909 which are within ranges of good model fit (Hu & Bentler, 1999). In addressing the conceptual model presented by Brand and his colleagues, I also tested the model with 5 factors (see Table 3) where three NTC scales, Time, Facilities and Resources and Instructional Practices and Supports were combined into "instructional resources." Figure 7 shows the model with five factors (f2, f3, f4, f7 and a combination of f1, f5, f6) combined into total job satisfaction scale (f9). This model provided a CFI of .912 and a TLI of .908. Given these results, it can be concluded that

the model of teacher job satisfaction which includes intrinsic and school-based

influences is both conceptually and empirically valid.
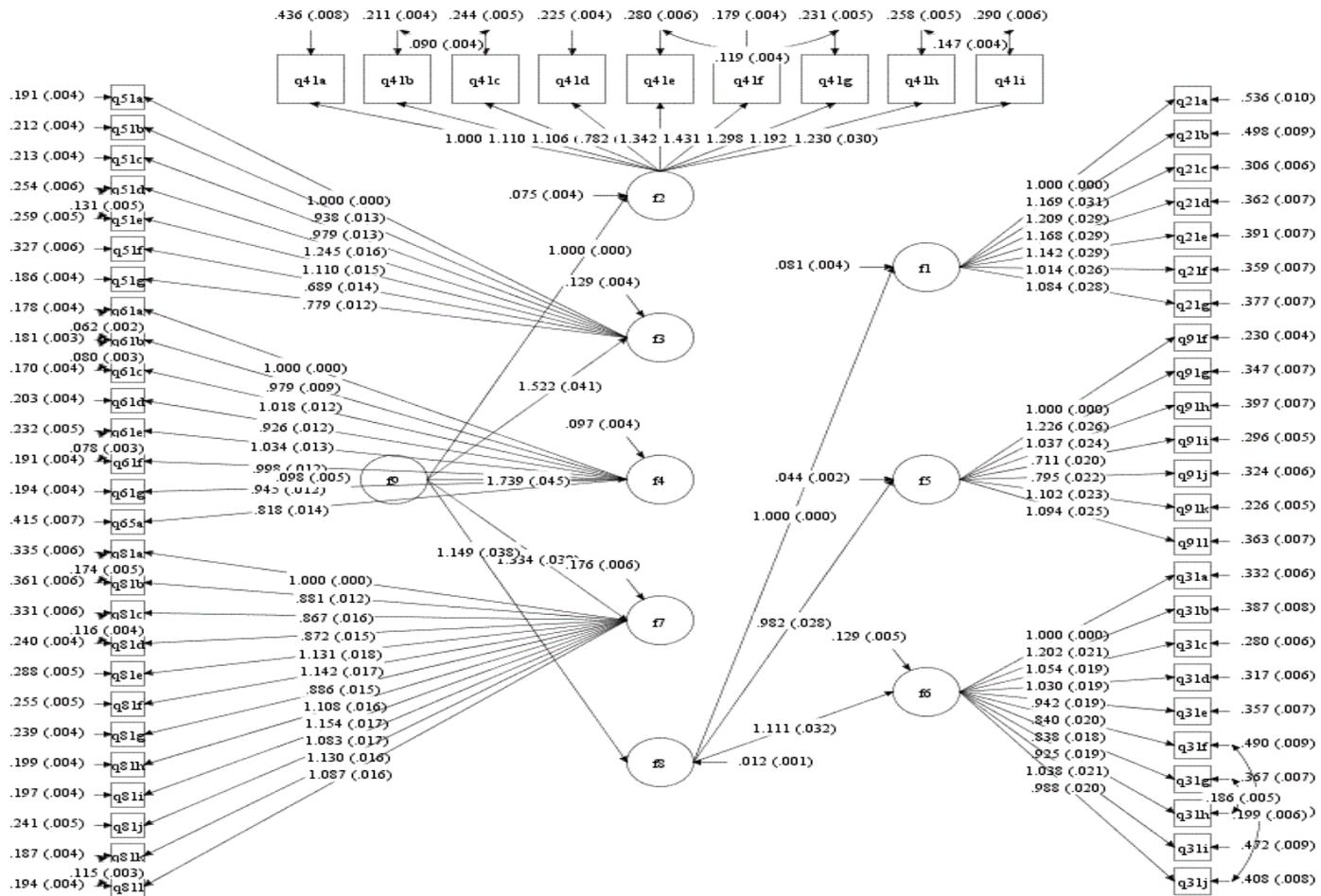
Figure 7. Five factor model of intrinsic and school-based influences on teacher job satisfaction

Reliability analyses of teacher job satisfaction. Table 7 presents the reliability

of the five CFA-confirmed factors related to teacher job satisfaction (TJS).

Table 7. Reliability Analyses of Teacher Job Satisfaction		
Factor	Items (n)	Cronbach's Alpha (α)
All Teacher Job Satisfaction Survey Items	60	.967
Professional Development Factor	12	.902
Teacher Leadership Factor	8	.901
Managing Student Conduct Factor	7	.886
Community Support and Involvement Factor	9	.852
Combined Factors of Instructional Practices and Supports, Facilities and Resources, and Time	24	.913

Reliability analyses revealed that in total, the 60 teacher job satisfaction survey items

had a Cronbach's alpha of .967. All CFA-confirmed factors were reliable to highly

reliable, with Cronbach's alpha ranged between .852 and .913 with the combined CFA

factor being the highest (.913) and 'community support and involvement' being the

lowest (.852).

Question Two: The Relationship between School Leadership and Teacher Job Satisfaction

In order to investigate the relationship between school leadership and teacher

job satisfaction, several HLM models were built and tested. In finding the "best fit"

model, the following models were examined in sequence: the unconditional model

with no predictors at both levels 1 and 2 (one-way ANOVA); a conditional model with

only level 1 predictors (random coefficients regression model); and a conditional

model with both levels 1 and 2 predictors (means-as-outcomes regression model).

