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UNIVERSITY OF CALIFORNIA
RIVERSIDE

Student Trust: Impacting High School Outcomes

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Education

by

Lisa Romero

August 2010

Dissertation Committee:

Douglas E. Mitchell Ph.D., Chairperson

George Marcoulides Ph.D.

Robert Ream, Ph.D.

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The Dissertation of Lisa Romero is approved:

Committee Chairperson

University of California, Riverside

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ABSTRACT OF THE DISSERTATION

Student Trust: Impacting High School Outcomes

by

Lisa Romero

Doctor of Philosophy, Graduate Program in Education
University of California, Riverside, August 2010
Dr. Douglas E. Mitchell, Chairperson

There has been growing recognition of the importance of trust in efforts to reform schools, improve learning, and positively impact student achievement. Previous research has focused on trust between adult actors—teachers, parents and principals—typically in elementary school settings. This dissertation shifts the focus to *student trust*, asking whether and how student trust in high schools matters.

Trust is conceptualized as a multi-faceted construct involving the discernment of benevolence, competence and integrity in school organizations and staff. Structural Equation Modeling is used to measure student trust as a second order factor with benevolence, competence and integrity as first order factors; and to determine the effect of trust on high school outcomes such as graduation and post-secondary plans, controlling for prior achievement and student background.

Data for this study is drawn from the Educational Longitudinal Study of 2002 (ELS). ELS provides a nationally representative sample of over 14,000 students attending more than 750 public, private and Catholic schools, representing 3.2 million students in the U.S. who were high school sophomores in 2002, with follow-up studies in 2004 and 2006.

Results show that student trust has a significant measureable effect on high school outcomes. Students with high levels of trust have more positive high school outcomes than students low in trust. Trusting students are more likely to graduate, have more ambitious postsecondary plans and higher grade point averages. Additionally, this research demonstrates that while all three facets of trust are important, student estimation of benevolence is the most important, followed by equal amounts of competence and integrity.

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Chapter 1

Introduction

“Without trust, words become the hollow sound of a wooden gong. With trust, words become life itself.” John Harold Hewitt

The persistence of the achievement gap, despite nearly constant efforts to reform and improve our nation’s schools over the last half century, is disheartening. Educational researchers, professional educators, and policy makers have long endeavored to find a magic bullet, or one best solution, that, if implemented correctly, would improve our schools (Tyack, 1974; Tyack & Cuban, 1995). These rational solutions to school improvement have included a host of restructuring plans, new programs, special curriculum, professional development and teacher training. Some successes have been enjoyed, but the effects are often fleeting or fail to be replicated elsewhere.

Missing from this rational project has been the explicit recognition that schools are social organizations. In the effort to find the best structure (middle schools, K-8 schools, charter schools), best management strategy (site based management, strong central office), right class size, most effective bell schedule and calendar (block schedules, traditional or year-round schools), best program or curricula (phonetics, whole language, new math), method of lesson delivery, testing or accountability system-- we have forgotten the lessons learned from Elton Mayo.¹ Organizations are populated by

¹ Elton Mayo was an American sociologist and industrial engineer credited with founding the Human Relations School of organizational management in the early 1930s. In the course of his work at the General

social beings, and that fact has important consequences. This is not to suggest that programs and structures do not matter, or that some methods of teaching are not superior to others. It is to say that the social components of schools, and the quality of relationships within schools, need to be attended to because they affect teaching and learning.

Research led by Bryk and Schneider (2002), Hoy (2006, 1999) and other scholars recognize the fundamental role that social relationships, and trust in particular, play in any effort to reform schools, improve learning, and positively impact student achievement (Tschannen-Moran, 2004, 2009; Tschannen-Moran and Hoy, 2000). A variety of studies examine teacher-teacher trust, teacher-principal trust, and teacher-parent trust. Teacher trust has been found to be positively correlated with student achievement, a factor that has a mediating effect on poverty, a predictor of teacher professionalism and openness to innovation, and a necessary component of effective school reform. In short, trust in schools matters. Trust by itself may not be a sufficient condition for reform, but it is likely an important prerequisite.

Much of the research on trust in schools, however, has focused on adult actors-- teachers, principals and parents. Additionally, most studies use elementary or middle school data and rely on regional samples, limiting generalizability. Whether or not trust

Electric Hawthorne plant, Mayo discovered the powerful influence of informal groups and social processes on productivity, performance and motivation.

plays an equally important role in other settings and with other actors--chiefly students and, particularly high school students--is unknown.

The Educational Longitudinal Study of 2002 (ELS) provides the opportunity to address important, overlooked aspects of trust in schools, namely: the relationship between high student trust and educational outcomes, using nationally representative data, including multiple outcome indicators, and incorporating longitudinal change. ELS surveyed students in three waves: the Base Year (2002) when students were in 10th grade, the First Follow Up (2004) when most students were seniors, and the Second Follow Up (2006) two years post secondary. ELS contains data from 14,000 students in 2006 who were members of the 2002 sophomore cohort.

Structural Equation Modeling (SEM) is used to examine both the antecedents and outcomes of generalized student trust. Generalized trust is conceptualized as a latent variable or construct. Common in social sciences, latent variables are theoretical constructs (such as motivation or IQ) for which no directly observable measure exists. Latent constructs are measured indirectly by observing the behavior of proxy, manifest variables that can be measured. As such, trust, though not directly measureable like income in dollars or the temperature on a thermometer, can be inferred and quantified through a factor analysis of these indicator variables (Marcoulides & Hershberger, 1997; Tenko & Marcoulides, 2006).

The goal of this study, however, is not simply to measure trust. It is to ascertain the consequences of student trust on high school outcomes. The existing literature on trust suggests that teacher trust has important consequences for achievement; but has yet to ask whether (and how) student trust may matter as well. This is remarkable given that it is student achievement that we are after. It is students who learning seeks to transform by providing them with new knowledge, skills, behaviors, and ways of thinking (Mitchell & Spady, 1983). This transformation is difficult without their willingness. Thus, just as teacher trust is vital to school reform, it is reasonable to imagine that student trust must be vital as well. Simply put, students may learn better and achieve more when they trust their schools and teachers.

Finally, this study will expand the types of educational outcomes considered. The trust research, like much educational research, is preoccupied with narrow measures of achievement, content with small gains in a single reading or mathematics test. But limiting ourselves to test scores, while facilitating measurement, is a rather myopic vision of schools and students. For high school students, and American society as well, there are more important outcomes with farther reaching consequences than a small gain on a particular math or reading test (Berliner & Biddle, 1995; Bowen & Bok, 1998). Thus, while this study includes test scores, I am more interested in larger life outcomes like whether a student drops out or graduates, goes on to a college or university, or enters the work force.

This study has important policy implications for current and future school reform efforts. For more than 50 years, policy makers and reform-minded educators have sought to improve schools and student learning. In spite of this, both international and domestic assessments of American achievement show disappointing results. Year after year in international comparisons, U.S. students score lower on tests of math and science than do students from a surprising number of other countries. And, domestically, the achievement gap between white students and students of color has barely budged. Latinos are three times as likely to drop out as white students and twice as likely as African American students (Rivera-Batiz, 2008).

Policy makers have legislated a host of rational reforms and programs, with little sustained national improvement. Currently, this is best exemplified by the No Child Left Behind (NCLB) legislation which mandates widespread student testing and complex accountability requirements. Yet, by 2014, it is estimated that by NCLB standards 80% of schools could be labeled failing, and there is little indication that the achievement of individual students is improving.

If trust does indeed matter, then we need to redirect policy efforts. Designing appropriate policy instruments may require re-thinking our definition of the problem (McDonnell & Elmore, 1987; D. Mitchell, Ream, Ryan, & Espinoza, 2008). For example, widely touted pay-for-performance incentives may need to be rethought, and the definition of performance expanded beyond the narrow confines of test scores. Additionally, management research has guided many businesses in processes designed to

develop, maintain and restore employee and client trust. Teachers and school leaders may well benefit from similar professional development. These and other policy implications will be discussed.

A brief description of the remaining chapters of this dissertation follows. Chapter 2, begins with the question why study trust? It discusses the failure of school reform efforts and introduces trust. There has been mounting interest in the study of trust since the 1990's. Trust reintroduces the human, social side of individual, group and organizational performance and has shown promising results in school reform efforts. Chapter 2 also describes four theoretical frameworks that could be used to account for the importance of trust: organizational theory and the limits of contracts, Bidwell's client member theory, authentic leadership, and social capital theory.

Chapter 3 reviews the literature, discusses measurement approaches, and findings from research on trust. Three approaches to measurement are delineated. The first, views trust as attitudinal, and asks a few general questions about trusting attitudes. The second approach sees trust as behavior and uses game theory to measure decisions to trust. The third approach, adopted in this inquiry, views trust as perception with trustors making judgments about the benevolence, competence and integrity of trustees. This third approach is the dominant paradigm in educational research. Educational research has documented a number of positive findings related to trust, but the research neglects students, instead focusing on teachers, principals and parents.

Chapter 4 presents the conceptual model employed in this research and hypotheses that are tested. Data for this research is pulled from the Educational Longitudinal Study of 2002 (ELS 2002). ELS is a longitudinal study of high school students who were sophomores in 2002, with follow-up studies conducted in 2004 and 2006. Detailed information about the Educational Longitudinal Study of 2002 and the specific variables used in this research will be provided.

Chapter 5 explains the research methodology, presents results of the analysis and answers the research hypotheses. Structural Equation Modeling (SEM) is used to measure trust as a second order factor with benevolence, competence and integrity as its first order constructs. Measuring trust in this way more closely aligns the measure with educational research which consistently speaks of trust as a multi-faceted construct. Modeled as a second order construct it is possible to assess and delineate the contribution of benevolence, competence and integrity (Koufteros, et al, 2009). Once measured, trust will be placed in a full structural equation model in order to assess the impact of trust on high school outcomes. As will be seen, findings show that student trust is productive; that is, trust does play a role in high school outcomes.

Chapter 6 concludes with a synopsis of the findings and discusses how this dissertation adds to our knowledge about trust in schools. Several noteworthy contributions are made to the field. Foremost, it extends knowledge about the role of trust in schools to students. Not only does trust matter (Tschannen-Moran, 2004), but *student trust* matters. Additionally, support is found for a multi-faceted view of trust involving

the discernment of benevolence, competence and integrity. And, while all three components are important, this research asserts that benevolence is the most important, followed by roughly equal amounts of integrity and competence. The chapter concludes with a discussion of the implications for policy and practice.

Chapter 2

Why Study Trust?

Failure of Reform

In 2010 nearly two-thirds of Americans ranked education as one of the top priorities of national concern, even while facing the worst economic crisis since the Great Depression (Pew Research Center, 2010). While polling numbers may wax and wane, Americans have long believed that education is a vital component of a democratic society. It is perhaps from this basic belief that the U.S. has developed one of the most heralded and yet criticized, systems of universal free, public education in the world. Since its start, Americans have entrusted our public schools with a wide variety of missions--teaching citizenship and responsibility; transmitting knowledge about the classics, arts, math and science; imbuing a common culture; preparing students for adult roles and vocations; ameliorating social ills; ensuring equity and equal opportunity; rewarding merit and intellect; and guaranteeing the safety and economic competitiveness of the nation. These diverse goals often have made the school house the site of intense debate over the purposes and methods of schooling and have been the source of “waves” of school reform (Cuban, 1990; Kliebard, 1995; Tyack, 1974; Tyack & Cuban, 1995; Tyack & Hansot, 1982; Wirt & Kirst, 2001).

Public education has been the target of reform almost since its inception (Kliebard, 1995). However, since the 1950s the pace of these efforts has accelerated. Two

events in particular—the Supreme Court decision in the landmark 1954 *Brown v. Board of Education* case ordering school desegregation, and, the 1957 Soviet launch of Sputnik, which sparked concern for the competitive position of the United States in the world community—served as catalyzers and focusing agents for school reform efforts (Mitchell, 2006).

Since these events, two overarching and intertwined goals have dominated the politics, policy and discourse of school reform efforts: 1) that of securing high quality education and achievement for historically discriminated against and under-represented groups within the United States, and; 2) ensuring that American students achieve at high levels to maintain America's competitive position in the world.

The first goal has been generally thought of and phrased in terms of equity with the term “equal opportunity” lingua franca in the 1960's and 1970's, and “eliminating the achievement gap” in contemporary usage (although Gloria Billings-Ladson (2006) correctly reminds us that achievement “debt” is a more accurate analogy). This goal was manifest in court decisions led by *Brown* in 1954 (and continued by its intellectual heirs including *Lau v. Nichols* (414 U.S. 563) in 1974). The achievement gap and apparent ineffectiveness of schools was brought into stark relief by the Coleman Report (1966). It was codified by federal policy and legislation most notably in the Civil Rights Act of 1964, the War on Poverty, passage of the Elementary and Secondary Education Act (ESEA) in 1965, the Equal Opportunity Act of 1974, and funneling of ameliorative revenue such as Title I and EIA funds to schools via the states. These and other initiatives

and mandates (Head Start, busing) have taken aim at improving the education of children disadvantaged by poverty and/or by years of de jure or de facto discrimination.

The second goal of international excellence and dominance was brought to the forefront by the Soviet launch of Sputnik, the ensuing Cold War, and later, by periods of recurring economic recession. Concerns about America's competitive position in the world drove waves of school reform focused on ensuring that students would be prepared for future careers deemed important for maintaining a high functioning economy and preserving American competitiveness in the world community. This goal was enacted through policy and legislation beginning with the National Defense Education Act (1958), increased funding for the National Science Foundation and concomitant attention and funding for public school math and science training and curriculum development. The Reagan-era Department of Education "bell weather" report, *A Nation at Risk* (1983), renewed these concerns, warning, in dire terms, that our students were falling behind other nations. The accountability movement epitomized by the No Child Left Behind Act has led to waves of new school reform efforts.

Reform efforts have targeted all levels of schooling from pre-kindergarten to high school. However, high schools more than any other level have been the focus of criticism (Goodlad, 2004; Lee and Ready, 2007; Oakes, 2005; Sizer, 1992;). Secondary education has been criticized for its alienating culture, high levels of failing students and dropouts, and apparent low levels of literacy produced in even its graduates. Policy responses have included more State and Federal accountability requirements, establishment of high

school exit exams in some states, new and elaborated curriculum standards, requirements that all students take and pass Algebra and other courses, new teacher certification and testing requirements and incentives for class size reduction and restructuring.

Concordantly, high schools have been structured and restructured into magnet schools, small schools, charter schools, smaller learning communities and schools-within-schools. In some cases there has been success, with scholars pointing to some model or “high flying” schools and programs that do a remarkable job of educating all students (Carter, 2000; Educational Trust, 2000; Harris, 2007).

Yet in spite of more than 50 years of near constant reform efforts, the achievement gap has proven to be remarkably tenacious. According to the 2009 National Assessment of Educational Progress (NAEP), at age 17, white students on average scored 29 points higher than Black students and 26 points higher than Latino students in reading. In math, 17 year-old white students scored 26 and 21 points higher than Black and Latino students respectively (Rampey, Dion, & Donahue, 2009). Nationwide, in 2008, the average dropout rate for was 4.8% for whites, 9.9% for Blacks and 18.3% for Latinos (Snyder, & Dillow, 2010).

The achievement gap has modestly improved since the early 1970s when the Department of Education began collecting these statistics. During the 1970s and 1980s, Black and Latino students’ rate of achievement improved at a more rapid rate than whites, narrowing the achievement gap. But, in the last 20 years these gains have stagnated and even show signs of reversing (Lee, 2002).

In the international community, American student achievement lags behind that of a number of other nations. In 2006, 15 year olds in the U.S. scored in the bottom 20% of nations (23rd of 29) in math literacy on the Programme for International Student Assessment (PISA). The same year in science, the U.S. scored 16th of 29 nations.

Whether viewed from the perspective of achievement gaps between groups of students within the United States or from the perspective of relative performance internationally, efforts at reform have failed to produce the expected gains in student achievement. One of the reasons for this failure may be that reform has over-focused on physical artifacts of schooling, like organizational structure, curriculum and testing. Additionally, accountability requirements of No Child Left Behind has led schools and researchers to focus almost exclusively on irreducible, snapshot tests of achievement. The fact that schools are social systems, and that learning takes place in a social context, seems to have been lost in the wake of reform. Clearly, technical components of teaching and learning must be in place for learning to occur, but as the last 50 years of reform have shown this is not enough.

Since the 1990s there has been growing interest in research on trust. Research on trust reintroduces the human, social side of individual, group and organizational performance. Research on trust in schools has shown promising results in school reform efforts, and is the subject of this research. Therefore, an introduction to thought and theory on trust is provided next.

Introducing Trust

Thought and theory on trust have a long intellectual history, going back perhaps to the beginnings of social philosophy. Trust, and its importance to a just and well-functioning civic society, is found in the 300 B.C.E. writings of Greek philosopher Plato, in the thoughts of 18th century Enlightenment philosophers John Locke, David Hume and Immanuel Kant, and in the works of political thinker and historian Alexis de Tocqueville, to name only a few.

In recent years, interest in the theory and concept of trust has seen a virtual explosion in popularity. It is not just educational researchers who are interested in trust. Economists and political scientists have pointed to the importance of trust in the creation of prosperity, nation building and the civic well-being of states (Brehm & Rahn, 1997; Fukuyama, 1995; Putnam, 1993, 1995b, 2000; Rahn & Transue, 1998). Business literature speaks volumes on the value of organizational trust, the importance of trust in management-employee relations, in marketing, and in building client loyalty (Kramer & Tyler, 1996; Mayer, Davis, & Schoorman, 1995; Schoorman, Mayer, & Davis, 2007;). Research on leadership is laced with trust-related concepts like transformational leadership (Burns, 1978), authentic authority (Mitchell & Spady, 1983), servant leadership (Greenleaf, 1977) and spiritual or moral leadership (Bolman & Deal, 2001; Sergiovanni, 1992). Health and medical journals are replete with concerns about trust in medical institutions and doctor-patient care (see for example Mechanic, 1996). Even, the binary world of computer science has become consumed with issues of trust brought on

by the Internet, social networking, open systems and interconnectedness (see for example Grandison & Sloman, 2001; Klienberg, 2008).

Why such a diversity of interest in trust? The reason is that trust has consequences. Whether trust itself is productive, or if trust merely creates a fertile environment for productivity, the presence or absence of trust has consequences. Trust is efficient; it acts as a lubricant, facilitating transactions, communication and collaboration (Fukuyama, 1995; Kramer, 1999; Vangen & Huxham, 2003). Trust can result in higher motivation, performance and increased adaptability (Kramer 1999; Mayer et al, 1996; Mishra, 1995; Seashore Louis, 2007). Trust acts as a form of social control, promotes citizenship behaviors (Fukuyama, 2003, Putnam, 1993; Tschanen-Moran & Hoy, 2000), and induces followers to voluntarily “shape their behavior” to “embrace the purposes, intentions and guidelines” of superordinates (Mitchell & Spady, 1983). Above all for students, trust is essential to learning (Bidwell, 1970) and positively related to achievement (Bryk & Schneider, 2002; Goddard, Tschanen-Moran and & Hoy, 2001; Goddard, 2003) .