Unconditional model of teacher job satisfaction. An unconditional model

was built and tested to begin the analysis of the relationship between school leadership

and teacher job satisfaction. The model is notated as:

Level 1:   Teacher Job Satisfaction $[TSJALLCO]_{ij} = \beta_{0j} + r_{ij}$

Level 2: $\beta_{0j} = \gamma_{00} + u_{0j}$

Combined: $TSJALLCO_{ij} = \gamma_{00} + u_{0j} + r_{ij}$

This baseline model partitions the total variance in teacher satisfaction into two

components: within- and between-school. The intercept parameter, γ_{00} indicates the

average response of all 16,918 teachers in 502 schools. On average, teachers tend to

agree with the items related to satisfaction using the following response scale: (1)

strongly disagree; (2) disagree; (3) agree; and (4) strongly agree. This model is similar

to one-way ANOVA where the group (school) differences are examined. However, the

HLM model provides more reliable estimates of group differences than traditional

one-way ANOVA as it specifies two separate levels (Bryk & Raudenbush, 2002). The

significance of the variance component ($\tau = .04913$, p<.001) denotes that there are

significant variances between schools indicating that a multilevel model is an

appropriate approach to investigating the relationship between leadership and school

level predictors and teacher job satisfaction. This unconditional model also provides

variance partitioning. The intraclass correlation coefficient, ICC, was calculated as

$.04913/(.04913 + .13132 = .18045) = .272$, indicating that 27% of the variance in the

composite scale of teacher job satisfaction lies between schools, while the remaining

73% is within schools. HLM also provides the reliability coefficient for the fixed effects. The reliability of the intercept (the only fixed effect in this model) was .91.

Random coefficient regression models of teacher job satisfaction with level 1 predictors. A random coefficient (RC) regression model was developed and run to test level 1 predictors: each responding teacher's (n=16,933) years of teaching experience in current school and overall. However, this model presented a multicollinearity problem as there was an extremely high correlation between years of teaching experience in current school and overall (r = .665, p<.00) and therefore it was not possible to use both variables in the model. I decided to use teaching experience in current school (*DML31YRS*).The model is notated as:

Level 1: $TSJALLCO_{ij} = \beta_{0j} + \beta_{1j}[DML31YRS_{ij}] + r_{ij}$

Level 2: $\beta_{0j} = \gamma_{00} + u_{0j}$

$\beta_{1j} = \gamma_{10}$

Combined: $TSJALLCO_{ij} = \gamma_{00} + \gamma_{10}DML31YRS_{ij} + u_{0j} + r_{ij}$

The model's reliability remained the same as the previous (α = .91). Results from the model indicated that σ^2 = .12941 and τ = .04932. This model provides information on how much variance within schools was explained by the level-1 predictor, teaching experience in current school here. With only one level 1 predictor, the model explained 1.5% of the within-school variance. This is not a strong model in explaining the variances within schools (1.5% of total 73%). While subsequent analyses would benefit from additional level 1 predictors to explain level 1variances, no other individual teacher characteristic data were available to add as additional level 1 predictors. Therefore, subsequent models were run with teaching years of experience

in current school as the only level 1 predictor. Table 8 presents findings of the

unconditional and final RC regression model side by side for comparison purposes.

Table 8. Comparison of Unconditional and Level 1Predictor Models				
	Model 1		Model 2	
Fixed Effect	Coeff.(s.e.)	t-ratio	Coeff.(s.e.)	t-ratio
Intercept (γ_{00})	2.86 (0.01)	276.49[**]	2.96 (0.01)	240.92[**]
Yrs current school (γ_{01})			- .03 (0.00)	-11.39[**]
Random Effect	Variance	χ^2	Variance	χ^2
Level 1 (u_0)	0.13132		0.12941	
Level 2 (r)	0.04911	6791.93[**]	0.04932	6766.64[**]
Variance	Partitioned		Explained	
Level 1	72.80%		1.5%	
Level 2	27.20%			
Deviance (df)	14929.30 (502)		14373.71 (502)	

**$p < .00$

Exploratory analysis of level 2 predictors on teacher job satisfaction. Prior

to developing and investigating the model of the relationship between school

leadership and teacher job satisfaction, thirteen level 2 variables were analyzed to

determine the extent to which they should be used as controls in the final model. The

level 2 potential controls fell into three categories and are as follows:

- School leadership level controls: years of experience as a principal overall

    [PRNTOTAL], experience as a principal in their current school

    [PRNSCHEX]; gender [PRINGEND]; and race/ethnicity [PRINRACE];

- School characteristic controls: traditional public or charter school

    [CHARTER]; school level (elementary, middle, or high) [SCHLVL]; total

number of teachers as proxy for school size [TOTALTCHRN]; student to

teacher ratio [STR]; and the district's designation as urban [URBANDIS]; and

- Student characteristic controls summarized at the school level: percentage of

white students as proxy for student diversity [WHITEPER]; percentage of

students from low income families [LOWINCOM]; percentage of students

receiving special education services [SPEDPER]; and percentage of students

receiving English language learning supports [ELLPER].

The model is notated as:

Level 1: $TSJALLCO_{ij} = \beta_{0j} + \beta_{1j}[DML31YRS_{ij}] + r_{ij}$

Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}[PRINGEND_j] + \gamma_{02}[PRINRACE_j] + \gamma_{03}[PRNTOTAL_j]$

$+ \gamma_{04}[PRNSCHEX_j] + \gamma_{05}[CHARTER_j] + \gamma_{06}[SCHLVL_j]$

$+ \gamma_{07}[TOTTCHRN_j] + \gamma_{08}[STR_j] + \gamma_{09}[URBANDIS_j] + \gamma_{010}[LOWINCOM_j]$

$+ \gamma_{011}[WHITEPER_j] + \gamma_{012}[ELLPER_j] + \gamma_{013}[SPEDPER_j] + u_{0j}$

$\beta_{1j} = \gamma_{10}$

Combined:

$TSJALLCO_{ij} = \gamma_{00} + \gamma_{01}PRINGEND_j + \gamma_{02}PRINRACE_j + \gamma_{03}PRNTOTAL_j$

$+ \gamma_{04}PRNSCHEX_j + \gamma_{05}CHARTER_j + \gamma_{06}SCHLVL_j + \gamma_{07}TOTTCHRN_j$

$+ \gamma_{08}STR_j + \gamma_{09}URBANDIS_j + \gamma_{010}LOWINCOM_j + \gamma_{011}WHITEPER_j$

$+ \gamma_{012}ELLPER_j + \gamma_{013}SPEDPER_j + \gamma_{10}DML31YRS_{ij} + u_{0j} + r_{ij}$

Table 9 presents the estimation of fixed effects for level 2 predictors.

Table 9. Satisfaction with Level 2 Predictors: Estimation of Fixed Effects

Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	3.461686	0.122885	28.170	489	<0.001
PRINGEND, γ_{01}	-0.007499	0.020134	-0.372	489	0.710
PRINRACE, γ_{02}	0.003017	0.004686	0.644	489	0.520
PRNTOTAL, γ_{03}	-0.003544	0.007813	-0.454	489	0.650
PRNSCHEX, γ_{04}	0.026470	0.008391	3.155	489	0.002**
CHARTER, γ_{05}	0.213178	0.059551	3.580	489	<0.001**
SCHLVL, γ_{06}	-0.011738	0.007422	-1.582	489	0.114
TOTTCHRN, γ_{07}	-0.001504	0.000478	-3.145	489	0.002**
STR, γ_{08}	-0.012058	0.004444	-2.713	489	0.007*
URBANDIS, γ_{09}	0.062211	0.038318	1.624	489	0.105
LOWINCOM, γ_{010}	-0.004340	0.000614	-7.064	489	<0.001**
WHITEPER, γ_{011}	-0.001768	0.000747	-2.367	489	0.018*
ELLPER, γ_{012}	0.002574	0.001213	2.122	489	0.034*
SPEDPER, γ_{013}	-0.001146	0.002046	-0.560	489	0.576
For DML31YRS slope, β_1					
INTRCPT2, γ_{10}	-0.026315	0.002294	-11.473	16017	<0.001

*$p < .05$, **$p < .00$

The above model does not model the slope parameter for DML31YRS slope. That is, DML31YRS slope was considered as fixed rather than random effect. Allowing the slope parameter to be random is one of the benefits of using multilevel modeling. However, I decided to fix the slope, as it is not of the primary interest of this research question and, allowing the slope to be random makes the estimates of the intercept, the primary interest of this research question, less reliable.

Review of the model with thirteen level 2 predictors indicated that only one principal characteristic, three school characteristics, and three aggregated student

characteristics significantly related to teacher job satisfaction. That is, as the

principal's years of experience in the school increased, so did teacher job satisfaction.

Working in a charter school related to increased levels of job satisfaction. Smaller

school size and smaller student-to-teacher ratios related to increased teacher job

satisfaction. Finally, lower percentages of students from low income families, higher

percentages of student diversity, and higher percentages of students receiving English

language learning supports also related to increased teacher job satisfaction; while

increased years of experience teaching in current school negatively relate to teacher

job satisfaction.

Among predictors on school demographics, again there was a problem of

multicollinearity as there were extremely high correlations between the four variables.

As the percentage of students from low income families is the most widely used

indicator for school socioeconomic status, I decided to include only that variable in the

final model.

Random intercept models of school leadership on teacher job satisfaction.

First, the relationship of school leadership factors (n=2) to overall teacher job

satisfaction was examined while controlling for one level 1 predictors and five level 2

predictors. For parsimony, only the statistically significant predictors were included in

the model. The model is notated as:

Level 1: $TSJALLCO_{ij} = \beta_{0j} + \beta_{1j}[DML31YRS_{ij}] + r_{ij}$

Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}[SLFQ7P1C_j] + \gamma_{02}[SLFQ7P2C_j] + \gamma_{03}[PRNSCHEX_j]$

$+ \gamma_{04}[CHARTER_j] + \gamma_{05}[TOTTCHRN_j] + \gamma_{06}[STR] + \gamma_{07}[LOWINCOM_j] + u_{0j}$

$\beta_{1j} = \gamma_{10}$

Combined: $TSJALLCO_{ij} = \gamma_{00} + \gamma_{01}SLFQ7P1C_j + \gamma_{02}SLFQ7P2C_j + \gamma_{03}PRNSCHEX_j$

$+ \gamma_{04}CHARTER_j + \gamma_{05}TOTTCHRN_j + \gamma_{06}STR_j + \gamma_{07}LOWINCOM_j$

$+ \gamma_{10}DML31YRS_{ij} + u_{0j} + r_{ij}$

Results from this model indicated that when factors related to school leadership were added, they also contributed significantly to teacher job satisfaction ($p < .00$). All level 2 controls gained significance with the exception of school size. School size as indicated by the total number of teachers was no longer a significant control variable ($p=.254$) and therefore was removed from subsequent analyses.

Two school leadership scales were statistically significant predictors of teacher job satisfaction, along with controls such as principal experience in current school, public or charter school, student to teacher ratio and percentage of students from low income families after the effect of teaching experience was accounted for. That is, both school leadership dimensions of efficacy and support, and expectation and accountability played an important role in teacher job satisfaction as teachers were more satisfied with their job when they perceived principal leadership more positively. Teachers were more satisfied when their principals had longer experience at their current school. Compared to public schools, teachers who were in charter schools were more satisfied. Teachers who had smaller student-to-teacher ratio were more satisfied and teachers in schools with lower percentages of students from low income families were more satisfied. Teaching experience was also a significant factor for job satisfaction, as teachers with more years of experience at their current school were less satisfied. The finding that teachers' reported levels of satisfaction decreased as their years of experience increased is an interesting finding in and of itself, which would

require more analyses to unpack. Seventy-nine percent of the variance between schools was explained as six predictors were added at level-2 (school-level) (see Model 3 in Table 10).

To determine how much variance was explained by the school leadership factors alone, a model was run of just these two level 2 predictors along with level 1 control teacher experience on teacher job satisfaction (Model 4 in Table 10). The model is notated as:

Level 1: $TSJALLCO_{ij} = \beta_{0j} + \beta_{1j}[DML31YRS_{ij}] + r_{ij}$

Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}[SLFQ7P1C_j] + \gamma_{02}[SLFQ7P2C_j] + u_{0j}$

$\beta_{1j} = \gamma_{10}$

Combined: $TSJALLCO_{ij} = \gamma_{00} + \gamma_{01}SLFQ7P1C_j + \gamma_{02}SLFQ7P2C_j$

$+ \gamma_{10}DML31YRS_{ij} + u_{0j} + r_{ij}$

This model showed that without control variables, two school leadership variables explained approximately 68% of the between-school variance. All other controls added 11% of the between-school variance explained. The coefficient for the Efficacy and Support School Leadership factor stays the same between the two models whereas the coefficient for the Expectations and Accountability was reduced by adding other controls. It appears that leadership's expectations and accountability shares more of the variance in teacher job satisfaction with other controls than leadership's efficacy and support.