Distrust, on the other hand, has costs (Daley, 2009; Dirks, 2006; Tschannen-Moran & Hoy, 2000). Distrust is associated with lower productivity, rule proliferation, organizational rigidity, resistance and energy diverted to self protection, disruption and even revenge (Daley, 2009; Mishra, 1996; Tschannen-Moran, 2004; Bidwell, 1970; Fukuyama, 1995). Where trust lubricates (Arrow, 1974) and facilitates social exchange and learning, distrust causes friction and impedes social exchange and learning.

Humans are social beings and trust plays a vital role not only to the quality of relationships and social experiences, but also to the productivity and effectiveness of groups, organizations and even nations. Positive consequences, attributed to high levels of trust, have been documented for individuals (Coleman, 1990; Malhotra, D. 2004; Owens & Johnson, 2009; Stanton-Salazar & Dornbusch, 1995), groups and organizations (Kramer, 1999; Oliver & Montgomery, 2001; Mayer et al, 1996; Mishra, 1996; Vangen & Huxham, 2003), and even for the well-being of nations (Fukuyama, 1995; Putnam, 1993, 2000). Schools are no exception. Research on trust in schools has established that the presence of trust is positively associated with a variety of desirable outcomes and, as such, plays an essential, albeit likely indirect, role in learning, and teacher and school effectiveness.

A detailed review of the research on trust is presented in the next chapter, along with a discussion of definition and measurement. However, before looking in depth at the literature, I complete this chapter by considering the theoretical foundations of trust.

Theoretical Frameworks for Trust

Given the breadth and depth of intellectual interest in trust, it is not surprising that more than one theoretical framework can be found that offers explanations for why trust matters. Although interesting, not all are relevant for this research. Accordingly I focus on four theories particularly salient to this inquiry: organizational theory and the limits of control, Bidwell's client member organizational theory, authentic leadership, and social capital theory. Each of these theories shed light on the function and consequences of trust

in organizations. I present a synopsis of pertinent elements of each theoretical frame, and then discuss the implications of the theory for student trust and trust in schools. Though each framework examines trust through a different lens, they provide rich insights into why trust is important and the mechanisms through which trust may impact behavior and performance.

I start this section with a discussion of classical organizational theory, its shortcomings and the subsequent recognition of the social side of organizations and limits of control. This brief history provides an important contextual backdrop prior to examining the four theoretical frames.

Organizational Theory: From Machines to Social Systems

Contemporary organizational theory tells us that even the most optimally structured organization depends on trust for effectiveness. Simply put, trust is important in organizations because there are limits to contracts, limits to organizational control (Arrow, 1974). Before discussing trust and limits of control, I begin with a synopsis of classical organizational theory and its shortcomings.

The need for trust in organizations was not considered in early organizational theory. Rapid industrialization and urbanization, at the end of the 19th and beginning of the 20th century, lead to fundamental changes in the way many people lived and worked. Small craft shops gave way to larger organizations and associations shifted from

*Gemeinschaft to Gesellschaft.*² Sociologist Max Weber, like Durkheim and other sociologists of the day, was concerned about the radical transformation of society and the implications of industrialization for humanity (Weber, 1979; Durkheim, 1998; Adams and Sydie, 2002; Cosner, 1977). Weber hailed rational, bureaucratic organizations as vital to the functioning of modern capitalist societies. The principals of bureaucracy, upon which Weber's ideal type organization were built, included hierarchy of control, specialization and the division of labor, impersonalization of relationships and control by rules. Managerial power would be based on rational-legal authority with expertise driving promotion. The perfectly rational organization was an efficient machine-- not a social organization.

American industrial engineer Frederick Taylor extended Weber's ideas into the "gospel" of scientific management which worshiped the God of efficiency. Taylor envisioned workers as "cogs in a machine." Taylor believed that the "one best way" (best meaning most efficient) could be precisely determined through careful, scientific analysis of production processes using time and motion studies. Scientific management was quickly and widely embraced not just by business but also by schools. It is the root of the familiar "school as factory" (Cubberly, 1919) model of schooling. And, though

² Tonnies (1887) a German sociologist, coined these terms for two different manner of association. *Gemeinschaft* is family, or small community, type association with social bonding provided by shared norms and values. *Gesellschaft* is larger, impersonal, modern societal association typified by bureaucratic organizations held together by hierarchy and division of control.

organizational and management theory have since transcended classical organizational theory and strict adherence to principles of scientific management, the bureaucratic model still provides the foundation for the organization and management of most large organizations throughout the modern world.

However, it was not long before the scientific managers themselves began to discover that the ideal rational, efficient organization had a social component that could not be ignored. Most famously, in the 1920s, Elton Mayo discovered this in his study of lighting and worker productivity. Workers themselves and group norms had a more powerful effect on productivity than the optimal amount of lighting. The struggles to organize labor in the 1920s and 1930s further illustrated the informal power of individuals and groups through strikes, work slow-downs and even outright sabotage. As a result, the human relations school of thought began to develop. This new line of thinking recognized the informal, human side of organizations and the needs of workers as individuals, the power of groups and informal norms.

The human relations movement and its intellectual descendants viewed organizations as a family or social system rather than as a machine. Concordantly, Parsons (1959) and other sociologists of education began to talk of the “school as a social system.” This paradigmatic shift from machine to family (Mitchell, 1986) or social system, opened the way for theories about the importance of worker motivation, leadership styles, organizational culture and norms, and the “messy” informal but

powerful human side of organizations. Importantly, for the next part of this discussion, it also revealed limits of organization.

Trust and Limits of Control

How does the previous discussion help us understand the importance of trust in organizations and in schools in particular? Simply put, no matter how rationally organized, it is impossible for a position description or contract to spell out the required behavior, work or actions required for every situation encountered on the job. It might be possible to get close if, for example, we imagine a small tightly coupled manufacturing organization— with a single clear goal, producing an unmistakably well-defined final product or output, using uniform raw materials as input, with an exact production process or technology. But even here we must trust that the employees can and will follow the proper procedures and, even with trustworthy employees, it would be difficult or impossible to anticipate and prescribe expected behavior for every situation or contingency which might arise. In a complex organization, like a school, difficult becomes impossible.

Schools stand in sharp contrast to this imagined simple organization. Schools as bureaucracies tend to be loosely coupled organizations (Meyer & Rowen, 1976; Weick, 1976). There is no single, universally recognized goal of schooling. Rather there are a myriad of (frequently conflicting) goals outlined for schools. The raw materials-- students-- are anything but uniform. They come to school with varying levels of prior knowledge, resources, talents and interests. Additionally, the technology for producing

learning is uncertain and the content of the learning to be produced is often intensely debated. Table 2.1 summarizes these differences.

Table 2.1

Ideal Type Bureaucracy Compared to Schools

Ideal Type Bureaucracy	Schools, Teaching and Learning
Output is a uniform product (widgets)	Output not uniform or easily evaluated (learning)
Input is uniform (raw materials)	Input not uniform (individual students)
Production technology is certain	Uncertain technology
Clear goals, tight coupling	Goal conflict, loose coupling

In summary, the shortcomings of classical organizational theory led to the important recognition that organizations are social systems and, as such, are much more complex than the ideal type bureaucracy. Schools as organizations have special characteristics that further delineate them from other organizations. The theoretical framework considered next, Bidwell’s school as client member organization, further draws out these distinctions, and, in doing so, provides a rationale for the importance of student trust in schools.

Trust and Client-Member Organizations

Bidwell's (1975) work on client-member organizations sheds further light on how schools differ from the ideal bureaucratic model and why student trust in schools is important. Bidwell contrasts ordinary client-professional relationships to that of relationships found in client-member organizations like schools. Typical client-professional relationships, such as attorney-client and doctor-patient relationships, are voluntary, dyadic and periodic. The relationship is voluntary so far as individuals are free to choose, and change, their attorney or physician. It is a dyadic, one-on-one relationship. And, the relationship is episodic rather than sustained. That is, people interact with their doctors or attorneys periodically, when the situation warrants, rather than on a continual basis.

Trust is an important component of effective client-attorney relationships. Without trust, clients may be unwilling to disclose important information relevant to their situation that the attorney needs to effectively defend a client. Similarly, a patient who does not trust their doctor may be unwilling to disclose personal information, such as drinking habits or symptoms that could impede diagnosis. Trust is so important in these relationships that it is embedded in the concepts of client-attorney privilege and doctor-patient confidentiality.

Initially, trust in professionals such as doctors and lawyers is granted based on expertise (signified by their professional status) and perhaps because of reputation (of the individual or institution for which they work). For example, clients may trust a doctor

because of the status and presumed expertise confirmed by a medical degree. Or, they may trust a doctor because she works for a famous and well respected institution such as the Mayo Clinic. Here the trust of the institution is extended by proxy to the individual. In essence, trust is granted through a recognition of legitimacy of the profession and/or his or her institution.

Additionally, this grant of trust is of limited domain. Doctors or lawyers are granted trust in the area of expertise, and the area in which help is sought or desired by the client. During the course of their professional relationship, the client may withdraw trust if their experience leads them to have doubts about the professional's competence, integrity or good will. If this happens, because the relationship is voluntary, the client is free to end the relationship and seek advice elsewhere.

Student trust in teachers and their schools is no less important for the successful learning endeavor than it is in the case of a lawyer defending a client or a doctor making a correct diagnosis. Bidwell³ writes:

teachers' use of the authority office—generates little in the way of learning...student trust in teachers is of the greatest importance as it generates those affective bonds between teachers and student...that

³ Bidwell's commentary about the limited effectiveness of relying on "the authority of office" is very similar to Mitchell and Spady's (1987) concepts of power and authority. Here Bidwell's theory is close to leadership theory handled in the next section.

generate in students motivation to learn (whatever the content to be learned) independent of teacher demands for compliance (p.50)

Bidwell draws important distinctions between the functioning of relationships in organizations like schools, which he labels “client member organizations,” and the earlier described ideal professional-client organization. Bidwell explains that “the defining attribute of organizational membership is generalized subordination to the authority structure *of the organization* (in contrast to one or more of the organization’s staff, individually)” and once a member of the organization, the individual “must defer to any of its professional staff” (p. 43).

Although as a member of the organization, students are subordinate to a variety of school employees, the primary professional-client relationship is between teacher and student. In contrast to the typical professional-client relationship, this relationship is involuntary, one to many, and sustained. In most cases, especially for public school students (and students from families who cannot afford to opt for private school or to move to another location) the relationship is not voluntary. Students are assigned to public schools based on where they live and, once in school, they are assigned to classrooms and teachers. Not only is the student unable to choose their schools or teachers but the “school cannot select its students, it must accept them without clear evidence of their willingness to grant the legitimacy of the school’s authority” (Bidwell, 1970, p.56).

These attributes of schools “constrain the formation of student-teacher trust” (p.38). Further, the lower status of the teaching profession and the involuntary nature of the relationship makes trust more tentative. Students and parents may not be as willing to grant a teacher legitimacy by virtue their educational credentials as they are to higher status professions like medicine and law. Additionally, Bidwell posits that this may be compounded in the case of low-income students and under-represented minorities who frequently who have no choice but to attend schools with poor reputations.

Once the relationship between teacher and student is established trust may develop, but if it fails, or is broken, the student does not have the option of terminating the relationship and contracting with another teacher. Compounding this problem is the fact that teacher–student relationships are sustained over long periods of time. As a result, “failures of trust must be lived with” and this has important implications for learning (p. 50). Since the student “can’t escape the teacher or the school” they escape by other means. They may respond by passively withdrawing and being inattentive. Or, they may actively resist and disrupt the classroom. Students can also “fail to perform and can seduce the teacher into accepting student definitions of performance standards in exchange for classroom order, and perhaps, a willing effort” (Bidwell, 1970, p. 53).

Whether by passively withdrawing, actively resisting, lulling the teachers into accepting substandard performance, or failing to establish affective bonds essential to learning motivation, trust plays a vital role in learning. Stated in terms empirical terms, Bidwell’s theory suggests that trust mediates learning. Further, Bidwell posits that

student trust is more important with older students (who have stronger peer group affiliation than their elementary counter parts), is likely to be more problematic in public schools than private (where choice serves as a proxy for trust), and with students from low-income or minority backgrounds.

Trust and Authentic Leadership

Recognizing the importance of both the formal and informal aspects of organizational life, behavioral theorists have developed leadership theories which can also be used to explain the importance of trusting relationships in schools. (Dirks, 2006). A variety of scholars have posited that certain forms, types or styles of leadership are more effective than others.

Leaders may rely on a variety of sources of power and authority in order to secure follower compliance (Bowman & Deal, 2003; Burns, 1978; Mitchell, 1987). For example, a manager's positional power may include the ability to reward or sanction employee behavior. Employees comply with the manager's direction based a sort of cost-benefit, exchange or rational choice type calculation. Alternatively, leaders may rely on power that springs from followers' recognition of their traditional authority, as in a monarchy, with costume and tradition influencing behavior or motivating compliance (Weber, 1979). Traditional authority, predominant in earlier, clan-like societies, is more limited in effectiveness in modern, complex, heterogeneous societies. Or, leadership may be based on "legal-rational authority" in which compliance springs from recognition of the importance of due process or of "sanctity of the rules."

However, many have recognized that a different type of leadership, alternatively called--“charismatic” (Weber, 1978), “authentic” (Mitchell, 1987) or “transformational” (Burns, 1978) leadership-- is more effective than leadership based on calculative positional, traditional or even legal-rational authority. This type of leadership is a more personal type of leadership. Followers believe and trust in the goodwill, intentions and values of the leader and therefore willingly follow the leader.

“Authentic” leaders are empowered by subordinates’ recognition of the quality of their “inner character” (Mitchell & Spady 1987, p. 7). Here, legitimacy is derived “not from rules, positions or traditions but from a ‘devotion to the specific and exceptional sanctity, heroism, or exemplary character of an individual person and of the normative patterns revealed or ordained by him’” (Conger & Kanungo, 1987, p. 638). As Dirks (2006) explains:

Followers make inferences about the leader’s characteristics such as integrity, dependability, fairness and ability, and ...these have positive consequences for work behavior and attitudes...trust is a belief or perception held by the follower; it is not a property of the relationship or leader *per se* (p. 16)

Transformational leaders, according to Burns (1978) and Bass (1985), are more effective than other types of leaders because subordinates internalize the values and goals of the leader and organization. With transformational leadership, employees and organizations are able to reach higher levels of motivation, performance and productivity

(Bass, 1986; Burns, 1978). But, this is not possible without trust. Trust is central to this style of leadership. According to Mitchell and Spady (1987) authentic authority “is created in relationships characterized by trust” (p. 12).

What does this leadership theory suggest about student trust in schools? It is important that students perceive the school and its institutional agents, most especially their teachers, as authentic authorities that they trust. When an atmosphere of trust exists, students are more likely to be motivated to learn, to embrace the learning goals of their teachers and school. Issues of classroom management and compliance with rules, though ever present, recede into the background. In short, when student trust exists, when students perceive that the institution and their teacher leaders act with benevolence, competence and integrity (Mayer et al, 1995), they are transformed and motivated to learn.

Social Capital

Social capital theory is the next theoretical framework that will be considered. The themes of trust and trustworthiness reoccur frequently in scholarly discussions of social capital theory and many educational researchers have positioned their research on trust within this framework. The concept of social capital is widely attributed to seminal works by Bourdieu (1984, 1986) and Coleman (1990). Both view social capital as convertible to other forms of capital such as human and economic capital, though certainly more ephemeral and less fungible than other forms of capital. However, from Bourdieu’s perspective as a critical theorist, social capital is part of social reproduction of

class and maintenance of privileged status. Coleman, on the other hand, takes a more functionalist and positive approach to social capital, seeing it as a resource to draw upon. Additionally, while both mention trust, Coleman (1988) tells us specifically, that trust is a form of social capital.

Putnam (1993, 1995, 2000) and Fukuyama (1995) extended the discussion of social capital and trust to important properties of civic society, healthy institutions, and robust national economies. Putnam (2000) tells us that the “touchstone of social capital is generalized reciprocity” (p.134), and that trusting communities have lower “transaction costs” because “honesty and trust lubricate the inevitable frictions of social life” (p.135).

Social capital theory responds to a central shortcoming of classical economic theory, which focuses on the individual as a--utility maximizing, cost/benefit analyzing, independently acting, pull yourself up by your boot straps--rational actor. Inherent in social capital theory is the recognition that this view is insufficient because “economic life is deeply embedded in social life, and cannot be understood apart” from it (Fukuyama, 1995, p.13). In this sense, social capital theory can be used to explain differential outcomes for social actors, not only in our economy, but also different academic outcomes and experiences of students in our schools (Dika & Singh, 2002; Horvat, Weininger, & Lareau, 2003; Lareau, 2000; Ream, 2005; Ream & Palardy, 2008; Ream & Rumberger, 2008; Stanton-Slazar, 1997).

Importantly this implies that if social capital, or more specifically in this case, trust, can be used to explain differential outcomes for different social actors, then trust may be an important mediating (or moderating) factor in student achievement. Consistent with the idea of trust as having a mediating or moderating effect on student achievement, a number of relatively recent educational studies have examined the role of trust in the success of school reform initiatives and its role in student achievement.

Summary

In summary, these frameworks are provided as possible explanations for the power of trust, especially in schools. Each framework prescribes a different mechanism through which trust might function to mediate student outcomes. And each provides a somewhat different viewpoint about how and why trust may arise in schools, and how and why it may make a difference in student achievement. While at some future point, it may be desirable to test the veracity of each lens; this is not the fundamental task of this research. The goal of this research is to see if a particular form of trust-- student trust-- can be measured and has consequences. If it can be demonstrated that there is a connection between student trust and high school outcomes-- such as graduation, achievement or post-secondary plans-- then will it be appropriate to return to the task of parsing which framework provides the best explanation of how trust works. At this point however, it has yet been ascertained that student trust matters or even how it could be measured.

In Chapter 3 a detailed examination of empirical research on trust is conducted. It begins with the problem of defining trust. This is followed by a careful review of how trust is measured, and the findings from research.

Chapter 3

Measuring Trust

Classical and more contemporary theoretical pieces on what constitutes or does not constitute trust abound; but there are far fewer studies that attempt to empirically (quantitatively or qualitatively) measure trust (see for example, Hardin (1996, 2003) and Seligman (1997, 1998)). That trust, or trustworthiness, has important consequences is clear. What is less clear, however, is how to measure trust. In the words of Glaeser, Laibson, Scheinkman and Soutter (2000), “the great lacuna within this research agenda is the measurement of trust” (p. 811).

The Problem of Definition

The measurement of trust is made difficult, in part, by the lack of consensus on a definition of trust (Rousseau, Sitkin, Burt, & Camerer, 1998). Though trust has been a topic of discussion for centuries by theologians and philosophers, a precise definition remains elusive (Glaeser, et al., 2000; Rousseau, et al., 1998; Tschannen-Moran & Hoy, 2000). For example, some definitions in contemporary scholarship define trust as:

- “a ‘standing decision’ to give most people—even those whom one does not know from direct experience—the benefit of the doubt” (Rahn & Transue, 1998)

- “a psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behaviors of another” (Rousseau, et al., 1998)
- “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control the other party” (Mayer, et al., 1995, p. 712)
- Trust is one party's willingness to be vulnerable to another party based on the belief that the latter party is 1) competent, 2) open, 3) concerned, and 4) reliable (Mishra, 1996, p.5)
- “a recognition of alter’s agency” (Seligman, 1997, p. 398, 1998), a process of a trustor perceiving and evaluating various type of information [competence, benevolence, integrity] about a trustee” (Oliver & Montgomery, 2001, p. 1055)
- “confidence in or reliance on the integrity, veracity, justice, friendship, or other sound principle, of another person or group” (Seashore Louis, 2007, p. 2)

This plethora of definitions has led Rousseau et al. (1998) to conclude that “we have no universally accepted scholarly, definition of trust” (p. 394). Tschannen-Moran and Hoy (2000) agree, stating “There appears to be widespread agreement on the importance of trust in human conduct, but unfortunately there also appears to be an

equally widespread lack of agreement on a suitable definition of the construct” (p. 551, quoting Hosmer, 1995). Further, the words “trust” and “trustworthiness” are often used interchangeably in the literature. But, some scholars (Hardin, 1996; Malhotra, 2004) see a clear distinction between trust (an act or an attitude of a trustor) and trustworthiness (a property of the trustee perceived by the trustor). Perhaps this explains why many authors quite freely employ the concept of trust without attempting to define it (Seashore Louis, 2007; Weaver, 2006).

Though definition remains difficult, there has been “scholarly agreement on the multi-dimension nature of trust” (Adams, 2008, p.48). In fact, the preponderance of educational research on trust, and a great deal of business management and leadership research, sees trust as multi-dimensional, or faceted (Tschannen-Moran & Hoy, 2000). In the field of organizational management, seminal work by Mayer, Davis and Schoorman, (1995) points to benevolence, ability and integrity as key components of trust. After conducting a review of research on trust in the business literature, Mishra (1996) concludes that trust is composed of competence, openness, concern and reliability. Adopting this approach in education research, Bryk and Schneider (2002) point to respect, competence, regard for others and integrity as dimensions of trust. Finally, Tschannen-Moran and Hoy (2000) review multi-disciplinary research and identify vulnerability, benevolence, reliability, competence, honesty and openness. In other words, trust is a collection of traits or characteristics that is perceived to exist in an

organization, individual or group. In this case, trust is perceptual; trust exists when a subject perceives that another person, group or organization is trustworthy.

Tschannen-Moran and Hoy, like Bidwell, remind us that the most important facet of trust likely depends on the domain and the nature of the relationships. For example, Tschannen-Moran and Hoy write “in the case of a surgeon competence is probably the prime concern, whereas in the case of an accountant honesty is just as important as competence. Among teachers and principals, all aspects of trust seem to carry significant importance” (p. 558).

The concept and definition of trust is further complicated by the notion that it may be more properly understood as a dynamic rather than a static concept. Viewed dynamically, trust can be seen as progressing through a series of stages (Mayer, et al., 1995; Owens & Johnson, 2009; Rousseau, et al., 1998; Schoorman, et al., 2007; Tschannen-Moran & Hoy, 2000; Vangen & Huxham, 2003). Over time, trust may be broken, requiring efforts to repair or re-build it.

Trust is cyclical and consequences of past trusting decisions, beliefs or actions influence trust in the future. Trust involves expectations. “Repeated cycles with successful fulfillment strengthen the willingness to rely on each other” (Rousseau, et al., 1998). Trust “ebbs and flows” (Tschannen-Moran & Hoy, 2000) and can “thicken” or thin (Putnam, 2000) with time. And it may be that different facets of trust are more or less valuable at different stages (Schoorman, et al., 2007). For example, competence may be vital in early stages and integrity more important in later stages.

That trust is dynamic and can be initiated, built and repaired is good news for schools. Indeed, to be of practical use, trust must be more than an intellectually interesting concept. Trust must be something that can be both measured and shown to have important consequences for schools, students and learning. I move in this direction in the next section of this study, by conducting a cross-disciplinary review of the extant research literature on trust, paying particular attention to how trust is conceptualized and measured, and the consequences or outcomes of trust.

Trust: Measurement and Consequences

Measuring and understanding consequences, correlates or antecedents, of latent constructs is never an easy task for social scientists and the concept of trust is no exception. Here, I examine literature from a variety of fields including political science, economics, business and education. I deliberately include, and in fact begin with, literature from outside of the field of education because research on trust in schools draws from these interdisciplinary roots. I explore three approaches toward quantifying and measuring trust common in interdisciplinary research. Each of these approaches conceptualizes trust differently viewing trust as attitudes, as behavior, or as perception.

The first approach uses survey research to make broad assessments about trusting attitudes. Here scholars, typically political scientists, rely on data from long running, large-scale public surveys which ask respondents direct questions about trusting attitudes.

The second approach is experimental research grounded in game theory, found primarily in business and economics research. This approach aims to measure behavioral indicators of trust by engaging experimental participants in games which involve both risk and reward for trusting behavior.

The third and final approach considered takes a multidimensional view of trust as perception. This approach is common in organizational management research and dominant in educational research on trust. In fact it is, according to Forsyth (2008) “*the paradigm* for school trust measurement” (p. 1) and is “the one preferred by survey researchers who study organizations in situ and when experimental situations are not feasible” (p. 3). Here, respondents are not questioned directly about trust nor do they participate in experimental games; instead respondents are asked questions that are indicators of elements (or components or facets) of trust in the context of that domain (i.e. school or business) under study. The focus is on identifying facets such as competence, benevolence, regard for others, or integrity, that are perceived by respondents and serve as indicators of trust (Bryk & Schneider, 2002).

Each of these approaches provides valuable insights not only into the measurement of trust but also into the consequences, correlates and precursors of trust. As such, findings from the entire body of literature are used to build and inform the conceptual model employed in this research project. However after careful consideration, it is the third, multi-dimensional, approach towards measurement which this research ultimately adopts. I now turn to a review of the survey research on trust.

Trust as Attitude: Large Scale Social Surveys and Generalized Trust

There is a great deal of literature that attempts to quantify and measure trusting attitudes through the statistical analysis of large-scale survey instruments. Much the literature on trust, and particularly research from political science, adopts this approach.

By far one of the most common approaches draws data and/or questions from the General Social Survey (Brehm & Rahn, 1997; Glaeser, et al., 2000; Rousseau, et al., 1998; Weaver, 2006). The General Social Survey (GSS) is a National Science Foundation funded survey, administered by the National Opinion Research Center at the University of Chicago. The survey has been administered 27 times between 1972 and 2008 and asks a nationwide sample of Americans a series of attitudinal and demographic questions. Though some of the questions change from year to year, a significant core of the questions remain unchanged across administrations, thus facilitating attitudinal comparisons over time and allowing for analyses of trends. (More information on the GSS can be found at <http://www.norc.org/projects/General+Social+Survey.htm>.)

The GSS contains three questions⁴ that researchers have consistently used to measure trust. The questions are:

⁴ These questions were originally developed by Rosenberg (1956).

- [1] Generally speaking, would you say that most people can be trusted or that you can't be too careful? (Response options: can be trusted, can't be too careful, depends)
- [2] Do you think most people would try to take advantage of you if they got a chance or would they try to be fair? (Response options: would take advantage of you, would try to be fair, depends)
- [3] Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves? (Response options: try to be helpful, just looking out for themselves, depends)

Some researchers use the first question to measure trust (Glaeser, et al., 2000; Putnam, 1995, 2000), while others use a combination of the three (Brehm & Rahn, 1997; Weaver, 2006).

These same trust questions are also found in the National Election Study (NES). The NES is a long-running, nationwide survey of attitudes, opinions and demographics of American voters. The NES has been conducted every two years (in Congressional election years) since 1952, with the most recent administration in 2008. The NES is funded by the National Science Foundation and is administered by the University of Michigan. (More information can be found at <http://www.electionstudies.org>.) The NES is perhaps the most widely used collection of databases in political science and has also been employed in the study of social capital and trust (Burns, Kinder, & Rahn, 2003).

Robert Putnam, in his work *Bowling Alone*, a study of the declining social capital in the United States, relies (in large part) on data culled from the General Social Survey (Putnam, 1995). Putnam measures trust (one component of his composite social capital index) using responses over time to the first GSS question that asks specifically about trust. Putnam finds (and many have replicated this finding) that generalized trust is declining, and has been declining in America for the past 40 years. He also finds that there is a profound cohort effect in the data, with each generation of younger Americans less trusting than the previous generation. Additionally, he shows that there is a positive correlation between level of education and trust, and an interaction effect between race and trust (with minorities less trusting).

Following in Putnam's footsteps, Brehm and Rahn (1997) use pooled General Social Surveys from 1972 to 1994 to look at the relationship between three principal constructs--interpersonal trust, civic engagement, and individual level confidence in government. Factor analysis is used to construct and validate the underlying measures of the three latent variables or factors. The factor of interest for this inquiry--interpersonal trust--is a composite of the three GSS trust questions. Additionally, Brehm and Rahn find several exogenous variables that influenced trust. Being non-white, divorced, or unemployed is negatively related to interpersonal trust, while higher levels of education, income and civic engagement is positively related to interpersonal trust.

Rahn and Transue (1998) confirm and extend Putnam's findings about the decline of trust and social capital in a study of American youth using data from 1976 to 1995.

The authors draw the data for this research from the University of Michigan's Monitoring the Future (MTF) project, which conducts an annual survey of American high school seniors in public and private schools. The MTF survey asks the same three trust questions found on the GSS and NES surveys. As in earlier research (Brehm & Rahn, 1997), the authors combine the three questions into a single factor that they call "social trust" and, like Putnam, they find a declining trend in levels of trust.

More recently, Burns, Kinder and Rahn (2003) have worked to develop more particularized, domain-specific measures of social trust than permitted by the standard three trust questions. To do so, they created new questions piloted in the 2000 Special Topic Pilot of the NES, and subsequently included in the 2002 regular NES survey. The new questions are designed to measure neighborhood trust and workplace trust, in addition to the standard general measures. Respondents are asked if neighbors and co-workers were "generally just looking out for themselves," if they "try to take advantage of others," if they "treat each other with respect," and if they were "honest." Results, using confirmatory factor analysis, show that trust does indeed vary across the domains of neighborhood and workplace. The significance of this finding, for the purposes of this inquiry, is that accurately measuring trust requires consideration and specification of domain.

Finally, Weaver (2006), seeking to measure the level of trust in Hispanic Americans, uses GSS data and compares the aggregate responses of Hispanics and Non-Hispanic whites on each of the three trust questions (individually and not as a composite

measure), controlling for gender. He finds that Hispanic Americans are significantly less trusting than Non-Hispanic whites. He questions but rejects the notion that the results were driven by SES, experience with discrimination, or acculturation (leaving one to wonder to what to attribute the findings).

Contributions of survey research approach.

Survey research has a number of strengths and has made a number of contributions to the measurement of trust. First, survey researchers seem to have found three questions that provide a consistent, reliable measure of generalized trusting attitudes. This is true across a variety of surveys, samples and demographic subgroups. Second, the GSS, NES, and even the MTF, generally ask the same set of core questions year after year, providing the unique opportunity to study trust across a relatively long period of time. It is particularly remarkable, especially in the case of the NES, that we have data going back to the 1950's. Third, these large-scale surveys are well administered to nationally representative samples with solid demographic information. Finally, most of the research, statistics and findings are high quality work, vetted in respected, peer reviewed journals.

Equally as noteworthy, this body of research has identified some important demographic variables that are associated with trust. Respondent race, ethnicity, education and income are particularly salient (as is frequently the case in social science research). Non-white minorities and Hispanics tend to exhibit measurably lower levels of trust than white respondents (Brahm & Rahn, 1997; Putnam, 1995; Weaver, 2006).

Individuals with greater levels of education and income tend to be more trusting than individuals with lower levels of income or education (Brahm & Rahn, 1997; Putnam, 1995). Accordingly, these variables are included in the conceptual model used in this research.

There are, however, some distinct limitations inherent in this type of research. First, this literature on trust has been criticized for measuring trusting attitudes rather than trusting behaviors (Glaeser, et al., 2000). There is no guarantee that a respondent who agrees that “most people can be trusted” makes decisions or behaves in a manner consistent with this professed belief. Second, the measures of trust employed are general, lack context and domain specificity (Glaeser, et al., 2000; Green & Broch, 1998). For example, the most ubiquitously employed question, “Generally speaking, would you say that most people can be trusted or that you can't be too careful?” does not provide the respondent with any background. Most people, where?; in my neighborhood, in my school, the nation, the world? In what situation?; at work, with peers, subordinates, or with my supervisor? Finally this line of research does not allow for the possibility that trust may be a multi-dimensional construct.

Fortunately, many of these problems will be remedied by the research conducted later in this study. In the present study of student trust in schools the data is domain specific. The respondents in the ELS survey were high school students being questioned about their experiences in high school. Additionally trust will be measured as a multi-dimensional construct.

I turn now to another, vastly different, approach to measuring trust-- game theory.

Trust as Behavior: Game Theory and Experimental Research

Game theory has also been instrumental in research on trust. In contrast to the quasi-experimental survey research described above, game theory is an experimental approach to measuring trust. Rather than measuring trusting attitudes, game theory intends to measure trusting behaviors. Game theory is based on assumptions of rational choice. That is, humans are seen as utility maximizers who make deliberate (rational) choices in order to maximize personal gain or profit, usually measured in dollars. In terms of trust, this means that humans should trust (or be trustworthy) only when they stand to gain personally.

Most game theory experiments examining trust are based on the famous Prisoner's Dilemma (Glaeser, et al., 2000; Malhotra, 2004; Paldam, 2000), originally conceived of by Princeton mathematician Albert W. Tucker in 1950. Briefly, Prisoner's Dilemma revolves around a hypothetical situation in which two men are arrested for committing a crime. Police put the men in separate rooms for questioning so that they are unable to communicate. There are four possible outcomes of this scenario: the men trust each other and neither confesses to the crime, resulting in short sentences (such as 3 years) for both men. One (or the other) man confesses, "ratting" on his partner, in exchange for no sentence or a very minimal sentence (such as 1 year) for himself, but a longer sentence for his partner (such as 5 years). But, if both men rat on their partners

(hoping for the most lenient sentence), they both receive long convictions (such as 10 years). This is usually depicted in a 2 X 2 table similar to Table 3.1.

Table 3.1

Prisoner's Dilemma Choices and Numbers of Years of Sentence

		Prisoner A: Confession?	
		No	Yes
Prisoner B: Confession?	No	(A:B) 3,3	1, 5
	Yes	5, 1	10, 10

While trust is the optimal group solution, it is not the rational choice. Rational choice theory would predict that both men opt for the solution that maximizes their own benefit, confessing in return for the shorter sentence. However, this means that both confess and they both end up with the longest sentence (10 years each). However, running counter to rational choice theory, researchers have found that individuals choose the cooperative solution, to trust one another more frequently than predicted (Malhotra, 2004; Paldam, 2000).

Many variations on this game have been played, including varying the number of years served (to vary the risk) and varying the number of times the game is played.

According to Paldam, in “the language of game theory, social capital is the excess propensity to play cooperative solutions in prisoner’s dilemma games” (p. 630). In other words, it is trust. Paldam further tells us that the:

game representation of social capital suggests a method of measurement. By choosing the right game and a particular set of experiments, one can measure social capital as the frequency by which the cooperative solution is played ...if the two players trust each other--i.e. have enough social capital--they can stay in [the cooperative solution], but without trust the game ends in [the worst solution]. (2000, p. 638)

Much of the game theory research on trust plays a variant of Prisoner’s Dilemma,⁵ frequently called the “Trust Game.” There are two principal differences between typical implementations of Prisoner’s Dilemma and Trust Games. The first is that, in Prisoner’s Dilemma, participants decide simultaneously without knowing the decision made by their partner, while in the Trust Game, participants play sequentially reacting to the decision of the other player (Malhotra, 2004). Second, most typically in the Trust Game, money is exchanged between and earned by players. The first player is the “trustor” who makes the

⁵ A variety of other trust games have been designed (though none are as popular as Prisoner’s Dilemma). For example, another common trust game involves participants finding a ‘lost’ wallet and examines their decisions to return or keep the money. Early work by psychologists endeavored to measure trust by timing the number of seconds a person hesitated before falling backwards in to the arms of other people.

initial decision about how much money to lend the second player, or the “trustee.” The amount of money lent by the trustor is, for example, tripled by the experimenter before it is given to the trustee who then decides how much to reciprocate. The amount of money lent can be viewed as a measure of trust, and the amount of money returned as a measure of trustworthiness. The net amount of money can be viewed as the aggregate level of social capital (Paldam, 2000). As in Prisoner’s Dilemma, the rules can be changed to vary the amount of risk and return, the number of exchanges, and the players’ knowledge of the rules or identity of their partner.

A number of Trust Game studies have found that “trust and reciprocity are correlated and that the degree of reciprocity is a function of the level of trust: large trusting acts make reciprocity more likely and more substantive” (Malhotra, 2004, p. 62). Because there are literally thousands of articles detailing variations on this type of game, I do not attempt a full literature review. Instead, I describe two notable examples, Glaeser, et al, (2000) and Malhotra (2004), in greater detail.

In their article, “Measuring Trust,” Glaeser et al. (2000) measure trust and trustworthiness in experiments conducted on undergraduate students enrolled in an introductory psychology class at Harvard University. One of the games played is a Prisoner’s Dilemma variant involving monetary rewards. They also survey the students on trusting attitudes (using the GSS trust questions) and add questions aimed specifically at past trusting behaviors (e.g., lending money or possessions to friends, and leaving doors unlocked). They find that the general attitudinal questions predict *trustworthiness*

(measured by the ratio of money returned) rather than trust. In other words, people who answer the GSS questions positively were less likely to cheat their partners and more likely to reciprocate. However, the questions about past trusting behavior better predict the *decision to trust*.

The authors also find that social connectedness (if the students know each other or are strangers) is positively correlated with the decision to trust and that racial and ethnic differences are negatively related to trustworthiness (as is being an only child). Additionally, they find that more sociable students receive higher monetary returns in the game.

Malhotra (2004) also uses a game theory variant of Prisoner's Dilemma to examine trust and reciprocity. Malhotra notes that prior research shows a correlation between trust and reciprocity, with experimental results that show that "trustors expect others to reciprocate even when the decisions are anonymous, others are unconstrained, and there is no possibility of future interaction." They also document that "many trusted parties reciprocate under these conditions" (Malhotra, 2004).