Table 10. HLM Results of Four Models

	Model 1		Model 2		Model 3		Model 4	
Fixed Effect	Coeff.(s.e.)	t-ratio	Coeff.(s.e.)	t-ratio	Coeff.(s.e.)	t-ratio	Coeff.(s.e.)	t-ratio
Intercept (γ_{00})	2.86 (0.01)	276.49**	2.96 (0.01)	240.92**	1.26 (0.07)	17.11**	1.17 (0.08)	15.21**
SLFQ7P1C (γ_{01})					0.17 (0.02)	8.45**	0.21 (0.02)	8.97**
SLFQ7P2C (γ_{02})					0.43 (0.04)	11.46**	0.33 (0.04)	8.00**
PRNSCHEX (γ_{03})					0.02 (0.00)	4.50**		
CHARTER (γ_{04})					0.15 (0.03)	6.11**		
STR (γ_{05})					-0.01 (0.00)	-4.93**		
LOWINCOM (γ_{06})					-0.002 (.00)	-10.72**		
Teaching experience			-0.03 (0.00)	-11.39**	-0.03 (0.00)	-11.29**	-0.03 (0.00)	-10.99**
Random Effect			Variance	χ^2	Variance	χ^2	Variance	χ^2
Level 1 (u_0)	0.13132		0.12941		0.12945		0.12942	
Level 2 (r)	0.04911	6791.93**	0.04932	6766.64**	0.01015	1757.38**	0.01543	2473.47**
Variance	Partitioned		Partitioned		Explained		Explained	
Level 1	72.80%		72.41%					
Level 2	27.20%		27.59%		79.42%		68.71%	
Deviance (df)	14929.30 (502)		14373.71 (502)		13778.57 (496)		13890.56 (500)	

*$p < .05$, **$p < .01$

Question Three: The Relationships between School Leadership, Teacher Job Satisfaction, and Student Achievement

Question three asked how and to what extent are school leadership and teacher job satisfaction related to student achievement in English Language Arts and Mathematics. The relationships between these variables were explored using multiple regression instead of a three-level hierarchical model because student achievement data were available as aggregated at the school level only.

In this multiple regression analysis, student achievement in English Language Arts and Mathematics served as the dependent variables while the validated total composite scales of school leadership and teacher job satisfaction served as predictors. In the preliminary analyses, two dimensions of school leadership and seven dimensions of teacher job satisfaction were included but many of them had strong inter-correlations and therefore presented a problem of multicollinearity. To avoid this problem, only the total scores for school leadership and teacher job satisfaction were used here. All final MR analyses were conducted using the stepwise method in SPSS version 21.

Variance in achievement explained by school level variables. Similar to HLM analyses, the following variables were investigated as potential controls for multiple regression analyses:

- School size (total number of teachers as proxy), type (public or charter), level (elementary, middle, secondary), and location (urban or nonurban);

- Principal background characteristics including gender, race, and years of experience as principal in current school;

- Teachers' average years of teaching experience in current school;

- Student-to-teacher ratio;

- Percentage of courses taught by highly qualified teachers, that is teachers licensed in course subject area in which they are teaching; and,

- Percentage of students from low income families, as a proxy for school level demographics.

Among these, eight variables were selected to make the models consistent across content areas (Mathematics and English Language Arts, or ELA). For both Mathematics and ELA, the percentage of low income students, school level, and school type were significant factors that affected student achievement. For Mathematics, the number of teachers, student-to-teacher ratio and percentage of courses taught by teachers licensed in that content area were also significant factors. For ELA, principal's total years in current school was a significant factor. School means of teachers' years of experience in the current school were not significant for Mathematics or ELA. These analyses may indicate that class size measures, such as student-to-teacher ratio, have greater effect on students' mathematics achievement than ELA achievement, but more research is needed to unpack this. All together, these significant control variables explained 60% of the variance in Mathematics achievement and 77% of the variance in ELA achievement.

Variance in achievement explained by school leadership and teacher job satisfaction. Model 1 in Tables 12 and 13 include both total teacher job satisfaction and school leadership scales, in addition to school controls. For both mathematics and ELA, teacher job satisfaction had significant positive effects on student achievement.

That is, when teachers reported higher job satisfaction overall, students did better on MCAS tests in Mathematics and ELA, clearly supporting the link between teacher job satisfaction and student achievement. However, when both teacher job satisfaction and school leadership scales were entered, school leadership turned out to be statistically insignificant in the negative direction. In answering research question two, it was established that school leadership had significant effects on teacher job satisfaction. Insignificant negative coefficients for school leadership may have come from the fact that leadership has indirect effect on student achievement through teacher job satisfaction. Or, it may be an artifact of multicollinearity between the two variables.

To test the multicollinearity hypothesis, Models 2 and 3 in tables 11 and 12 included teacher job satisfaction and school leadership separately. The second models include only teacher job satisfaction and the third models include only school leadership. When entered separately, both teacher job satisfaction and school leadership were significant factors for student achievement in both mathematics and ELA. School leadership became a statistically significant factor in the positive direction in the third models. Comparing the second to the third models, teacher job satisfaction explained more variance in student achievement than school leadership: 4.2% compared to 2.5% for Mathematics and 2.2% compared to 1.2% for ELA. When the correlation between the two variables was examined, it was .799. Therefore they share 64% of the variance. Based on these findings, the models including teacher job satisfaction (Model 2) are assumed to be the best fitting models, as they explained 64% of the variance in Mathematics achievement and 79% of the variance in ELA achievement. However, it is important to note that while the models excluding school

leadership were the best fitting models to explain variance in achievement, school

leadership was still found to have a significant relationship to students' achievement in

both Mathematics and ELA.

Table 12. Multiple Regression Results for Mathematics

	Mathematics								
	Model 1 TJS & SL			Model 2 TJS Only			Model 3 SL Only		
Variable	B	SE B	β	B	SE B	β	B	SE B	B
Block 1									
Constant	-25.20	14.62		-24.40	14.57		.22	14.00	
Low Income	-.42	.02	-.65**	-.42	.02	-.70**	-.45	.02	-.71**
SchLvl	1.91	.36	.21**	1.94	.36	.21**	1.95	.37	.21**
Charter	7.84	2.60	.09**	8.13	2.57	.09**	10.73	2.59	.12**
Num Tchrs	.09	.03	.12**	.09	.03	.12**	.09	.03	.13**
Prin Yrs Tot	.03	.35	.003	.06	.35	.005	.23	.36	.02
HQ course	.34	.12	.08**	.34	.12	.08**	.32	.12	.08*
ST ratio	.60	.20	.09**	.57	.20	.09**	.36	.20	.05
Block 2									
TSJALL	19.03	3.86	.25**	16.65	2.19	.22**			
SLFALL	-1.97	2.61	-.03				8.65	1.52	.17**
R^2	Block 1 .599		Block 2 .642	Block 1 .599		Block 2 .641	Block 1 .599		Block 2 .624

$^*p < .05$ $^{**}p < .01$

Table 13. *Multiple Regression Results for ELA*								
	English Language Arts							
	Model 1 TJS & SL			Model 2 TJS Only			Model 3 SL Only		
Variable	B	SE B	β	B	SE B	β	B	SE B	B
Block 1									
Constant	11.26	11.60		12.09	11.57		31.38	11.11	
Low Income	-.45	.02	-.68**	-.46	.02	-.69**	-.58	.02	-.72**
Sch Lvl	4.40	.29	.45**	4.43	.28	.46**	4.43	.29	.46**
Charter	9.61	2.06	.10**	9.91	2.04	.11**	11.89	2.06	.13**
Num Tchrs	.02	.02	.03	.02	.02	.03	.02	.02	.03
Prin Yrs Tot	.58	.28	.04*	.61	.28	.05*	.74	.28	.06**
HQ courses	.14	.10	.03	.14	.10	.03	.12	.10	.03
ST ratio	.29	.16	.04	.25	.16	.04	.09	.16	.01
Block 2									
TSJALL	15.06	3.06	.19**	12.60	1.74	.16**			
SLFALL	-2.03	2.08	-.04				6.37	1.21	.12**
R^2	Block 1	Block 2		Block 1	Block 2		Block 1	Block 2	
	.769	.792		.769	.791		.769	.781	

*$p < .05$ **$p < .01$

Summary

Chapter four presented the analyses and findings related to the three research questions included in this study. First, EFA, CFA, and reliability analyses determined that the survey scales of the school leadership dimensions of efficacy and support and expectations and accountability were valid and reliable. However, the original seven factor model of teacher job satisfaction was reduced to a five factor model based on CFA results. Second, HLM analyses confirmed the significant relationship of the two dimensions of school leadership to overall teacher job satisfaction. With the addition of teacher and school level controls, the final model accounted for 79.42% of the variance in teacher job satisfaction. Finally, multiple regression analyses confirmed the significant relationships of the teacher job satisfaction and school leadership scales to student achievement in ELA and Mathematics when school and student-level

predictors were controlled. While significant school- and student-level controls accounted for 76.9% of the variance in student achievement in ELA and 59.9% of the achievement in Mathematics, teacher job satisfaction increased these percentages by 2.2% and 4.2% respectively to present the best fitting models.

CHAPTER 5

CONCLUSION

The purpose of this study was to define school leadership and teacher job satisfaction and investigate their relationships to each other and to student achievement in English Language Arts and Mathematics. Within the school, leaders are one level removed from direct instruction of students, as they interact more frequently with administrators and teachers than with students on a day-to-day basis. However, school leaders do directly impact the organizational conditions of the school in which instruction is carried out be classroom teachers.

This study examined the hypothesis that school leadership and student achievement are related, though this relationship is mediated by teacher action in the classroom which is related to teacher job satisfaction. The study suggested that effective school leadership leads to a more satisfying context, which leads to more job satisfaction among teachers, thereby strengthening their commitment to their work and to implementing classroom and instructional strategies that support students' learning and achievement. Correlational in nature, the results of this study presented the strength of the relationships between the operational constructs of school leadership, teacher job satisfaction, and student achievement. The following three questions guided the study:

1. What are the dimensions of effective school leadership and teacher job satisfaction?

2. To what extent is school leadership related to teacher job satisfaction after controlling for principal experience; principal demographics, such as gender, race, and ethnicity; school characteristics; and student characteristics?

3. To what extent are school leadership and teacher job satisfaction related to student achievement in English Language Arts and Mathematics after controlling for school leader, school, teacher, and student characteristics?

Dimensions of School Leadership and Teacher Job Satisfaction

A review of the literature on school leadership indicated that the dimensions of effective school leadership can be defined as the integration of three concepts: (1) expectations and accountability; (2) efficacy and support; and (3) engagement and stakeholder influences (Louis et al., 2010). The TELL Mass survey included 11 questions related to teachers' perceptions of school leadership. Specifically, two of the three dimensions defined by Leithwood and colleagues: leaders' expectations and accountability, and efficacy and support could be measured through the survey. Because the third leadership dimension, engagement and stakeholder influences, is based on leaders' engagement with stakeholders outside of the school building, teachers' perceptions were not able to measure this concept accurately through the survey. It is important to note that since individuals tend to respond to surveys about their individual behavior with a degree of social desirability, use of teachers' perceptions of school leadership can be considered a stronger measure than principals' self-reported evaluation. Specifically, the dimensions of school leadership can be captured more accurately by the aggregated perceptions of teachers. Use of teacher

perception of school leadership, rather than principals' self-reported behavior is one of the strengths of this study.

Two factors emerged from exploratory factor analyses (EFA). The two factor model aligned conceptually with the two dimensions of school leadership: efficacy and support and expectations and accountability. Together, these two factors explained approximately 60% of the total variance in school leadership as measured through the survey.

Confirmatory factor analysis (CFA) using MPlus showed the data fit well with the hypothesized two factor model (a CFI of .955 and a TLI of .943). EFA and CFA showed that the two factors were empirically distinct and valid. Both the efficacy and support scale and the expectations and accountability scale were reliable (α = .882, 801, respectively). The combined total scale based on 11 items had a Cronbach's alpha of .94.

In addition, the TELL Mass survey included sixty questions that related to intrinsic and school-based job satisfaction of the teachers (Dinham and Scott, 1998). Among various EFA modes, a seven factor model made most sense conceptually. This model included: (1) professional development; (2) teacher leadership; (3) managing student conduct, (4) community support and involvement; (5) instructional practices and supports; (6) time; and (7) facilities and resources. Factors one, two, and, three were aligned with intrinsic influences and factors four through seven were aligned with school-based influences (Dinham and Scott, 1998). All factors were also aligned with the five factor model by Brand et al. (2008). Therefore, to reduce the complexity of the model factors five, six, and seven were combined into one (see Table 3).

The CFA of the five factor model showed acceptable goodness-of-fit (CFI of .912 and TLI of .908). Finally, additional analyses confirmed the reliability of the scales, as the Cronbach's alphas of each factor ranged from .852 and .913. The combined total scale with 60 items was also reliable ($\alpha = .97$).