Malhotra attempts to distinguish between factors that influence the decision to trust versus those that influence the decision to reciprocate. He does this by setting up several Trust Games that vary the amounts of risk and benefit that can be accrued by players. After the games are played, participants are questioned regarding their perception of the decisions made by both players. In this instance, Malhotra's experiment

involves 63 MBA students attending a mid-western university, enrolled in an elective course. Malhotra analyzes the results using logistic regression (because the decision to trust or not trust is dichotomous) and analysis of variance, and finds that trustors and trustees weigh different information in their decisions. The trustor is most concerned with the level of risk the trusting act involves (the lower the risk, the higher the likelihood of trust). On the other hand, the trustee is most concerned with the level of benefit received (and does not consider the risk taken by the trustor). Trustees weigh the amount they receive when deciding how much to reciprocate. The larger the amount they receive, the more likely they are to reciprocate, and in higher amounts.

Interestingly, some researchers are now combining trust games with medical technology such as magnetic resonance imaging studies. This allows researchers to look at changes in participants' brains while they play the game, presumably making decisions to trust or not trust, reciprocate or not (King-Casas, et al., 2005).

Strengths and weaknesses of game theory.

The use of game theory to measure trust has several distinct strengths. First, game theory attempts to measure trusting behavior. This is an important distinction from the survey research which is an attitudinal measure of trust. Responses to survey questions about beliefs or attitudes about trust may, or may not, be consistent with actual trusting behavior (Malhotra, 2004). A second strength of game theory is the ability to manipulate experimental conditions. In experimental games, the level of risk, benefits, the duration

of the relationship between the players can all be modified. (Some experiments have even attempted to manipulate the moods of the players (Green & Broch, 1998)).

There are also some significant problems with this research. First, it requires a certain leap of faith to believe that lending token “money” with no real financial risk to participants measures a decision to trust. Second, that the subjects are engaged in game playing is another significant problem. It is reasonable to expect that individuals may behave differently in a game than they would in real life. The American cultural norm is that you play games to win, not to demonstrate your level of trust or trustworthiness. Not surprisingly, researchers have “questioned the validity of inferring trust” from simulated games, suggesting that “participants in PD [Prisoner’s Dilemma] games react to the situation as a competitive game rather than an opportunity to be trusting or trustworthy” (Tschannen-Moran & Hoy, 2000, p. 565). Further, though games may simulate situations where norms of reciprocity could be activated by playing multiple rounds, the reality is that decisions to trust or not trust, or to reciprocate or not reciprocate, are made in the context of a game. When the game is over, the relationship between players ends, hence, these experiments are not “embedded” in networks of social relationships which is central to social capital theory. Finally, like the survey research of trusting attitudes, most of these games lack domain specificity. That is the games are played in a sort of experimental vacuum, leaving one to wondering if measures of trusting behaviors transcend the lab and are indicative of behavior in business organizations, schools or other settings.

Finally, sample sizes are small and are far from representative. This research overwhelmingly relies on “convenience samples” (Welch, et al., 2005) of students enrolled in particular classes at particular schools. That Harvard undergraduates enrolled in a psychology class, or, MBA students enrolled in a single elective are representative of anything (other than, depending on the method of selection, maybe their classmates) seems more than obvious.

Trust as Perception: Multidimensional Domain Specific

Viewing trust as a multi-dimensional, or multi-faceted (Tschannen-Moran & Hoy, 2000) concept is the dominant paradigm in educational research. Here, trust is considered a collection of traits or characteristics (i.e. benevolence, competence, integrity) that are perceived to exist in an organization, individual or group. In this case, trust is perceptual; trust exists when a subject perceives that another person, group or organization possesses the latent components of trust. According to Adams (2008) trust involves “cognitive discernment” or a process “by which information about another party is converted into trust perceptions” (p. 31).

Much of the research in this tradition draws its roots from two principal studies by Mayer, Davis and Schoorman (1995), and Mishra (1996), both from the field of business. Mayer, Davis and Schoorman (1995) assert that ability, integrity and benevolence are the three key components of trust (Mayer, et al., 1995; Schoorman, et al., 2007). Mishra (1996) identifies four similar components: competence, openness, concern, and

reliability. Because this inquiry adopts a three-factor model based on Mayer, Davis and Schoorman (1995) their research is discussed in some detail.

In their article, “An Integrative Model of Organizational Trust,” Mayer, Davis and Schoorman (1995) review and synthesize contemporaneous research from an array of disciplines including business management, organizational theory, psychology and sociology. The authors draw on this research to propose their now seminal model of organizational trust. The Meyer et al model outlines three “factors of perceived trustworthiness;” ability, benevolence and integrity. Ability is “that group of skills, competences, and characteristics that enable a party to have influence within some specific domain” (p. 717). They note that other “theorists have discussed similar constructs...using several synonyms” among them “competence” and “perceived expertise” (p. 717). Benevolence is “the extent to which a trustee is believed to want to do good to the trustor...it suggests that the trustee has some specific attachment to the trustor” and “is the perception of a positive orientation of the trustee toward the trustor” (p. 718-719). Integrity “involves the trustor’s perception that the trustee adheres to a set of principles that the trustor finds acceptable” (p.719). Here both the acceptability of, and adherence to, the principals are important; adherence (consistency) alone is insufficient. For students this may mean not only that school rules are consistently enforced but also that they believe the rules are acceptable. The authors note that similar concepts from other research include fairness, reliability and openness.

Importantly for the present research, Mayer, Davis and Schoorman (1995) also assert that there is an interrelationship between the three factors. They stress that “ability, benevolence, and integrity are important to trust, and each may vary independently of the others.” This statement “does not imply that the three are unrelated to one another, but only that they are separable” (p. 720). They further assert that if “ability, benevolence, and integrity were all perceived to be high, the trustee would be deemed to be quite trustworthy. However, trustworthiness should be thought of as a continuum ... Each of the three factors can vary along a continuum” (p. 721).

Later quantitative research by the authors provides empirical evidence for their three factor model and the relationship between trust and performance (Davis, Schoorman, Mayer, & Tan, 2000; Schoorman, Mayer, & Davis, 2007). In a study of employee trust and restaurant performance, they demonstrate that trust of the general manager is positively related to increased sales and profit and negatively associated with employee turnover (Schoorman, Mayer, & Davis, 2007). Additionally, confirmatory factor analysis provided support for a three factor model with alpha coefficients for ability, benevolence and integrity of .617, .907 and .866, respectively.

Adopting this approach in education research, Bryk and Schneider (1996, 2002) point to four dimensions of trust: respect, competence, regard for others, and integrity. Similarly, research led by Hoy and Tschannen-Moran identifies benevolence, reliability, competency, honesty, and openness as the five “facets” of trust (Hoy & Tschannen-Moran, 1999; Tschannen-Moran & Hoy, 2000). A variety of other studies

(many of them by former students or colleagues of Hoy) adopt this five facet conception of trust as well (Adams, 2008; Forsyth, 2008; Hoy, Gage, & Tarter, 2006; Goddard, 2003; Goddard, Tschannen-Moran, & Hoy, 2001; Tschannen-Moran, 2004).

In short, in the view of these researchers, trust not only has many “facets” but it also involves perception. This line of thinking conceptualizes trust as a collection of traits or characteristics that is perceived to exist in an organization, individual or group.

Educational Research on Trust

Educational sociologist Gary Coleman is widely credited with pointing to the importance of trust, as a form of social capital, in student achievement. A central goal of education is increased knowledge, skills and abilities or what is often referred to as human capital (Becker, 1964; Coleman, 1990). And social capital, Coleman tells us, aids in development of human capital (Coleman, 1990). It makes “possible the achievement of certain ends that would not be attainable in its absence” (Coleman, 1990, p. 302) As an example he writes that “a group whose members manifest trustworthiness and place extensive trust in one another will be able to accomplish much more than a group lacking in trust” (Coleman, 1990, p. 304). Although Coleman provides important theoretical insight into the importance of trust in schools, his quantitative work focuses on other forms of social capital, leaving other researchers to grapple more directly with trust.

Drawing from Coleman, Putnam and Fukuyama, *Trust in Schools* by Bryk and Schneider (2002) has become the standard bearer in the research and measurement of trust in educational settings. Bryk and Schneider measure what they refer to as “social” or

“relational trust” which is very similar to what other social scientists refer to as “generalized trust.” The authors view trust as a “substantive property of the social organization of schools” (Bryk & Schneider, 2002, p. 12).

Through a multi-year study of school improvement efforts taking place in Chicago during the 1990’s, Bryk and Schneider find a positive relationship between relational trust and the success of school improvement efforts in low-income elementary schools. Bryk and Schneider develop three composite measures of trust-- teacher/teacher trust, teacher/principal trust and teacher/parent trust. They rank survey responses using a Rasch rating scale resulting in scores of “no trust,” “minimal trust,” “strong trust,” or “very strong trust” for each composite. Then they analyze data using Hierarchical Linear Modeling (HLM).

It is important to note that the survey items in Bryk and Schneider’s composites never ask directly about trust. In fact the word “trust” does not appear in any of the items in the composite. Instead they look at indicators of trust. For example, teachers were asked if they were evaluated fairly, if staff were encouraged and supported, if parents respect them and, if their colleagues work hard (Bryk & Schneider, 2002, p. 167).

Additionally qualitative data was gathered through observation and interviews, and Bryk and Schneider reinforce their quantitative findings with qualitative data from numerous hours of observations and interviews. They conclude that trust does vary between schools and that schools that rank higher in relational trust were better able to

engage in needed school reform efforts and change which, in turn, positively impacted student achievement in reading and math. This study remains one of the most cited and patterned-after studies of trust in schools.

In a similar vein, Goddard, Tschannen-Moran and Hoy (2001) and Goddard (2003) employ HLM to study the relationship between trust and achievement. Data in these studies is pulled from approximately 45 elementary schools, more than 400 teachers, and over 2,000 students in a large, mid-western school district. They find that teacher trust in parents and students is positively related to achievement in elementary school students, even after controlling for the effects socio-economic differences between schools.

Hoy, Gage and Tarter (2006) examine the relationship between trust and faculty mindfulness, surveying 2,600 teachers at 75 middle schools. Before examining the relationship between mindfulness and trust, the authors develop the concept and importance of faculty mindfulness. Like the studies cited above, results (using regression and factor analysis) find trust to be positively associated with mindfulness.

Seashore Louis (2007) uses qualitative research methods to examine the relationship between teachers' willingness to implement innovations prescribed by central office administrators. Her three-year investigation in five high schools reveals that trust is a central element impacting receptivity to administrator innovations.

Most recently, Goddard, Salloum and Berebitsky (2009) look at trust as a mediating factor between poverty and race and academic achievement. Like other studies, this research focuses on teacher trust and relies on data from elementary schools in a particular geographic region. Data is drawn from a stratified random sample of public elementary schools with fourth and fifth grade students in the State of Michigan. Specifically, Goddard et al look at teacher trust in parents and students. To do so, they use a 14 item scale based on Bryk and Schneider's conceptual framework. Teachers are asked to respond to questions such as "teachers in this school believe what students say" on a five point Likert scale (p. 300). Results from factor analysis produce a single trust factor based on the 14 items.

They find that trust correlates negatively with school size, poverty and race. But, they also find that teacher trust moderates the effects of poverty (as measured by free and reduced lunch rate) and race (defined as the proportion of students of color) and find a positive relationship with student achievement (measured by growth in 4th grade achievement in reading and math).

A variety of other articles center around parent and school trust (Adams, Forsyth, & Mitchell, 2009; Forsyth, Barnes, & Adams, 2006; Adams, 2008), trust and teacher learning (Fisler & Firestone, 2006), and trust and teacher professionalism (Tschannen-Moran, 2009). Only one recent piece of research by Adams and Forsyth (2009), takes on the task of measuring student trust. Adams and Forsyth use a convenience sample of 450 middle school students (grades 7, 8 and 9) to field test a 14 item Likert scale survey

intended to measure student trust. Students were asked questions about their perceptions of the openness, honesty, benevolence, competence and reliability of the faculty in general. Results of factor analysis indicated that the survey items loaded on to a single factor with items loading from .62 to .85.

Although the Adams and Forsyth work is an important step toward exploring student trust, measuring trust is only the first step. As the authors note, they did “not set out to explore the nature and function of student trust” (p. 264). Also, although the Adams and Forsyth research appears solid, it is published as a chapter in a book (*Studies in School Improvement* edited by Hoy and DiPaola (2009)). To date there are still no empirical studies of student trust in ranking peer reviewed educational research journals.

Strengths and weaknesses of educational research.

Taken together, this body of work makes a significant contribution to the study and measurement of trust. First, it focuses specifically on trust in educational settings. Importantly, we learn that levels of teacher trust and parent trust may have implications for school reform efforts and student achievement. Secondly, while direct measures of trust may be lacking, educational researchers seem to have found some reliable indicators. In many ways, these studies complement one another thereby reinforcing and lending credence to their findings.

However, this strength is also the weakness of this body of research. All of these studies focus on a particular geographical region (most in the mid-west). Many are

conducted in roughly the same period of time, and appear to be extensions of the data and field work from a few projects. This obviously imposes limitations on the generalizability of the findings.

Additionally, it is odd that while educational researchers repeatedly posit that trust is multi-faceted, empirical research as yet to measure it as such. Most of the education research measures trust either as a single factor, a composite variable, or as three factors each representing a stakeholder group (teachers, principal, parents). If the trust literature is correct and trust is made up of benevolence, competence and integrity (or any other combination of traits) then this ought to be verifiable. It is possible that empirical research has not identified separately loading constructs because trust simply cannot be disaggregated into its component parts. The facets of trust might be too tightly bound together, or too highly correlated to pull apart. In any case, the research would benefit from a trust measure that is more closely aligned to extant theory demonstrating the convergence and divergence of the factors.

Finally, most studies focus on elementary schools and few on high schools. However, most glaring in the body of literature is the constant focus on the trust levels of adults and the remarkable absence of concern with student trust. Simply put, where are the students in the studies of trust in schools? Does student trust matter? It is this shortcoming, as well as the relative absence of studies of trust in high schools, and the lack of nationally representative data which this research hopes to address.

Summary

There is a rich and varied literature on trust, inside and outside of educational research, germane to this research. In the literature reviewed in this inquiry, scholars have typically conceptualized of trust in three different manners. In the social sciences, trust is typically conceived of as an attitude, with large scale, nationally representative surveys asking direct questions about trust. In business and economics, trust is frequently conceived of as behavior with games used to measure calculative, rational choices. Samples are generally smaller, and include convenience samples of students enrolled in particular courses. Still other research from the field of business, and especially educational research, conceptualizes trust as perceptual. These surveys ask questions designed to tap into respondents' perceptions of components of trust such as benevolence, competence and integrity.

A number of salient points emerge from this body of research. First, trust is clearly associated with important consequences. For education, desirable outcomes including increased student achievement are repeatedly purported to be positively associated with trust. Whether trust is actually casual, as opposed to correlated, needs a more careful look. Second, though trust is clearly a latent construct, researchers have been able to find proxies or indicators of trust. In fact, it may be more valid to ask a variety of questions that indicate trust rather than directly asking, "Do you trust?" since trusting attitudes may not be the same as trusting behaviors. Additionally, one does not have to be able to measure highly particularized, individual trusting acts or dispositions.

Generalized or social trust is also a property of organizations and groups. Third, the literature provides useful information about likely precursors and correlates of trust including individual background, prior experiences and ethnicity. Finally, a clear hole exists in the educational research. There is an astonishing lack of studies of student trust in schools.

It is with these thoughts in mind that I offer an initial conceptual model in the next section of this study.

Chapter 4

Conceptual Model

Measuring student trust is the heart of this inquiry. As elaborated on in the previous chapter, trust is believed to be a multi-dimensional construct. This research follows the lead of Mayer, Davis and Schoorman (1995) viewing trust as a three factor construct with benevolence, competence (called ability by Mayer et al), and integrity as the essential components of trust. To reiterate, benevolence is the expectation that the trustee is acting out of kindness, with good intentions and in the best interests of the trustor. It is the “extent to which a trustee is believed to want to do good to the trustor...the perception of a positive orientation of the trustee to the trustor” (Mayer, et al, 1995, p. 718-719). Competence is the belief that the trustee is qualified, has the skills or knowledge needed to aid or assist the trustee. Integrity implies the perception of honesty, fairness and reliability. Integrity “involves the trustor’s perception that the trustee adheres to a set of principles [rules] that the trustee finds acceptable” (Mayer et al, 1995, p. 719). For students, reliability or integrity is often viewed in terms of fairness (Adams and Forsyth, 2009). This implies that, for students, integrity may be closely aligned with their perception of the fairness of rules and the consistency with which they are applied to all students.

The Mayer et al model is adopted for several reasons. It is parsimonious, intuitively appealing, and has been widely applied in research by numerous scholars in and beyond

the social sciences.⁶ Some scholars have proposed more complicated models of trust, positing that trust may have as many as ten (Butler, 1991) subcomponents. However, I strongly agree with Mayer et al that a “parsimonious model . . . with a manageable number of factors should provide a solid foundation for the empirical study of trust” (1995, p.711). It might be that very fine lines that can be explicated in theoretical, arm-chair discussions (such as the difference between “regard for others” and “respect”) are just too fine, or too loosely constructed, to be empirically measured. Words whose meanings are nearly synonymous in a dictionary or a thesaurus are likely empirically indistinguishable or multicollinear.

In short, I argue that scholars are choosing different words to describe the same basic constructs and that benevolence, competence and integrity best describe the three principle components of trust. Table 4.1 illustrates how similar terms used in well-regarded pieces of research might appropriately be organized under these three headings. As shown in Table 4.1, competence (or ability) is universally regarded as a facet of trust. It is arguable that “regard for others,” “concern” and “respect” all fit under the umbrella of benevolence. Fairness, reliability, honesty and openness may be appropriately thought of as describing integrity (and, in fact, are synonyms in Roget’s Thesaurus (Kipfer, 2001)).

⁶ According to the Social Science Citation Index the Mayer, Davis and Schoorman (1995) has been cited 1,267 times. Google scholar lists the number of citations as 4,216.