Relationships between School Leadership and Teacher Job Satisfaction

Using HLM, several models were built and tested in order to investigate the relationship between school leadership and teacher job satisfaction. Analyses revealed that the two school leadership factors (efficacy and support, expectations and accountability) were statistically significant predictors of teacher job satisfaction, along with such significant controls as principal experience in current school, the type of school (traditional public or charter), student-to-teacher ratio, and the percentage of students from low income families after the effect of teaching experience was accounted for. That is, teachers reported higher levels of job satisfaction when leadership remained consistent, when teaching in a charter school rather than a traditional public school, when the ratio of students to teachers was lower, and finally, when fewer students were from low income families. Both efficacy and support and expectation and accountability were found to play an important role in teacher job satisfaction, as teachers were more satisfied with their job when they perceived school leadership more positively in each dimension.

The unconditional HLM model revealed that approximately 28% of the variance in teacher job satisfaction was between schools. Considering the fact that between school variances on many affective variables are less than 15%, this shows

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that school policies and practices can make big differences in job satisfaction of their teachers (Willms, 1992).

This was also confirmed by the subsequent conditional models. The two school leadership factors alone explained approximately 68% of the between-school variance (68% of the 28% between school variances). That is, teachers' perception of school leadership alone explained approximately 19% of the total variance in teacher job satisfaction. Four school level controls added 11% of the between-school variance explained.

Relationships between School Leadership, Teacher Job Satisfaction, and Student Achievement

Using hierarchical multiple regression analysis, student achievement in English Language Arts (ELA) and mathematics were set as dependent variables while the total school leadership scale and the total teacher job satisfaction scale served as the predictors of interests along with eight student, principal, and school-level control variables: the percentage of students from low income families, school level, school type, school size, student-to-teacher ratio; percentage of courses taught by teachers licensed in that content area; and principal's total years in current school. These control variables were found to have significant effects on student achievement. Specifically, secondary level charter schools with fewer students from low income families tended to have students who performed better on both the mathematics and ELA MCAS exams than their counterparts. Additionally, smaller ratios of students to teachers, increased percentages of certified teachers in their content area, and larger

numbers of teaching staff overall, tended to have positive effects on students' performance on the mathematics MCAS exam. Finally, schools with principals who had been in the school longer, tended to have positive effects on students' performance on the ELA MCAS exam.

For both mathematics and ELA, teacher job satisfaction had significant positive effects on student achievement, supporting the link between teacher job satisfaction and student achievement. However, when both teacher job satisfaction and school leadership total scales were examined simultaneously in the model, school leadership turned out to be statistically insignificant in the negative direction. When modeled separately, both teacher job satisfaction and school leadership had significantly positive effects on student achievement in both mathematics and ELA. In other words, school leadership had significant positive effects on student achievement when it was entered alone but when it was entered along with teacher job satisfaction, it was not a significant predictor over and above the effects of job satisfaction. It appears that the effects of school leadership on student achievements are mediated by teacher job satisfaction. This finding supports the previous research (Dinham, 2005; Griffith, 2003; Guin, 2004; and Ronfeldt et al., 2012).

Both school leadership and teacher job satisfaction explained an additional 2% to 5% of the variances in student achievements in mathematics and ELA compared to the 60% to 77%, respectively explained by school and student demographics controls. This is not a surprising finding, as the multiple regressions do not account for nested structures like HLM can. That is, school policy and practice variables tend to explain

only the small proportion of variances in aggregated data (Burstein, 1980). This is one of the limitations of this study.

Limitations and Generalizability of the Study

While the strength of this study's design was grounded in the large data set, specifically school level data from 503 schools and teacher survey data from over 17,000 teachers; and the use of hierarchical linear modeling to account for a multi-level data when investigating the relationship of school leadership and teacher job satisfaction; this study was not without limitations. Specifically, the design was limited by the type of data available and the design's correlational and cross-sectional nature.

While use of survey data to investigate dimensions of school leadership and teacher job satisfaction allowed for a large sample size, self-reported data is not without weaknesses. Specifically, survey respondents may respond in ways that are "socially desirable." That is, their responses may reflect, in part, what they think the survey administrator would like to be reported (Dillman, Smyth, & Christian, 2009). Within this study, the impact of social desirability was limited, as teachers' perceptions of school leaders were used as the indicator of school leadership, rather than school leaders' self-reported practices. In addition, teacher job satisfaction was analyzed at the school-level, therefore the mean of ten or more teachers was used to indicate overall satisfaction, as opposed to one teacher's response.

The use of secondary data limited the researcher's ability to investigate all dimensions of the school leadership and teacher job satisfaction frameworks.

Specifically, using a pre-existing survey and its collected data as is, did not allow for modifications or additional data collection. However, use of the pre-existing survey also served as a strength of the study, as the instrument had already been piloted, refined, and tested for validity and reliability.

The cross-section correlational design of the study used data from one point in time: the 2011-12 school year, and explored relationships between Massachusetts' school leaders, teachers, and student achievement. In doing so, findings represent relationships between these variables during the 2011-12 year only. These findings are not able to suggest future trends in these relationships nor are they able to suggest causality. A longitudinal study, whereby data could be examined over time to identify trends, is a much stronger indicator of the strength of relationships. Furthermore, an experimental or quasi-experimental design could have drawn conclusions related to causality.

The design was also limited by the level at which survey and student achievement data were available. Specifically, student achievement data were reported at the school-level, not the individual student-level, and therefore could not be connected to individual teachers. In addition, given the anonymity of teacher survey responses, even if individual student achievement data were available, it would have been impossible to link the students to their specific teachers. Therefore, HLM analyses were limited to two-level models and the analyses of the relationship between school leadership and teacher job satisfaction, as it was not possible to nest specific students under specific teachers.

Finally, while the data available allow for conclusions that are representative

of the state of Massachusetts, generalization to other states is limited. The United States Department of Education sets policy and regulation nationally; however, states are granted the power to customize their individual educational systems beyond national policy and regulation. This customization impacts the context in which education takes place as well as to some extent, how the state reports student outcomes. For example, states can measure student achievement by their choice of assessment system. Additionally, states have the authority to develop and implement additional student achievement requirements for graduation beyond the national minimum. As such, the state of Massachusetts developed and implemented the MCAS system. Massachusetts' students take MCAS exams throughout their public education career in English Language Arts, Mathematics, and Science (grades 3, 4, 5, 6, 7, 8 and 10). However, the tenth grade MCAS exams is considered "high stakes," as students must score a minimum of 220 on the tenth grade MCAS exams in English Language Arts and Mathematics to be eligible to graduate from high school (MA ESE, n.d.b).

Implications

This study provides additional evidence regarding the importance of seeking and cultivating effective school leaders. Specifically, findings from this study indicate that the school leadership dimensions of efficacy and support and expectations and accountability significantly relate to teacher job satisfaction and student achievement. Findings from this study are of interest to education policy makers, education leadership preparation program leaders, and school district leaders. Specifically, policy makers and program leaders can use Leithwood and colleagues' (Louis et al.,

2010) effective leadership framework to define the qualities and skills they wish to cultivate and/or seek in school leaders.

Oftentimes, school leader job descriptions and preparation programs focus more on previous experience in the education system in various roles, familiarity with and development of skills related to business operations such as budgets and knowledge of rules and regulations. However, knowledge and skills in these areas do not directly translate to increased levels of teacher job satisfaction which is related to increased levels of student achievement, the intended outcome of the system. Policy and preparation programs would benefit from focusing more directly on the soft skills outlined in Louis and colleagues' (2010) framework. That is, directly cultivating leaders' ability to share a vision and specific goals for his or her school; get faculty to buy in and commit to ways of working; create a climate in which teaching staff feel empowered; and hold teaching staff accountable for higher standards of teaching while creating the space and teachers to feel safe to try new things.

In terms of future research implications, the sample size, methodological approach, and results from this study should be considered when developing future research in this area. The findings from this study could be validated and strengthened if future research could include individual student-level achievement data that could be connected to specific teachers. Additionally, a survey, or other data sources that include information related to school leaders' capacity in the area of engagement and stakeholder influence, and extrinsic influences on teacher job satisfaction could test the full model of the school leadership and teacher job satisfaction relationships to student achievement.

Conclusion

Results from this study with large scale data and more appropriate analytical methods provided the needed empirical supports for the previous research in school leadership and student achievement. Both school leadership and job satisfaction have distinct dimensions aligned with prior research (Brand et al., 2008; Dinham & Scott, 1998; and Louis et al., 2012). When teachers perceived their school leadership more positively, they were more satisfied with their job. Large proportion of variances in job satisfaction lay in between schools, indicating school leadership and its influence on school policies and practices can make big differences in teacher job satisfaction regardless of school type, level, size, and the diversity of its students. More importantly, this study provided the empirical evidence that links school leadership and student achievement. Based on over 17,000 teachers in 503 schools, this study showed that schools with more satisfied teachers had students who performed better on standardized tests in mathematics and English Language Arts after controlling for school and student characteristics such as size, affluence, and diversity. School leadership had significant indirect effects on student achievement mediated by teacher job satisfaction. Therefore, effective school leadership creates a school climate where teachers feel more appreciated and autonomous, which in turn, influences student academic performance. This clearly shows the contribution of effective school leadership to student achievement.

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ADDITIONAL INFORMATION REGARDING THE TELL MASS SURVEY AND

MASSACHUSETTS COMPREHENSIVE ASSESSMENT SYSTEM

The following provides additional information regarding development,

validity, and reliability of two of the study's main data collection instruments: the

TELL Mass survey and Massachusetts Comprehensive Assessment System.

TELL Mass Survey

In 2011, the Massachusetts Department of Elementary and Secondary

Education (MA ESE) contracted with the New Teacher Center (NTC), a national non-

profit focused on school effectiveness, to administer NTC's Teaching and Learning

Conditions survey to all 80,901 school-based licensed educators in the state (NTC,

2012). For the Massachusetts administration, NTC's survey was enhanced and re-

titled as the *Teaching, Empowering, Leading, and Learning in Massachusetts*, or

TELL Mass survey. School level survey results are available through the TELL Mass

website (http://www.tellmass.org/reports).

Survey content. The TELL Mass survey consists of 182-questions, of which

40 questions form the basis for NTC's eight research-based constructs:

1. Time – available for teachers to plan, collaborate and instruct (7 questions).

2. Facilities and Resources – availability of school resources related to

    instruction and technology (10 questions).

3. Community Support and Involvement – communication with parents/guardians as well as the larger community and the extent to which these parties have influence in the school (9 questions).

4. Managing Student Conduct – the existence of school policies and practices that address student behavior and ensure the safety school staff and students (7 questions).

5. Teacher Leadership – the extent to which are involved in school-level decision making that impacts classroom and school practices (8 questions).

6. School Leadership – the extent to which school leaders can create a supportive teaching and learning environment while addressing teacher concerns (11 questions).

7. Professional Development – availability and quality of professional learning opportunities for teachers (12 questions).

8. Instructional Practices and Supports – availability of data and support focused on improving instruction and student learning (7 questions).

Validity and reliability. According to the New Teachers Center's Validity and Reliability Research Brief (2012b) the survey's content validity is based on a 2001 literature review of teacher working conditions and evidence of the extent to which these conditions contributed to teacher dissatisfaction, mobility and, attrition. In addition to the literature review, the New Teacher Center also analyzed data from working conditions related items on the National Center for Education Statistics' School and Staffing Survey (SASS). Since 2004, many states have administered the New Teacher Center's survey. Over time, the survey has been revised and refined

based on results and feedback.

In terms of construct validity, the American Institute for Research (AIR) conducted an exploratory factor analysis of the survey data from 400,000 educators. The exploratory factor analysis revealed 11 factors, explaining 64% of the variance. Using confirmatory factor analysis, AIR found that the survey's eight constructs presented above, explained 51% of the variance (NTC, 2012b).

Lastly, the New Teacher Center has tested the reliability of the constructs using the TELL Mass data specifically. Cronbach's alphas were calculated for each of the eight constructs. Results from the calculations revealed that the constructs are reliable within the TELL Mass data, as all eight constructs had alphas above 0.789 (NTC, 2012b).