Table 4.1

Dimensions of Trust

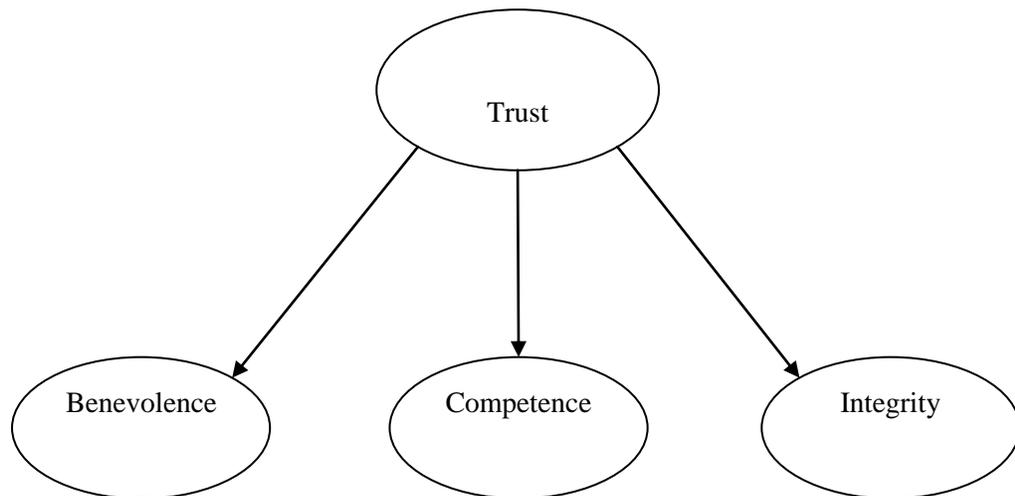
	Competence	Benevolence	Integrity
Mayer, Davis & Schmoorman (1995)	ability	benevolence	integrity
Mishra (1996)	competent	concern	reliable openness
Bryk & Schneider (2002)	competence	regard for others respect	integrity
Hoy & Tschannen-Moran (1999) Tschannen-Moran (2004) Adams & Forsyth (2009)	competence	benevolence	reliability honesty openness
Adams (2008)	competence	benevolence/regard	honesty/integrity reliability openness

Figure 4.1 displays the conceptual model of trust adopted in this inquiry. The model consists of four latent constructs, each represented by ovals. The latent construct trust has three arrows pointing to benevolence, competence and integrity which are themselves latent constructs. The direction of the arrows indicate that trust is reflected by benevolence, competence and integrity. As drawn, benevolence, competence and integrity all share common variance with trust but “each may vary independently of the

others...they are separable (Mayer et al, 1995, p. 720).” If all are high, “the trustee would be deemed quite trustworthy” (Mayer et al, 1995, p. 721). Specific measures (observed variables) for each of the latent factors are presented in the final section of this chapter and taken up in greater detail in the next chapter.

Figure 4.1

Trust Conceptual Model

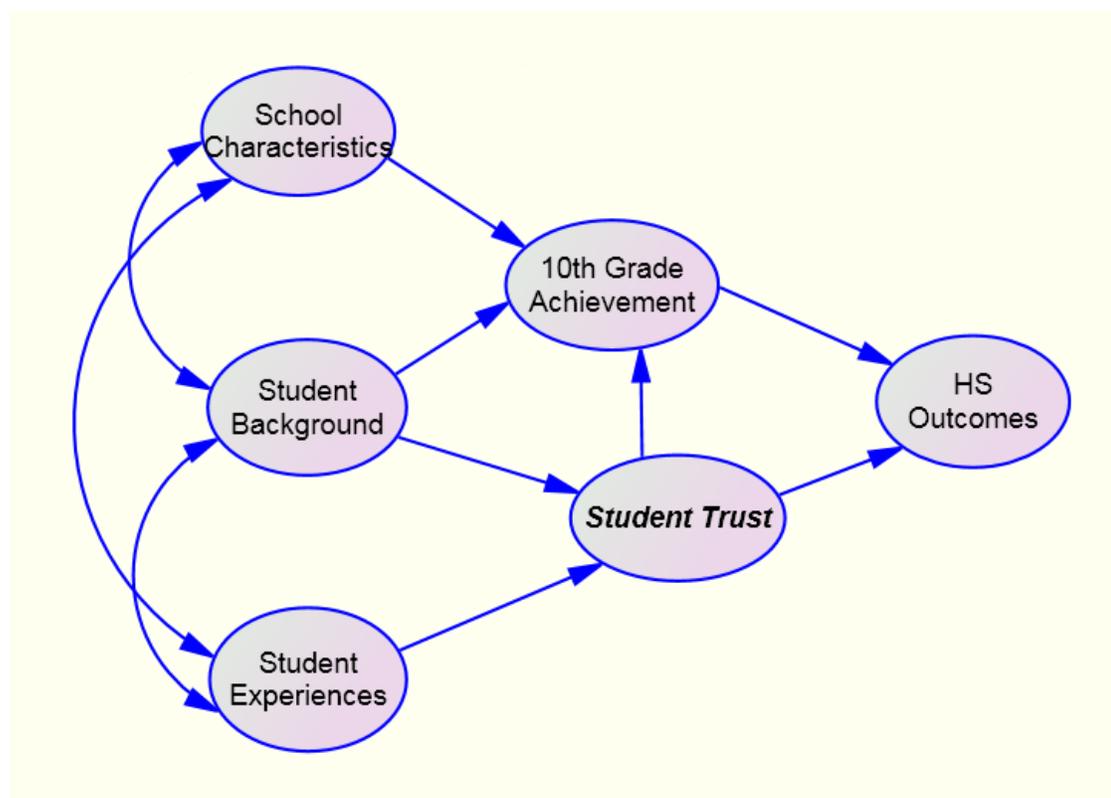


Next, trust is placed in the broader conceptual framework (only part of which will be considered in this study). In Figure 4.2 trust is positioned in relationship to key high school outcomes and antecedents. The conceptual model consists of six ovals each representing important latent constructs that effect student achievement and high school outcomes. At the far right is an oval representing High School (HS) Outcomes. High

School Outcomes include student achievement data (math achievement), high school completion status (drop-out, graduate), and post-secondary plans (i.e. employment, 2 year college, 4 year college). Arrows from 10th Grade Achievement and Student Trust point toward High School Outcomes because they are expected to explain a portion of the variance seen in these scores.

Figure 4.2

Full Conceptual Model



The oval representing 10th Grade Achievement is a control for the varying levels of student achievement, which undoubtedly will have a strong direct effect on High

School Outcomes. The arrows pointing to 10th Grade Achievement show that School Characteristics, Student Background, and most importantly, Student Trust, are expected to influence achievement.

The oval labeled School Characteristics is included because school attributes (i.e. school type, size, racial/ethnicity composition, % poverty, % English Learner) have been repeatedly demonstrated to impact student learning. For example, Lee has documented the importance of school size (Lee, Smerdon, Alfeld-Liro, & Brown, 2000; Lee & Smith, 1995, 1997) and examined differences between public and Catholic schools. Coleman documented that minority students had higher achievement in schools that were predominantly white (Coleman, 1966). Lee and Bryk have demonstrated the link between the socio-economics of schools and student achievement (1989).

The oval labeled Student Background serves as both control and a parameter of interest. The relationship between student background (i.e. socio-economic status) and achievement has been well documented since Coleman's 1966 landmark study *Equality of Educational Opportunity*. This relationship is represented by the arrow from Student Background to 10th Grade Achievement. Of more interest to this research is the path from Student Background to Student Trust, indicating the expected impact of background on trust.

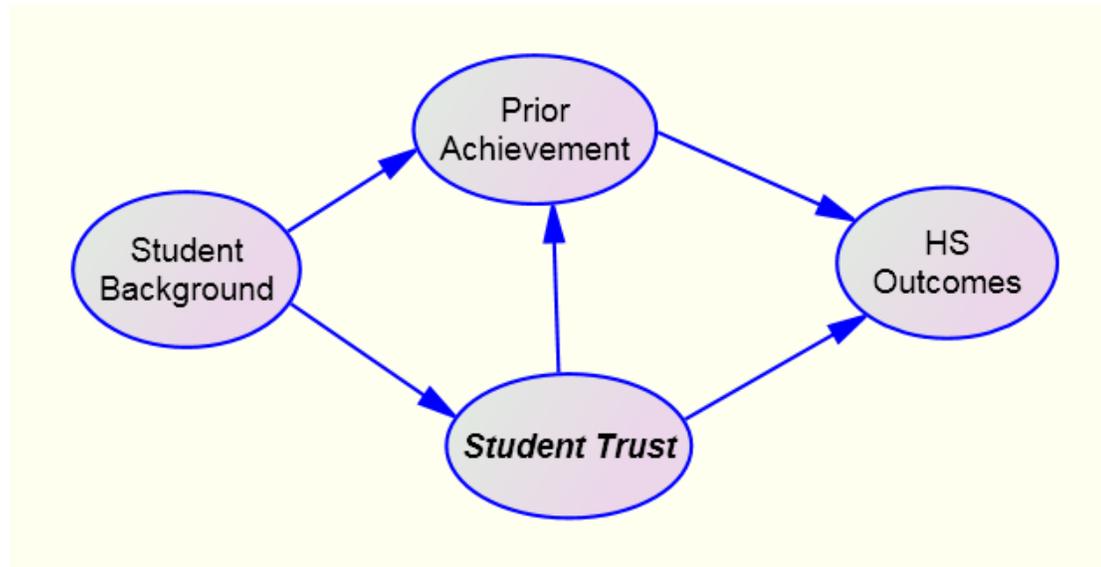
The oval labeled School Experiences (i.e. student was bullied, threatened, feels safe at school) points to trust because negative experiences can be expected to negatively influence individual trust (Green & Broch, 1998; Rotter, 1971).

The oval labeled Student Trust has two arrows, from Student Background and School Experiences, pointing to it. As such, 10th Grade Achievement, Student Background and School Experiences are expected to influence the variation in Student Trust. And importantly, Student Trust is expected to mediate the effects of these variables on High School Outcomes. Finally, of most interest to this research are the arrows pointing from Student Trust to 10th Grade Achievement and High School Outcomes. Here, not only trust is expected to directly influence 10th Grade Achievement and High School Outcomes, it is also expected to indirectly influence HS Outcome via its path through Achievement.

For the present research only a portion of the complete conceptual model is examined. This inquiry examines only the part of the model that includes the relationships between student background, prior achievement, trust and high school outcomes (see Figure 4.3). Possible additional impacts due to high school characteristics and student experiences are left for future research.

Figure 4.3

Reduced Conceptual Model



Research Hypotheses

The review of the literature, theory, and resulting conceptual model is used to pose the research questions and hypotheses of interest in this research. The first research questions concern the measurement of trust. Can trust be measured? Is it possible to measure trust with benevolence, competence and integrity as distinguishable components? The first three hypotheses address measurement.

Hypothesis 1: (First Order Factors) Measurement models for benevolence, competence and integrity demonstrate adequate fit, the direction and magnitude of factor loadings are consistent with theory, and the percentage of variance explained is substantial.

Hypothesis 2: (Construct Validity) The latent factors for benevolence, competence and integrity exhibit convergence and divergence. They correlate (converge) because all are indicators of trust, but they do not correlate too highly (divergence) showing that they measure related, but distinct, components of trust.

Hypothesis 3: (Trust is a Second Order Factor) Trust can be measured as a second order latent construct with benevolence, competence and integrity as first order constructs.

The literature suggests that poverty and low socio-economic status are associated with lower levels of trust than higher socioeconomic status.

Hypothesis 4: (SES) Socioeconomic status will be positively associated with trust.

The next hypothesis addresses the consequences of trust. That is, what is the effect of trust on high school outcomes? What is the relationship between trust, 10th grade achievement and high school outcomes?

Hypothesis 5: (High School Outcomes) Trust has a significant measurable effect on high school outcomes. The effect size is large enough to have practical as well as statistical significance.

Data

ELS 2002

To re-cap briefly, the goal of this research is to address some important new aspects of trust. These aspects are: student trust, at the high school level, using a nationally representative sample, with longitudinal data, and multiple outcomes. Data for this research will be drawn from the Educational Longitudinal Study of 2002. The Educational Longitudinal Study (ELS: 2002 or ELS) is deliberately chosen because the survey data, questions, construction and sample allow these new aspects of trust to be addressed.

ELS is particularly well-suited to examining the types of questions this research seeks to address. First, ELS surveys the population of interest-- high school students. Second, it is longitudinal. ELS repeatedly samples the same students in 2002, 2004 and 2006 as they progress through and beyond high school. Student data can be viewed cross-sectionally (looking at students in a particular grade level) or over time. Third, ELS is a nationally representative sample. It contains responses from over 15,000 students at over 750 public, private and Catholic schools nationwide. Fourth, ELS provides a rich variety of outcome data with which to examine student achievement, growth and the consequences of school. This includes math and reading achievement test data, grades, transcripts, high school graduation or dropout, college enrollment, employment and even family formation. Fifth, and central to this research, ELS provides data that can be used to measure social capital and trust. In fact, according to the NCES, some of the survey

questions were written with the stated intention of providing social capital indicators (Ingels, et al., 2007). A detailed description of the ELS database is provided below.

ELS Sample Selection

The ELS sample was drawn using a two-stage stratified sampling technique. The first stage drew a nationally representative sample of schools. The second stage selected students from within those schools.

In the first stage, schools with sophomore classes were selected. Before selection, schools were stratified by geographic region, urbanicity, and school type to ensure that the resulting school sample was nationally representative. Private and Catholic schools were deliberately over-sampled to ensure that the sample included sufficient numbers for comparison. The final school sample included 752 participating high schools representing 27,000 schools nationwide.

In the second stage, 10th grade students were selected from the school sample with approximately 24 students drawn from each school. Asian and Pacific Island students were intentionally oversampled to ensure that the sample included enough participants to make valid ethnic intergroup comparisons. Additionally, English Language Learners and Special education students are included in an expanded sample. The final student sample included 17,591 students, representing over 3 million students in public and private schools nationwide.

Base year survey: 2002.

A Base Year Survey (BY) was administered to 15,325 10th grade students attending 752 public and private high schools during the Spring of 2002. Students were asked about their high school experience, friends, attitudes and educational goals. They were also given tests to measure their achievement in mathematics and reading. Student background included information such as sex, race, ethnicity, family income and education, languages spoken and health information.

Base Year Surveys were also conducted of the students' parents, their math and English teachers and school administrators. Parents were questioned about their education and income, aspirations and expectations they held for their child, motivational and disciplinary practices, their involvement in school and acquaintance with their child's friends and family. Students' current math and English teachers were questioned about the students' ability and motivation, and their own credentials and qualifications. School administrators completed surveys about school size, student and teacher demographics, programs and courses offered, library and other resources. Additionally, the ELS survey administrator conducted a visual check list inspection of the campuses noting the general condition of the school campus and facilities (i.e. hallway noise during class, loitering students, presence of trash, graffiti, peeling paint, etc.).

First follow-up survey: 2004.

The First Follow-up Survey (F1) was administered two years later, during the Spring of 2004, to the same sample of students. Most of the original cohort of students

(85%, $n = 12,652$) were then in the 12th grade. A small percentage (1.6%) were in school but not in grade 12. Students were again asked about their high school experience, attitudes and educational goals, and were given a second mathematics achievement test. Separate surveys were administered to sample members who had dropped out, were being home schooled or had graduated early (9.3%, $n = 1369$). The remaining 8.2% ($n = 1,263$) of the sample were non-respondents or “out of scope” (i.e. “hard” refusals, out of the country, institutionalized, or status unknown).

The First Follow-up survey was also administered to a small sample of seniors ($n = 171$), not included in the Base Year survey to “freshen” the sample. Thus the First Follow-up survey consists of both nationally representative panel data (students surveyed in both 2002 and 2004, $n = 14,713$) and a cross sectional survey of students in the 12th grade in 2004 ($n = 16,252$). Additionally, the following year, transcripts ($n = 14,900$) were collected for students who participated in either the Base Year or First Year Follow-Up survey.

Second follow-up survey: 2006.

A Second Follow-Up (F2) study was conducted in 2006 (two years post high school). By this time, many students were sophomores in college; some had just started some form of postsecondary training, while others were members of the work force. The Second Follow-Up survey requested information about students’ post secondary education including college enrollment, major and financial aid information, as well as employment experience and earnings, family life, and civic involvement.

Like the First Follow-up, the second also includes a sample of students not included in earlier surveys to “freshen” the sample. Data from the Second Follow-up survey can be viewed longitudinally with panel data from 2002, 2004 and 2006 as students’ progress from their sophomore year in high school, to their senior year in high school, to postsecondary college or work-force. Alternatively, data from the Second Follow-up survey can be employed cross-sectionally looking at a nationally representative sample of students two years post-secondary.

Sample Used In This Research

Nationally representative weighted samples of students attending public, private and Catholic schools from the sophomore cohort of 2002 (G10COHRT =1) are used. Variables from all three waves of the survey (BY to F2) are utilized. In the first analysis, a cross sectional, base year student weight (BYSTUWT) is applied to the data. This sample ($n = 15,327$) includes students who participated in the base year of the survey as 10th graders in 2002. In the second analysis, panel weighted data (F2BYWT) is used. This sample ($n = 14,011$) includes students who were 10th graders in 2002 and participated in the base year and the second follow-up survey. Most, but not all of these students also participated in the first follow-up survey. Details including demographic descriptions of the samples are provided in results presented in the next chapter.

Variables and Indicators

ELS is a rich data source for the entire model. There are a number of variables in the ELS dataset which are prima facie valid indicators of student trust and, more

specifically, of benevolence, competence and integrity. Because teachers are the institutional agents with whom students interact the most, an effort was made to select variables that speak to student perceptions of teachers and classes. For measures of benevolence and competence, ELS provides variables that met this criteria. However, ELS does not contain indicators of integrity that *explicitly* mention teachers or classes. It does however include a number of survey items which can appropriately be seen as institutional indicators of integrity.

Survey items that indicate benevolence include: “Teachers are interested in students,” “Teachers praise efforts” and “Students get along well with teachers,” and (conversely) “Teachers pick on students.” Items reflective of competence are: “Classes are interesting and challenging,” “The teaching is good,” and “Teachers expect success in school.” Items reflective of integrity include: “School rules are fair,” “Punishment is the same no matter who you are,” “Everyone knows what the school rules are,” and “Students know punishment for broken rules.”

As mentioned, integrity items found in ELS seem to tap more school-wide measures of fairness and disciplinary processes than teacher-level processes. In spite of this, it is arguable that these measures of integrity are nonetheless valid for the following reasons. One, as pointed out earlier, students commonly interpret integrity in terms of fairness (Adams and Forsyth, 2009). Two, it is in fact teachers who in determine, communicate and adjudicate classroom rules and consequences. Further it is teachers, more often than any other institutional agent, who on a daily basis choose to enforce (or

not enforce) both classroom and school rules. Serious violations may result in a student being sent to a vice principal for discipline, but it is most frequently the teachers who (fairly or unfairly in the perception of the student) decide that a rule has or hasn't been broken and whether discipline is in order. Finally, as discussed in the last chapter the perception of integrity has two necessary ingredients, acceptability and adherence, which is implicit in the ELS variables. For example, asking students for their assessment of whether "the rules are *fair*" certainly taps acceptability. And, asking students if they believe that "the punishment is the *same no matter who you are*" arguably taps adherence.

In sum, ELS provides a number of measures that are reflective of benevolence, competence and integrity. Taken as a whole the survey items identified have face validity. How or whether they load in a factor analysis, and whether a more rigorous case can be made for construct validity will be one of the first tasks of this project.

Method

Structural Equation Modeling (SEM) using MPlus 5.1 will be used to measure generalized student trust and to examine both antecedents and outcomes of student trust. Structural Equation Modeling (SEM) will be employed as it is particularly well suited for multivariate analysis of complex processes involving multiple latent constructs (Tenko & Marcoulides, 2006). Generalized trust is conceptualized as a latent variable or construct. Common in social sciences, latent variables are theoretical constructs (such as motivation or IQ) for which no directly observable measure exists. Latent constructs are measured

indirectly by observing the behavior of proxy, manifest variables that can be measured. As such trust, though not directly measureable like income in dollars or the temperature on a thermometer, can be inferred and quantified through a factor analysis of these indicator variables. (Marcoulides & Hershberger, 1997; Tenko & Marcoulides, 2006). A detailed discussion of the modeling approach is provided in the next chapter.