Massachusetts Comprehensive Assessment System (MCAS)

Students in Massachusetts' public schools are assessed in reading in grade 3; English Language Arts and Mathematics in grades 3, 4, 5, 6, 7, 8, and 10; and Science and Technology in grades 5, 8, and 10 through the Massachusetts Comprehensive Assessment System (MA ESE, n.d.c). According to the MA ESE:

> The primary inferences drawn from the MCAS test results are conclusions about the level of students' achievement of the standards contained in the Massachusetts Curriculum Frameworks. Therefore, the MCAS tests are custom-designed to support those conclusions. All items included on the MCAS tests are written to measure performance based on standards contained in the Curriculum Frameworks. Equally

important, virtually all standards contained in the Curriculum

Frameworks are measured by items on the MCAS tests (MA ESE,

2008, p.5).

Content and format. 2012 MCAS student achievement data are available at

the school level for 1,652 schools through the MA ESE Profiles website,

http://profiles.doe.mass.edu/. Data are reported for all students as well as sub-

populations of students, such as students receiving special education and students

receiving English language instruction. Data are also available at the school level by

students' gender, race, ethnicity, and socio-economic status. MA ESE reports the total

number of students tested at a specific grade level for each subject area, as well as the

percentage of students scoring within each of the following four achievement

categories:

- Advanced,

- Proficient,

- Needs Improvement, and

- Warning/Failing.

Validity and reliability. In 2002, the MA ESE contracted with the UMass

Center for Educational Assessment to study the system. Since 2003, the Center has

conducted over 20 studies testing the ongoing validity and reliability of the MCAS

exams (UMass Center for Educational Assessment, n.d.). Results from the Center's

2005 validity study concluded that the MCAS was both valid and reliable when

compared to the National Assessment of Educational Progress (NAEP), the national

assessment system (UMass Center for Educational Assessment, 2005).

NEW TEACHER CENTER'S TELL MASS SURVEY FACTORS RELATED TO

TEACHER JOB SATISFACTION

The tables below present the New Teacher Center's seven survey factors that

relate to teacher job satisfaction as described in the literature: Professional

Development; Teacher Leadership; Managing Student Conduct; Community Support

and Involvement; Instructional Practices and Support; Time; and Facilities and

Resources.

Table B1. Survey Items related to NTC' s Time Factor (α=.807)	
Q#	Question
2.1a	Class sizes are reasonable such that teachers have the time available to meet the needs of all students
2.1b	Teachers have the time available to collaborate with colleagues
2.1c	Teachers are allowed to focus on educating students with minimal interruptions
2.1d	The non-instructional time provided for teachers in my school is sufficient
2.1e	Efforts are made to minimize the amount of routine paperwork teachers are required to do
2.1f	Teachers have sufficient instructional time to meet the needs of all students
2.1g	Teachers are protected from duties that interfere with their essential role of educating students

Table B2.Survey Items related to NTC' s Facilities and Resources Factor (α=.882)

Q#	Question
3.1a	Teachers have sufficient access to appropriate instructional materials and resources
3.1b	Teachers have sufficient access to instructional technology, including computers, printers, software and internet access.
3.1c	Teachers have access to reliable communication technology, including phones, faxes, and email.
3.1d	Teachers have sufficient access to office equipment and supplies such as copy machines, paper, pens, etc.
3.1e	Teachers have sufficient access to a broad range of professional personnel
3.1f	The school environment is clean and well maintained
3.1g	Teachers have adequate space to work productively
3,1h	The physical environment of classrooms in this school supports teacher and learning
3.1i	The reliability and speed of internet connections in this school are sufficient to support instructional practices
3.1j	Teachers and staff work in a school that is environmentally healthy

Table B3. Survey Items related to NTC's Community Support and Involvement Factor (α=.888)

Q#	Question
4.1a	Parents/guardians are influential decision makers in this school
4.1b	This school maintains clear, two-way communication with the community
4.1c	This school does a good job of encouraging parent/guardian involvement
4.1d	Teachers provide parents/guardians with useful information about student learning
4.1e	Families help students achieve educational goals in this school
4.1f	Parents/guardians know what is going on in this school
4.1g	Parents/guardians support teachers, contributing to their success with students.
4.1h	Community members support teachers, contributing to their success with students
4.1i	The community we serve is supportive of this school

	Table B4. Survey Items related to NTC's Managing Student Conduct Factor (α=.894)
Q#	Question
5.1a	Students at this school understand expectations for their conduct
5.1b	Students at this school follow rules of conduct
5.1c	Policies and procedures about student conduct are clearly understood by the faculty
5.1d	School administrators consistent enforce rules for student conduct
5.1e	School administrators support teachers efforts to maintain discipline in the classroom
5.1f	Teachers consistently enforce rules for student conduct
5.1g	The faculty work in a school environment that is safe.

	Table B5. Survey Items related to NTC's Teacher Leadership Factor (α=.928)
Q#	Question
6.1a	Teachers are recognized as educational experts
6.1b	Teachers are trusted to make sound professional decisions about instruction
6.1c	Teachers are relied upon to make decisions about educational issues
6.1d	Teachers are encouraged to participate in school leadership roles
6.1e	The faculty has an effective process for making group decisions to solve problems
6.1f	In this school we take steps to solve problems
6.1g	Teachers are effective leaders in this school
6.5	Teachers have an appropriate level of influence on decision making in this school

Q#	Question
	Table B6. Survey Items related to NTC's Professional Development Factor (α=.946)
8.1a	Sufficient resources are available for professional development in my school
8.1b	An appropriate amount of time is provided for professional development
8.1c	Professional development offerings are data driven
8.1d	Professional learning opportunities are aligned with the school's improvement plan
8.1e	Professional development is differentiated to meet the needs of individual teachers
8.1f	Professional development deepens teachers' content knowledge
8.1g	Teachers are encouraged to reflect on their own practice
8.1h	In this school, follow up is provided from professional development
8.1i	Professional development provides ongoing opportunities for teachers to work with colleagues to refine teaching practice
8.1j	Professional development is evaluated and the results are communicated to teachers
8.1k	Professional development enhances teachers' ability to implement instructional strategies that meet diverse student learning needs
8.1l	Professional development enhances teachers' ability to improve student learning

Q#	Question
	Table B7. Survey Items related to NTC's Instructional Practices and Support Factor (α=.791)
9.1f	Teachers are encouraged to try new things to improve instruction
9.1g	Teachers are assigned classes that maximize their likelihood of success with students
9.1h	Teachers have autonomy to make decisions about instructional delivery (i.e. pacing, materials, and pedagogy)
9.1i	The faculty are committed to helping every student learn
9.1j	The curriculum taught in this school is aligned with Common Core standards
9.1k	The curriculum taught meets the needs of students
9.1l	Social services are available to ensure that all students are ready to learn

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