Chapter 5

Analysis and Results

Modeling Approach

Structural Equation Modeling (SEM) is employed to examine the proposed model using MPlus 5.1. A model generating approach is used to propose and test a latent factor measuring trust, and then to examine it in a broader structural framework. The model generating approach lies midway between strictly confirmatory factor analysis (CFA) and purely exploratory factor analysis (EFA) (Raykov & Marcoulides, 2006). This approach begins much like a CFA: an initial theory-based model is proposed *a priori*, tested and evaluated for goodness of fit. But at this point, where a strictly confirmatory approach would stop and draw conclusions, a model generating approach continues to refine the model. Modeling becomes more exploratory in nature. Results, including fit statistics, factor loadings, correlations, residuals, and modification indices are analyzed, and modeling, still guided by theory, continues. An iterative process is used to make small changes to the model in order to make substantive and statistical improvements (Anderson & Gerbing, 1988).

A model generating approach is particularly appropriate for this analysis. The trust research literature universally agrees about the existence and importance of trust, and many scholars specifically conceptualize it as a latent construct. However, there is less clarity about precise indicators of trust. Although research on trust conceptualizes it

as a multi-dimensional concept, empirical educational research has yet to measure it as such. Most studies have examined trust as a composite or one factor latent variable.

This study uses a two-step modeling approach, which begins by constructing the measurement model. After this process has demonstrated the ability to measure trust, the construct is placed in a full structural equation model. Thus, the first task of this research is to discover if it is possible to measure trust as a multidimensional construct consisting of three interrelated factors-- benevolence, competence and integrity—as suggested by the research literature. Or, are the components of trust so closely related that they cannot be separated, making a single factor measurement model the best representation of trust?

Two distinct analyses are conducted. First, a cross sectional analysis of the 10th grade 2002 cohort is examined. Cross sectional analysis allows comparisons to be made across students of the same cohort. The two-fold goal of the cross sectional research is: a) to use the nationally representative ELS data to propose and test a model of student trust as a latent construct; and b) to determine whether trust can be modeled as a second order construct, based on the first order factors, benevolence, competence and integrity (providing a measure that is more nuanced and consistent with extant theory). Evaluating the validity of this measure is also an important task that will be undertaken.

Data analysis begins with a cross sectional analysis of 10th grade students in order to capture the full range of variability in trust across the 10th grade cohort. This is done because it is possible that respondents who could not be located or were “hard” refusals

in the follow-up samples may, on average, be less trusting therefore restricting the variability of the sample.

The second analysis utilizes the responses of the 10th grade 2002 cohort as they move through high school and into college, career or military. This analysis uses panel data from students, most of whom, were surveyed at three points in time: in 2002 as 10th graders; in 2004 when most of these same students were in 12th grade; and in 2006, two years after their intended high school graduation date.

The goal of this second analysis is to place trust in a broader theoretical framework. Here the goal is to determine if trust has significant consequences for students (i.e. does it have an impact on high school outcomes). Both analyses conceptualize and measure trust in the same manner. Details about the trust measurement model are presented next.

Trust Measurement Model

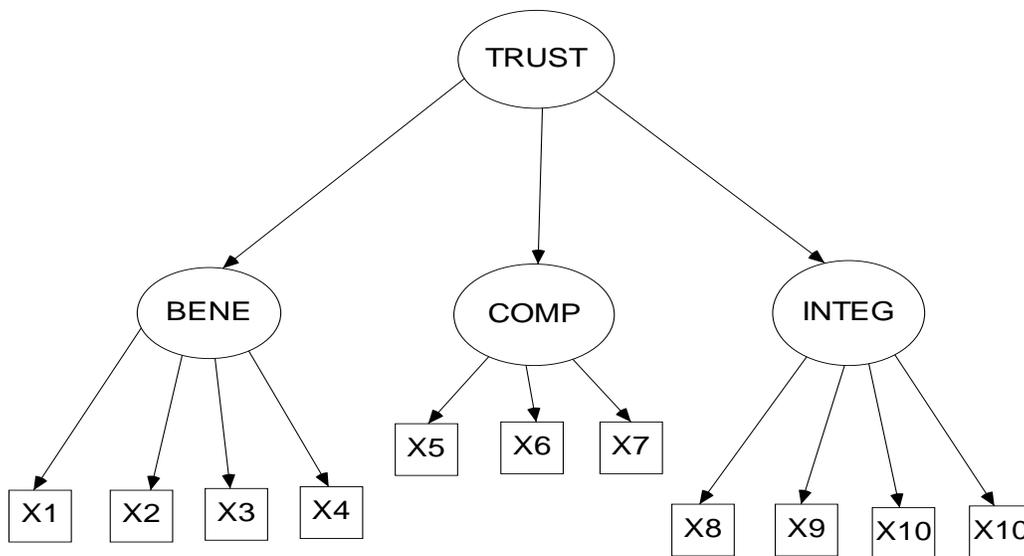
As described earlier, trust is thought to consist of three latent constructs—benevolence, competence and integrity. The first step is to see if a trust measurement model, consistent with the literature, can be found in the data. Accordingly, trust is posited as a second order factor with three first order factors reflecting benevolence, competence and integrity.

Figure 5.1 makes clear the relationship between the second order trust construct (trust), its constituent first order latent factors (benevolence, competence and integrity),

and the manifest variables in the model. Viewing the figure from the top down, trust is measured by benevolence, competence and integrity, which in turn are measured by manifest variables ($x_1 - x_{10}$).

Figure 5.1

Second Order CFA for Trust



There are a number of reasons that it is not only appropriate, but preferable, to represent trust in this manner as opposed to alternative models such as measuring trust as either a single factor or as a three factor inter-correlated model. First and foremost is theory (Koufteros, et al, 2009; Rindskop & Rose, 1988). As discussed in the last chapter, the theory on trust consistently presents it as a multi-faceted latent variable composed of other latent constructs. Furthermore some theory posits that different subcomponents of trust may be more or less important at different points of time (i.e. benevolence may be

more important when trust is developing while integrity may play a more important role in repeat encounters) and in different contexts (i.e., competence likely plays a greater role in deciding whether one should trust a surgeon whereas benevolence may be more important in a decision to trust a rabbi or pastor).

Modeled as a second order construct it is possible to assess and delineate the contribution of each of the lower order constructs (Koufteros, et al, 2009, p.634). In contrast, if trust is modeled as a first order, single factor latent variable with all of the items “bundled together... the explication of the resultant construct is incomplete (Gerbing et al, 1994) and the contribution of the various content domains to the final scale score will not be known (Koufteros, et al, 2009, p.634).” As Koufteros (2009) explains:

Second order models recognize the contribution and retain the idiosyncratic nature of each first order construct ... and treat such constructs as facets of the higher order construct. Path coefficients relate each first order construct to its second order construct and thus both the substantive and statistical contribution of each first order construct can be estimated and evaluated. The second order construct which is now a composite of first order constructs, can be posited as an explanatory variable (p.635).

In essence, trust is regressed on the three first order constructs. Variance is accounted for by the second order factor rather than calculating covariances between

benevolence, competence and integrity as would be the case if trust were represented as three correlated first order constructs.

In substantive terms, specifying trust as a second order construct makes it possible not only to measure and examine the importance of trust to high school students, it also makes it possible to see the relative importance of benevolence vs. competence vs. integrity. That is, do students trust teachers who they perceive as competent regardless of their perceived benevolence? Or, is benevolence (or integrity) the most important component of teacher trust? Or, are equal amounts of all three necessary for student trust? If trust is found to have consequences for student outcomes, then being able to distinguish between these different facets could have important implications for policy and practice. For example, when a principal is hiring, is it better to select the teacher who has an advance degree (competence) in the subject they will be teaching regardless of affect, or should the principal first be concerned with ability to establish rapport (benevolence)?

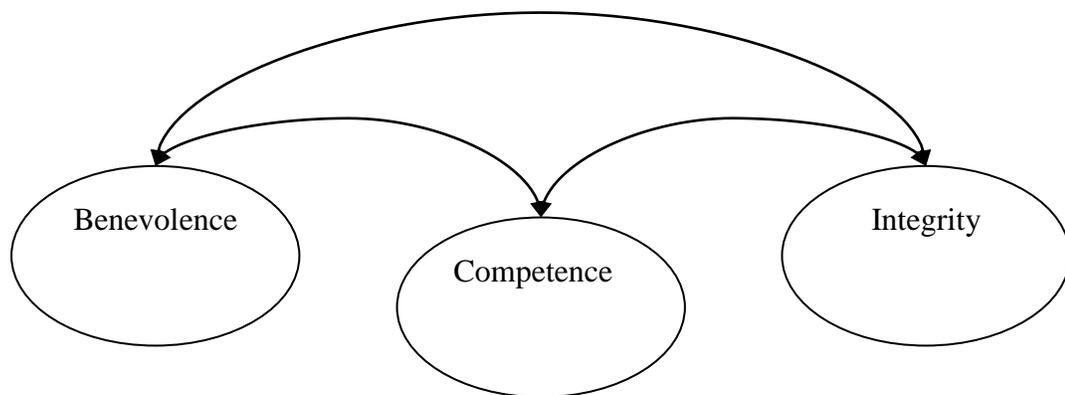
Measuring Trust: Cross Sectional Analysis of 10th Grade Cohort

Benevolence, Competence and Integrity First Order Factors

This analysis begins by testing the plausibility of benevolence, competence and integrity as three related but, nevertheless, distinct constructs. To do so, a three factor, model (shown in Figure 5.2) was analyzed to confirm that the latent factors benevolence, competence and integrity, were valid, and to establish that the constructs exhibited both convergence and divergence (Campbell & Fiske, 1959).

Figure 5.2

Benevolence, Competence and Integrity



Eleven variables from ELS were selected as likely factor indicators. Four variables were loaded on benevolence:

- Teachers are interested in students (BYS20Fr)
- Students get along well with teachers (BYS20Ar)
- When I work hard in school, my teachers praise my efforts (BYS20Gr)
- In class I often feel ‘put down’ by my teachers (BYS20H).

Three variables were loaded on competence:

- The subjects I’m taking are interesting and challenging (BYS27Ar)
- My teachers expect me to succeed (BYS27Hr)
- The teaching is good (BYS20Er)

Four variables were load on integrity:

- School rules are fair (BYS21Br)
- Everyone knows what the school rules are (BYS21Ar)
- The punishment is the same no matter who you are (BYS21Cr)
- Students know the punishment for broken rules (BYS21Er).

The variables are ordinal with original values ranging from one to four (strongly agree, agree, disagree, strongly disagree). Because this coding would result in counterintuitive results, with lower scores indicative of higher levels of trust, the variables were reverse coded. Reverse coding resulted in “Strongly Agree” having a value of 4 and “Strongly Disagree” a value of one. One variable, “in class often feels put down by teachers” (BYS20H) did not need to be reverse coded. A codebook with the ELS variables used, wording of survey questions and details about re-coding can be found in Appendix I. Descriptive statistics are provided in Table 5.1.

Table 5.1**Mean and Standard Deviation Grouped by Construct**

Construct	Variable	Mean	Standard	
			deviation	Range
Benevolence	Interested in students	2.84	.697	1- 4
	Get along	2.76	.592	1-4
	Praise efforts	2.74	.757	1-4
	Feels put down	3.13	.695	1-4
Competence	Interesting and challenging	2.58	.759	1-4
	Expect success	2.68	.816	1-4
	Teaching is good	2.91	.650	1-4
Integrity	Rules fair	2.50	.778	1-4
	Knows rules	2.99	.669	1-4
	Punishment the same	2.67	.889	1-4
	Knows punishment	2.77	.706	1-4

Note. Calculated using SPSS 18, $n=15,236$.

The model was tested using MPlus 5.1. Data were weighted (BYSTUWT) so that the sample would be representative of a national sample of 10th grade students in 2002. Because ELS uses complex stratified cluster sampling (violating the assumption of

independence) variables identifying the sample stratum and the school cluster were identified so that MPlus (using TYPE=COMPLEX) could correctly compute standard errors. Weighted Least Squares with Mean and Variance correction (WLSMV) was used to estimate the model fit because of the presence of categorical variables (Finney & DiStefano, 2006). Missing values were handled using Full Information Maximum Likelihood (FIML) estimation.

More than one fit index was used to appraise fit because each evaluates fit slightly differently (Raykov & Marcoulides, 2006). A short discussion of fit statistics, beginning with Chi-square, is provided before presenting model results.

Briefly, Chi-square compares the difference between the model implied covariance matrix and actual covariance matrix. Ideally the value should be small and non-significant (implying little difference between the model and the actual data). Since chi-square is notoriously sensitive to sample size and thus is virtually assured to be significant in this study, chi-square is used here as a very rough “badness of fit” index with the higher the value, the worse the fit.

The Tucker Lewis Index (TLI), also known as the Non-Norm Fit index, provides an alternative to chi-square which is less sensitive to sample size. This index essentially compares the difference between the chi-square value for the hypothesized model to that of the null model and adjusts for model complexity by considering the degrees of

freedom. A value of .95 or higher is considered a good fit (Raykov & Marcoulides, 2006).

The Comparative Fit Index (CFI) varies between zero and one and evaluates fit by comparing the hypothesized model to the null model (based on improvement in non-centrality). The closer the value is to one, the better the fit. A CFI above .90 indicates an “acceptable fit to the data” (Bentler, 1992, as cited in Byrne, 1998, p. 117), however higher values are desirable. According to Raykov and Marcoulides, (2006) “CFI’s in mid-90’s or above are usually associated with models that are plausible approximations of the data” (p. 46).

The Root Mean Square Error of Approximation (RMSEA) “shows how well the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available” (Browne & Cudeck, 1993 quoted in Diamantopoulis & Siguaw, 2007, p. 85). An RMSEA value of .05 or smaller indicates a good fit, and values up to .08 can be considered “reasonable errors of approximation” (Byrne, 1998, p.112).” Values between .08 and .10 are considered mediocre fits, and above .10 poor. Additionally, the RMSEA is one of the fit statistics that is least sensitive to sample size.

Turning now to results, fit indices revealed a moderate fit with the Tucker-Lewis Index (TLI) = .955, Comparative Fit Index (CFI) = .915, and a Root Mean Squared Error of Approximation (RMSEA) = .064. The chi-square value was significant $\chi^2 = 1843.205$,

$df = 30, p = .00$. In short, the model implied covariance matrix does a reasonably good, but not great, job of reproducing the actual patterns in the data.

All of the manifest variables had significant factor loadings. The directions of the loadings were consistent with theory. Correlations between each of the three latent factors were also significant and consistent with theory. Benevolence and competence correlated at .924 with a standard error of .008. Benevolence and integrity correlated at .682 with a standard error of .011. Competence and integrity correlated at .688 with a standard error of .011. Factor loadings for each of the manifest variables on their corresponding latent construct are provided in Table 5.2.

Table 5.2

Standardized and Unstandardized Coefficients for Original CFA

Construct	Variable	β	B	S.E.
Benevolence	Interested in students	.823	1.00	
	Get along	.578	.702	.011
	Praise efforts	.640	.778	.010
	Feels put down	.475	.578	.014
Competence	Interesting and challenging	.606	1.00	
	Expect success	.588	.970	.016

	Teaching is good	.787	1.298	.021
Integrity	Rules fair	.696	1.00	
	Knows rules	.545	.784	.017
	Punishment the same	.655	.941	0.17
	Knows punishment	.578	.830	0.18

n = 14,630

The magnitude of the factor loadings disclose the amount of variance observed in each of the manifest variables that can be attributed to its corresponding latent factor. This is also referred to as the amount of shared variance. Like standardized regression coefficients the magnitude of standardized factor loadings can also be compared to determine which shares the least or the most variance with the latent factor.

Briefly (because this is not the final model), the path coefficient of “interested” (teachers are interested in students) is .823 (see Table 5.2). This means that approximately 68% of the observed variance in “interested” is attributable to the latent factor benevolence. The other three variables that load on benevolence share less of their variance with “get along” (Teachers get along with students) loading at .578, “praise effort” (teachers praise student efforts) at .640, and “put down” (students feel put down by teachers) at only .475. For competence, “the teaching is good” loads the highest at .787, followed by “classes are interesting and challenging” (interesting and challenging) at .606 and, “teachers expect success” (expect success) at .588. The “rules are fair” (rules fair) and the “punishment is the same for everyone” (punishment the same) load the

highest at .696 and .655. Whether or not students “know the rules” (knows rules) or “know the punishments for breaking the rules” (knows punishment) load lower at .545 and .578, respectively.

Are these factor loadings high enough to conclude that variables are valid representations of the factors? Many introductory texts on factor analysis cite .7 or higher as ideal. However, in practice, lower values consistent with theory are acceptable.

According to Garson:

By one rule of thumb in confirmatory factor analysis, loadings should be .7 or higher to confirm that independent variables identified a priori are represented by a particular factor, on the rationale that the .7 level corresponds to about half of the variance in the indicator being explained by the factor. However, the .7 standard is a high one and real-life data may well not meet this criterion, which is why some researchers, particularly for exploratory purposes, will use a lower level such as .4 for the central factor and .25 for other factors (Raubenheimer, 2004). Hair et al. (1998) call loadings above .6 "high" and those below .4 "low". In any event, factor loadings must be interpreted in the light of theory, not by arbitrary cutoff levels (Garson, 2010).

Although higher loadings are desirable, I conclude that the estimated coefficients are valid. However, given that the model fit was adequate but not great, and that a model generating approach rather than a strictly confirmatory approach is being employed, I

next look at modification indices to see if improvements can be made to the factor structure.

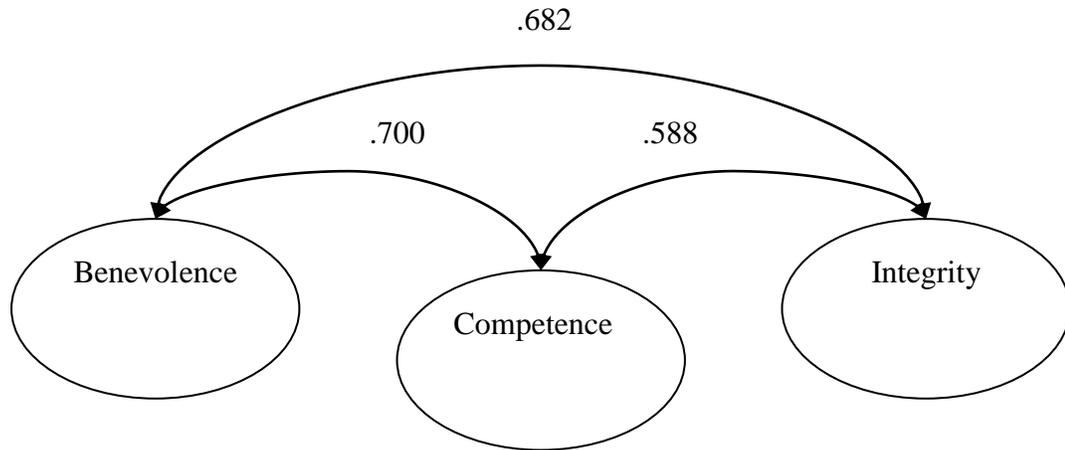
Modification indices suggested that the variable ‘teaching is good’ loaded on the benevolence factor. After careful consideration of the theoretical implications of loading “the teaching is good” on benevolence a decision was made to do so. It is possible that when students read the word “good” they interpret it as a moral rather than a technical dimension of teaching. That is “good” may imply benevolence rather than competence.

The model was re-specified with the “teaching is good” loading on both benevolence and competence. When this model was run, the coefficient no longer had a significant loading on competence. As a result, the model was again re-specified and re-run with the “teaching is good” loading only on benevolence. After these small changes, the final first order model was largely the same as the original except that one variable, “the teaching is good,” that originally was posited as loading on competence instead was found to load on benevolence.

This final trust measure, like the original, was a three factor, first order model with 11 indicators and 3 correlated latent variables, benevolence, competence and integrity. Goodness of fit statistics indicated a good fit with CFI =.952, TLI =.975 and RMSEA = .048. As expected with a sample of this size, chi-square was significant at $\chi^2 = 1059.279$, $df = 31$, $p=0.00$. Figure 5.3 illustrates the relationships between the three latent factors. Benevolence correlated with competence and integrity at .70 (SE .011) and .682 (S.E..010), respectively. Competence and integrity correlated at .588 (SE .012).

Figure 5.3

First Order Latent Factor Correlations



Since the overall model fit is acceptable, individual parameter estimates were considered. Table 5.3 presents the standardized and unstandardized parameter estimates and standard errors. Standardized results are analogous to regression β weights which are interpreted in units of standard deviation. A one standard deviation change in the latent variable will result in a standard deviation change the size of the path coefficient on the corresponding variable. For example, if competence increases by one standard deviation, a .723 deviation change in the observed value of the variable ‘interesting and challenging’ would be expected.

Table 5.3**Standardized and Unstandardized Coefficients for Final CFA**

Construct	Variable	β	B	SE
Benevolence	Interested in students	.820	1.00	
	Get along	.581	.709	.011
	Praise efforts	.643	.784	.010
	Feels put down	.478	.583	.014
	Teaching is good	.773	.943	.010
Competence	Interesting and challenging	.723	1.00	
	Expect success	.700	.968	.018
Integrity	Rules fair	.696	1.00	
	Knows rules	.545	.783	.017
	Punishment the same	.655	.942	.017
	Knows punishment	.578	.830	.018

N = 14,630, All coefficients are significant at *p* = 0.00

Comparing factor loadings reveals which observed variables share the most variance with the latent construct. In this case, teachers “are interested in students” .820 and “teaching is good” at .773 loaded high, sharing the most variance with benevolence

and “feels put down” at .478 the least. For competence, both variables loaded high at .723 and .700. For integrity, the loadings were the most modest with the highest loadings on “rules are fair” and the punishment “is the same no matter who you are” at .696 and .655 respectively.

A rule of thumb, as noted earlier, is that it is desirable for coefficients to be above .70. In the social sciences however, it is not uncommon to have lower, but nevertheless important, values. Additionally, in exploratory work, lower parameters are acceptable with values above .70 regarded as strong, values of .50 to .69 moderate, and values lower than .40 weak. Nevertheless, there is no absolute cut-off value above (or below) which a variable is considered good (or bad); whether or not a variable is “good” can only be determined by theory. In this case, variables like ‘put down’ (.478) could have been dropped from the analysis, but were retained because they are substantively interesting.

Assessing Validity and Reliability

Although modeling results indicated a good fit for the three factor trust measure, it is important to assess the reliability and validity of the indicators as well. Both reliability and validity are essential psychometric properties, however validity is arguably more important, “since a precise estimate of the wrong behavior is less useful than a relatively imprecise estimate of the intended behavior” (Marcoulides & Heck, 1993, p.22). As such, I begin with validity.

Evidence of convergent and divergent validity of the trust construct was examined and found to be satisfactory. The t values of the individual item loadings were significant, suggesting indicator validity (Koufteros & Marcoulides, 2006, p.295). Additionally, as suggested by Koufteros & Marcoulides (2006), each item's completely standardized expected change values were inspected for values greater than .40. None were found, further reinforcing the psychometric quality of the measure and that it was properly specified.

Divergent validity was assessed by placing a confidence interval of $\phi \pm 2\sigma_e$ around the correlation between benevolence and competence, between benevolence and integrity, and between integrity and competence. Because 1 was not in the confidence interval, there is evidence of discriminant validity (Koufteros & Marcoulides, 2006, p. 295).

Construct reliability was tested using Raykov's reliability coefficient (ρ) (Raykov 2004, 2009). Raykov's rho has a variety of advantages over commonly used Cronbach's alpha. Rho does not require unrealistic assumptions of alpha such the requirement of tau equivalence and uncorrelated error terms. Following Raykov, rho was estimated using maximum likelihood (ML) rather than WLSMV, generally used in this research. Maximum likelihood estimation assumes that the data is continuous and unweighted. However according to Raykov, ML is a robust estimator, capable of handling "a range of non-normal distributions" plus the "procedure is also trustworthy with minor clustering effects such as those in hierarchical data ... e.g. students nested within schools..." (2009,

p. 227). Generally, values greater than .60 are considered reliable ((Diamantopoulos & Siguaw, 2007). Because of the ubiquity with which Cronbach’s alpha (α) is used in the literature, it is also reported in Table 4.5. As can be seen in the table, each of the latent factors demonstrated construct validity with all values above .60.

Table 5.4

Reliability Coefficients

	Raykov’s Rho	Cronbach’s Alpa
	ρ	α
Benevolence	.798	.724
Competence	.730	.610
Integrity	.672	.643

Trust a Second Order Factor

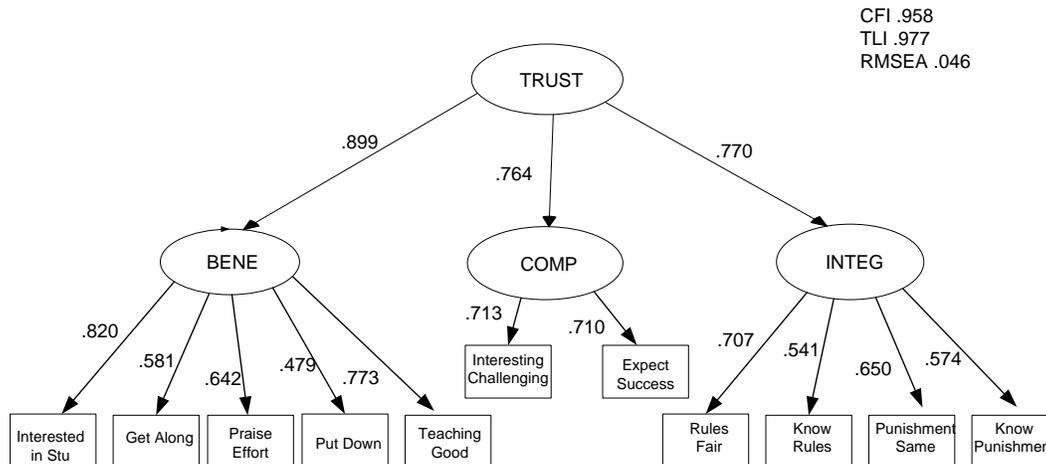
Having established the validity of the first order portion of the measurement model, a second order model was now specified. Here, consistent with theory, trust is placed center stage with benevolence, competence and integrity as subcomponents. This model posits that trust (the second order factor) accounts for the variability or “patterns of relations” between benevolence, competence and integrity (the first order factors) (Chen, Sousa & West, 2009, p. 474). Here, the three first order factors are loaded on trust, rather than being correlated with one another.

In this model, trust is a second order factor with three first order indicators measured by 11 manifest variables. The variables and the factors they load on remain unchanged from the previous first order model. Because a second order model with three factors is a just identified model, an additional constraint setting the path coefficients of competence and integrity equal, was added to the model (Byrne, 1998). This decision was made after examining the results from earlier analyses which showed negligible differences between the values of these parameters.

Weighted Least Squares with Mean and Variance correction (WLSMV) was again used to estimate the model. Goodness of fit statistics indicated an adequate fit with CFI=.958, TLI=.977 and RMSEA=.046. All of the manifest variables had significant factor loadings on their respective first order factors. Benevolence, competence and integrity all loaded significantly on trust with standardized values of .899, .764 and .770, respectively. As expected, path coefficients between benevolence and integrity to their observed measures were nearly identical to the previous first order model estimates. Results are provided in Figure 5.4.

Figure 5.4

Second Order Trust CFA with Standardized Coefficients



Of particular interest to this research is the relative importance of benevolence, competence and integrity in relation to trust. The path coefficients represent the amount of common (shared) variance in benevolence, competence and integrity attributable to trust. More than 80% of the variance in benevolence ($r^2 = .808$), almost 60% of the variance in competence ($r^2 = .584$) and integrity ($r^2 = .592$) is common to trust.

This means that as the literature suggests, not only is trust multi-faceted, but also, as posited benevolence, competence and integrity are significant components of trust. Students who are more trusting perceive, or weigh, benevolence, competence and integrity in their judgment of trustworthiness. Of the three constructs, benevolence is the most important, followed by competence and then integrity. In other words, for students to trust their teachers, it is necessary but not sufficient, that teachers are competent or that

consistent rules and consequences demonstrate the integrity of the school. It is vital that students perceive their instructors as benevolent. Although it has yet to be determined if student trust, consistent with other research on trust, has important consequences, if it does, this is an important finding with potentially far reaching consequences. For example, less tangible qualities such as the ability to establish rapport with students may be at least (or even more) important than the more easily measured “highly qualified” mandates in No Child Left Behind. Perhaps the adage “If you can’t reach them, you can’t teach them” is at least partly a truism for high school students.

In Chapter 4, five research hypotheses were presented. It is now possible to provide answers to the first three, which for readability, are repeated here.

Hypothesis 1: (First Order Factors) Measurement models for benevolence, competence and integrity demonstrate adequate fit, the direction and magnitude of factor loadings are consistent with theory.

Hypothesis 2: (Construct Validity) The latent factors for benevolence, competence and integrity exhibit convergence and divergence. They correlate (converge) because all are all indicators of trust, but they do not correlate too highly (divergence) showing that they measure related, but distinct, components of trust.

Hypothesis 3: (Trust is a Second Order Factor) Trust can be measured as a second order latent construct with benevolence, competence and integrity as first order constructs.

These hypotheses concern the measurement of trust, and this analysis finds support for all three. Three first order constructs, Benevolence, Competence and Integrity were found in the data, and they demonstrate construct validity. Further, trust can be measured as a second order latent construct with Benevolence, Competence and Integrity as first order constructs.

In sum, the data supports 1) the existence of student trust; 2) the discernment of benevolence, competence and integrity; and, 3) that benevolence is the largest component of trust followed by roughly equal contributions from competence and integrity. These findings, alone, are noteworthy contributions to the literature on trust. However, whether or not trust has consequences remains to be seen and is the principal task of the next analysis.

Assessing the Consequences of Trust: Panel Data Analysis

The goal of this analysis is to place trust in a broader theoretical (structural) framework in order to determine if trust matters by examining its consequences for students (i.e. does it have an effect on high school outcomes). While measuring trust was the focus of the first analysis, and is still key here, the real interest now shifts to the consequences of trust. Finding that student trust can be measured is interesting, but the

important question for educational research and policy is: Is trust productive? That is, does student trust play a supporting role in high school outcomes? And, can changing trust change high school outcomes? To determine this, trust is placed in a structural model as shown in Figure 5.5.

Figure 5.5

Structural Model

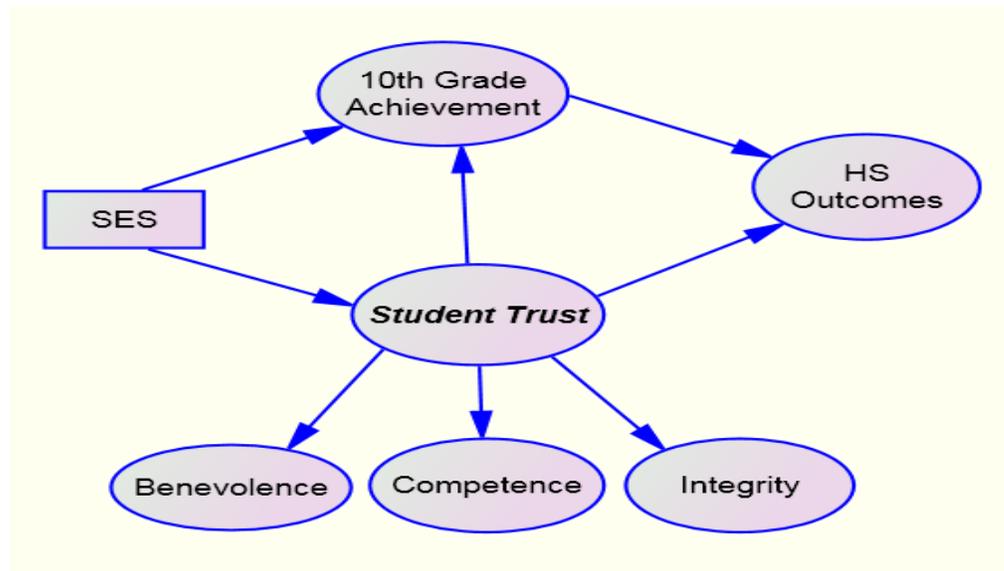


Figure 5.5 depicts the theorized relationships between trust, socio-economic status, 10th grade achievement and high school outcomes. The model contains three (endogenous) latent constructs—10th grade achievement, trust and high school outcomes—and one (exogenous) composite variable—socioeconomic status (SES). High school outcomes depend directly on 10th grade achievement and trust as indicated by the arrows. Trust and prior achievement are both regressed on socio-economic status. The

path from SES to trust is used to examine the effects of SES on trust. The path from socio-economic status to achievement is included to control for the effects of student background which are known to exert an influence on academic achievement. Although socio-economic status is easily conceived of as a latent construct, in this model the rectangle around it indicates that it is measured as composite variable.⁷

Analysis

The ELS 2002 10th grade cohort remains the object of study, but now the data is panel weighted (F2BYWT). This weight provides a nationally representative sample of 10th grade students ($n=14,000$) who were respondents in the base year study (in 2002) and in the second follow-up study (in 2006) regardless of participation status in the first follow up (in 2004) (Ingel et al, 2007).⁸

First, the trust measurement model validated in the cross sectional analysis is re-run. This is done to ensure that the shift in the sample and weighting has not disrupted the

⁷ SES is an ELS composite variable consisting of information about parents' level of education and occupation.

⁸ To be included students had to have 2002 base year data and 2006 second follow-up data. These students were included regardless of their participation status in 2004 during the first follow-up survey. Base year students included data from base year respondents, plus data from base year non-respondents who responded in the first follow-up and at which time some base year data was recovered. For additional information see *Education Longitudinal Study of 2002: Base-Year to Second Follow-Up Data File Documentation* (NCES 2008-347) available at <http://nces.ed.gov/pubs2008/2008347.pdf>.

measure of trust. That is, it is important to make sure that the trust measure is robust enough to make it appropriate to consider antecedents and consequences of trust.

The trust model specification remains unchanged; the only difference is the adjusted sampling frame and weighting. Therefore, only minor differences are expected in the new parameter estimates and fit. This could be a slightly compressed variance, small differences in the mean levels of trust, or minor changes in factor loadings. However no substantive changes such as large differences in the contributions of benevolence, competence or integrity are expected.

Second, measurement models for prior achievement and high school outcomes are specified and tested. Measurement models in place, the final step in this analysis is to specify the structural component of the model. Here the relationships between the latent constants are specified and the full model is run and evaluated for goodness of fit.

Once model fit is established, parameter estimates are used to investigate the real interest of this research—the role of trust in high school outcomes. That is: what, if anything, is the effect of trust on high school outcomes. Results of this analysis are presented next.

Measurement Models

Trust.

As in the cross sectional analysis, trust was *a priori* specified as a second order latent construct with benevolence, competence and integrity as first order factors. The same

manifest variables were used as in the previous analysis. They are repeated here for readability. Five variables were loaded on benevolence:

- teachers are interested in students (BYS20Fr)
- students get along well with teachers (BYS20Ar)
- teachers praise efforts (BYS20Gr)
- the teaching is good (BYS20Er), and
- in class often feels put down by teachers (BYS20H).

Two variables were loaded on competence:

- classes are interesting and challenging (BYS27Ar), and
- teachers expect success in school (BYS27Hr).

Four variables were load on integrity:

- school rules are fair (BYS21Br)
- everyone knows what the rules are (BYS21A)r
- the punishment is the same no matter who you are (BYS21Cr), and
- students know the punishment for broken rules (BYS21Er).

Because the manifest variables are ordinal variables with four categories rather than true continuous variables, weight least squares with mean and variance correction (WLSMV) was used to calculate parameter estimates. Model fit statistics indicated that the model was a good fit with CFI = .963, TLI = .977 and RMSEA = .045. As anticipated with a sample of this size, the chi-square statistic was significant with $\chi^2(28, 0.00) =$

766.892. Factor loadings for all of the path estimates were significant and varied minimally from the first analysis. Benevolence, competence and integrity all loaded high on trust providing evidence consistent with theory that they are in fact subcomponents or facets of trust. As earlier, benevolence loaded the highest at .894 with competence at .767 and integrity at .772 (standardized scores). The factor loadings of the manifest variables are presented in Table 5.5.

Table 5.5

Standardized and Unstandardized Coefficients for Second Order Trust CFA

Construct	Variable	β	B	SE
Trust	Benevolence	.894	1.00	
	Competence	.767	.736	.016
	Integrity	.772	.736	.016
Benevolence	Interested in students	.828	1.00	
	Get along	.590	.713	.012
	Praise efforts	.645	.779	.011
	Feels put down	.487	.588	.014
	Teaching is good	.772	.932	.017
Competence	Interesting and challenging	.711	.447	.011

	Expect success	.705	.992	.019
Integrity	Rules fair	.706	1.00	
	Knows rules	.536	.759	.019
	Punishment the same	.659	.933	.017
	Knows punishment	.573	.812	.018

$n = 12,852$, All coefficients are significant at $p = .000$

Satisfied that switching to the panel weighted data has not affected the trust construct, measurement models for the remaining constructs in the full model (high school outcomes, 10th grade achievement and student background) were considered next beginning with 10th grade achievement.

10th grade Achievement.

Tenth grade achievement was measured as a latent factor with three manifest variables: 10th grade point average (F1RGP10) and scores on tests of math (F1TXMBIR) and reading ability (BYTXRIRR). Sophomore grade point average was obtained from school records during the First Follow-Up survey in 2004. Tests of math and reading were administered by ELS when students were sophomores in the spring of 2002 (in the Base Year survey). The tests are criterion referenced IRT scores. Reading IRT scores range from 0-51 with a weighted mean of 29.4 and standard deviation of 9.66. Math IRT scores range from 0-85 with a weighted mean of 42.2 and a standard deviation of 13.95. Tenth grade gpa ranges from 0-4.0.

Table 5.6**Descriptive Statistics for 10th Grade Achievement**

Variable	Mean	Standard	
		deviation	Range
10 th Grade Reading IRT	29.69	9.66	10.20 - 49.09
10 th Grade Math IRT	42.65	13.95	13.74 - 82.54
10 th Grade GPA	2.63	.88	0.00-4.00

Calculated using SPSS 18, $n = 14,011$.

The model was estimated using maximum likelihood estimation because the variables are continuous. Factor loadings are presented in Table 5.7. Fit statistics are not provided because the model only has three observed variables making it just identified.

Table 5.7**Standardized and Unstandardized Coefficients for 10th Grade Achievement CFA**

Construct	Variable	β	B	SE
HS Outcomes	10 th Grade Math IRT	.902	1.00	
	10 th Grade Reading IRT	.828	.636	.009
	10 th Grade GPA	.612	.043	.001

$n = 13,992$

Student background.

Family socio-economic status, measured by a composite variable (F1SES2) was used to control for the effects of student background. ELS provides a measure of SES in 10th grade (2002) which is a composite of parents' level of education and occupational prestige. Occupational prestige is calculated using 1989 General Social Survey occupational prestige scores (Ingels et al, 2007). Values of the SES composite variable are z-scores with a mean of zero and a standard deviation of one. Values ranged from -2.12 to 1.97

High school outcomes.

As discussed earlier, this inquiry is interested in the effects of trust on high school outcomes that have lasting, real-life consequences for students as they transition to college and career; in other words, outcomes that can “change the shape of the river” for individual students (Bowen & Bok, 1998). Accordingly, multiple measures of high school outcomes were selected including variables reflective of whether or not students graduated, what their post secondary plans were, the highest math class taken, in addition to more ubiquitous variables like test scores and grade point average (GPA). A description of the variables used in the outcomes measurement model follows.

To measure high school outcomes, five variables were included in a confirmatory factor analysis: graduation status (GRADUATE), post secondary plans (F1PSEPLN), the

highest math class taken (HIMATH), 12th grade gpa (F1RGP), and 12th grade math IRT score (F1TXM1IR). Grade 12 IRT math scores ranged from 16.29 - 82.54 (with a possible range of 0-85) with a mean score of 48.879 and a standard deviation of 15.078. Grade point average was measured on a typical 4 point scale, ranging from 0.00 - 4.00 with a mean of 2.68 and standard deviation of .79.

Graduation status ranged from one to four with a score of 1 applied to dropouts or non-graduates (4.6%); 2 indicating that the student was still in high school or working towards a GED (3.2%); 3 for students that received a GED or certificate of completion (4.4%); and, 4 for students who graduated with a regular high school diploma (87.8%). This variable is skewed with almost 88% of the respondents graduating on time. In spite of the skewness, the variable is retained because whether or not a student graduated is arguably the most important of all high school outcomes.

Postsecondary plans asked students whether they planned to continue their education after high school and, if so, what type of postsecondary institution they planned to attend. Post secondary plans ranged from one to 6 with 1 indicating that the student did not plan to continue (1.2%); 2, the student did not know or has unspecified plans (5.4%); 3, student planned to attend vocational, technical or trade school (7.0%); 4, student planned to attend 2-year college (19.4%); 5, planned to attend a 4-year university (52%); or 6, student was an early graduate, already attending a post-secondary institution (2.4%). Table 5.8 provides descriptive statistics for each of these variables.

Table 5.8

Descriptive Statistics for HS Outcome Variables

Variable	Mean	SD	Range
12 th Grade Math IRT	48.88	15.08	16.29 - 82.54
12 th Grade GPA	2.68	.79	1.00 – 4.00
Graduation Status	3.754	1.88	1- 4
Post Secondary Plans	4.41	.993	1- 6
Highest Math Course	4.95	1.22	1 - 5

Calculated using SPSS 18, $n = 14,011$.

A confirmatory factor analysis was run on the measurement model for high school outcomes. Maximum likelihood (ML) was used to estimate the model (rather than WLSMV) because the observed variables were either continuous (math IRT score and gpa), or were categorical (graduation status, post secondary plans and highest math taken) but contained enough categories to handle them as if they were continuous. After evaluating an initial run, a correlation was added between the residuals for GPA and graduation status. Given the inextricable link between GPA and graduation, it is not at all surprising that the residuals are correlated. The model fit with CFI=.987, TLI=.967 and RMSEA = .039. Chi-square was 87.30, $df = 4$, $p = 0.00$. Factor loadings are provided in Table 5.9.

Table 5.9

Standardized and Unstandardized Coefficients for High School Outcomes CFA

Construct	Variable	β	B	SE
HS Outcomes	12 th Grade Math IRT	.834	1.00	
	12 th Grade GPA	.737	.045	.001
	Graduation Status	.395	.022	.001
	PS Plans	.500	.038	.001
	Highest Math	.706	.066	.002

$n = 14,011$

Full Structural Equation Model

Having satisfactory measurement models, I now turn to the full structural model. Assembling the measurement components into the full structural model allows consideration of trust placed within context. The structural model permits examination of the relationships between the latent constructs and concurrently to see how the latent constructs are related to the observed variables. With the full model in place it is possible not just to measure trust but also to assess the consequences of trust (its impact on high school outcomes) and the antecedents of trust (the effect of SES on trust).

Once the model is fit, parameter estimates in the structural model can be examined and interpreted in light of the theory being examined. The structural

component of the model is the relationships between the latent constructs, represented by the arrows, or paths, between SES and trust, SES and prior achievement, trust and prior achievement, trust and high school outcomes. Again, standardized values of these parameter estimates are comparable to regression coefficients. As such, when considering a direct path from one latent variable to another, a one standard deviation increase in the predictor variable (the variable from which the path originates) results in an increase (in standard deviation units) equivalent to the value of the path coefficient in the outcome variable (the variable that the arrow points to). Indirect effects of latent variables can also be examined by multiplying the coefficients along the path.

There is one exogenous composite variable (SES) and three endogenous latent variables (10th grade achievement, trust and HS outcomes) in this model. Trust is hypothesized to have a direct effect on 10th grade achievement (Trust → 10th Grade Achievement) as well as a direct effect on high school outcomes (Trust → HS Outcomes), and an indirect effect on high school outcomes (Trust → 10th Grade Achievement → HS Outcomes).

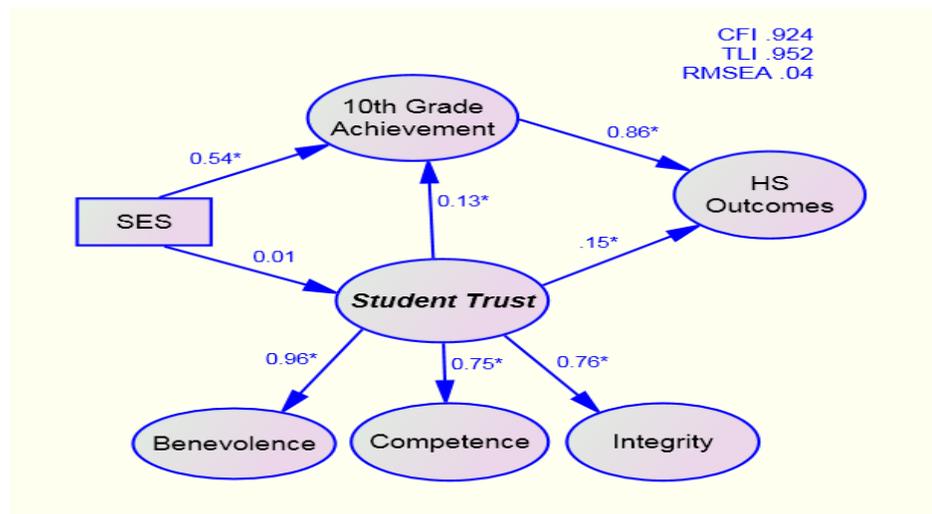
Tenth grade achievement is expected to have a direct effect (10th Grade Achievement → HS Outcomes) on high school outcomes. Socio-economic status is assumed to have a direct effect on 10th Grade Achievement (SES → 10th Grade Achievement) and a direct effect on trust (SES → Trust).

Results

Fit statistics indicate that the overall fit of the model is good with CFI = .92, TFI = .95 and RMSEA = .041. With one exception, the parameter estimates were significant and displayed small standard errors.⁹ A graphical depiction of the structural portion of the model with standardized coefficients is shown in Figure 5.6.

Figure 5.6

Path Diagram of Structural Model



⁹ The following adjustments were made when fitting the model: a) the 10th grade gpa variable was removed from 10th Grade Achievement construct because of multicollinearity with 12th grade gpa in the HS Outcomes construct. And, b) two theoretically sound correlated error terms were added: 1) Everyone knows what the school rules are”(BYS21Ar) was correlated with students know the punishment for broken rules (BYS21Er); and 2) Tenth grade math IRT (FITXMBIR) with 10th grade reading IRT (BYTXRIRR); Fit statistics without these correlations were only slightly different CFI = .931, TLI = .951 and RMSEA = .044.

Interestingly, the only non-significant parameter was the relationship between socio-economic status and trust. This is surprising and important because it suggests that trust is produced independently of socio-economic status, over which schools have no control. Accordingly, I reject:

Hypotheses 4: (SES) Socioeconomic status will be positively associated with trust;

The central interest to this research is the effect of trust on high school outcomes. The direct effect of trust on high school outcomes is statistically significant but, the magnitude of the effect (.150) is too small to be of practical significance, accounting for only 2.3% of the variance. Likewise, the indirect effect of trust via its path through prior achievement, of $(.13 * .86) .12$ is not of sufficient magnitude to alone be meaningful. However taken together, the total effect of trust is .26. This, albeit small, is large enough to be practically meaningful. In essence, trust (traced from all sources) accounts for 6.8% of the variance ($r^2=.0685$) in high school outcomes. This is an important finding for this research. The assertion that student trust has consequences is correct. Thus, Hypothesis 8, repeated below, is affirmed.

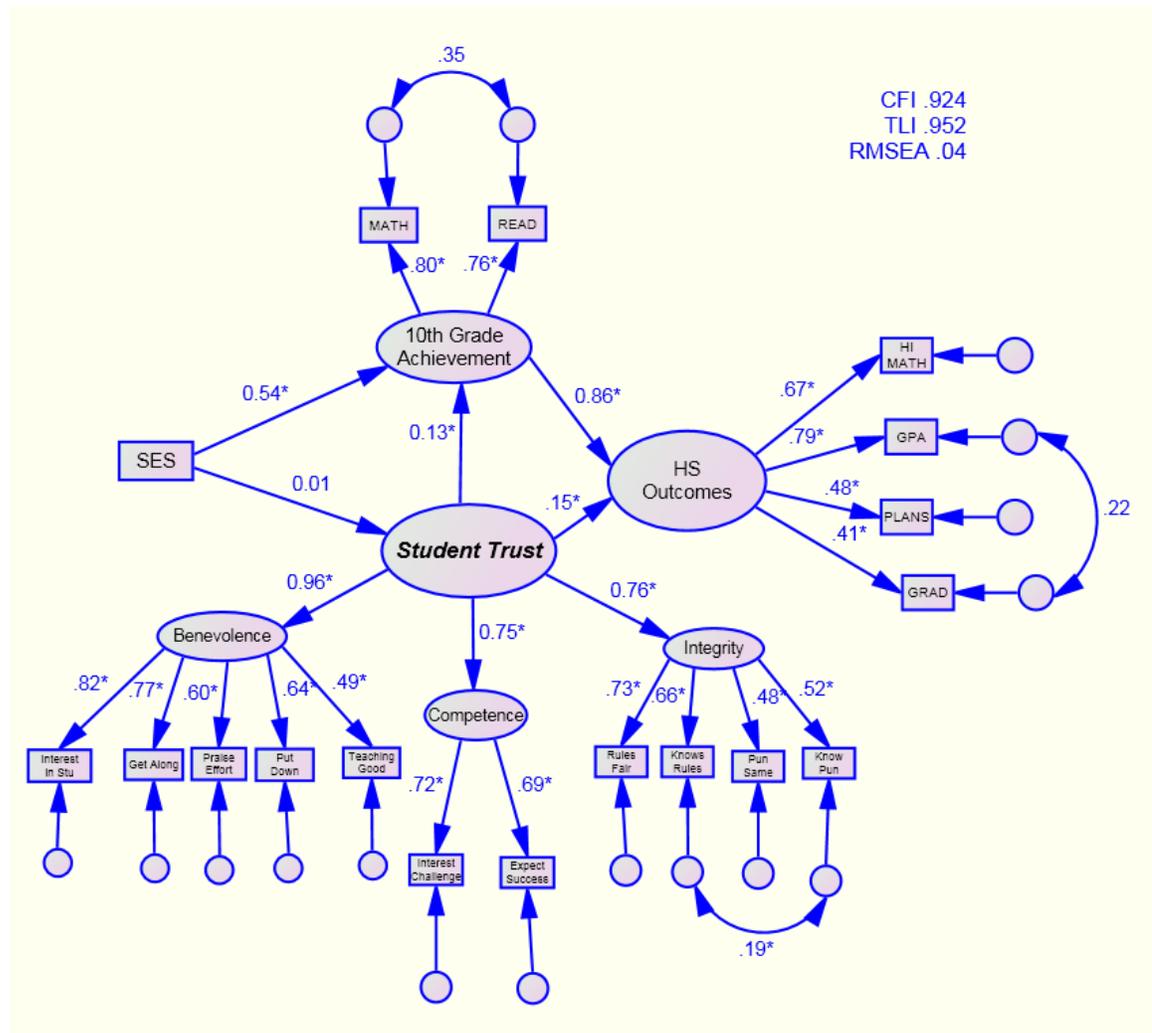
Hypothesis 5: (High School Outcomes) Trust has a significant measurable effect on high school outcomes. The effect size is large enough to have practical as well as statistical significance.

The majority of the variance in high school outcomes is accounted for by 10th grade achievement. As anticipated, 10th grade achievement has the greatest effect on

high school outcomes. The direct effect, .86, is large accounting for about 74% of the variance in outcomes. Figure 5.7 is path diagram of the full model.

Figure 5.7

Full Trust Model



Summary

Results from this analysis add two notable findings to those discussed earlier. First and most saliently—student trust has consequences. Whether or not students trust in schools; whether or not they perceive high levels of benevolence, competence and integrity has an impact on multiple high school outcomes including their GPA, the highest level of math they take, whether or not they graduate, and their post secondary plans educational plans.

Second, no relationship was found between socio-economic status and trust. In other words, family socio-economic status is not producing trust. This also means that the antecedents to student trust are not accounted for in this analysis. However, coupled with the finding that trust matters, this is an encouraging finding since family socio-economic status cannot be manipulated by schools.

The next and final chapter in this dissertation considers the research findings as a whole, considers their implications, and points to further research needed on student trust.

Chapter 6

Discussion, Implications, Future Research

For more than 50 years, policy makers and reform-minded educators have sought to improve schools and student learning. In spite of this, U.S. student achievement still lags behind a surprising number of nations in international comparisons. At the same time, the once narrowing achievement gap within the U.S. is stagnant and may be starting to widen. Undoubtedly, there are many reasons that reform has failed to produce the expected gains. This dissertation began by suggesting that one reason may be the quest for a silver bullet solution, the one best practice, program, or organizational structure and, the dogged insistence that the solution lies in the purely rational realm. Most reform efforts have neglected to acknowledge and consider an important fact of organizational life: schools are social organizations. There is no substitute for first-rate execution of the technical components of schooling but, as any Superintendent or Principal who has tried to institute comprehensive reform, or any teacher who has waited-out change, can attest to, the social side of schools can trump the technical. This is no less true for student learning; no matter how meticulously a lesson is planned students will not learn unless they are willing and cooperative.

Research on trust brings the social side of schooling back into reform efforts, and illuminates how a social mechanism can enhance, or dampen, student achievement. While there has been growing recognition of the importance of trust in efforts to reform

schools, and prior research has documented the importance of teacher, parent and principal trust, empirical studies of student trust have been missing. This dissertation fills that important hole in the research literature by shifting the focus to *student trust*, by considering whether and how student trust matters, and by examining the effect of trust on key high school outcomes, including graduation and post-secondary plans.

Above all, this inquiry sought to discover whether or not student trust, like teacher trust, was productive, asking: What are the consequences of student trust? Does high school student trust have a positive impact on secondary outcomes? To answer these questions, it was necessary to first determine: can, or how can, student trust be measured? Is it possible to measure student trust as a multi-faceted construct, consistent with the literature? Are benevolence, competence and integrity distinguishable components of trust? In addition to answering these fundamental questions about student trust, this dissertation sought to consider the “shape of the river” by looking at multiple high school outcomes with real life significance, as opposed to depending on narrow measures like a single score on a test of math or reading. Moreover, rather than relying on regional surveys of elementary or middle schools, this research tested these questions using a nationally representative longitudinal survey of high school students. In what follows key findings from this research are summarized, implications for policy and practice are discussed, and a guidepost to future research is presented.

Key Findings and Implications

Most saliently, I conclude that student trust does have a meaningful impact on high school outcomes. Students with high levels of trust have more positive high school outcomes than students low in trust. Specifically, trusting students are more likely to graduate, have more ambitious post secondary plans, have taken higher level math courses and have higher grade point averages. While the effect of trust is not large enough to move a student who is grossly behind in credits and achievement to high grades and graduation, the effect is large enough be helpful; moving a student on the border toward graduating, providing the extra push to enroll in a higher math class, or increasing their post secondary ambitions. In short, this research concurs with previous studies that “trust matters,” (Tchannen-Moran, 2009) but extends this to *student* trust matters.

This research also provides important information about essential components of trust. Student trust involves the discernment of benevolence, competence and integrity in school organizations and staff. Benevolence involves the perception of being well-meaning, of having positive intentions toward students. Competence entails the perception of requisite ability and skill. Integrity encompasses a sense of fairness and adherence to reasonable principles. All three are critical to trust but, of the three, benevolence is clearly the most important, followed by competence and integrity in equal proportion.

That a teacher needs to be a content matter expert goes without question, but images of teachers who know their subject matter but are nevertheless ineffective abound. Hollywood provides us with a plethora of memorable examples. The preeminence of benevolence is striking in the contrast between history teacher, Mr. Hand, in *Fast Times in Ridgemont High*, or, Coach Sue Sylvester in *Glee*, as compared to teacher Erin Gruwell in *Freedom Writer's Dairy* or alternative school teacher, Ms. Blu Rain, in *Precious*.

What are the implications of these findings for policy and practice? While on the surface, this may seem a simple question, it, in fact, requires consideration of a number of levels, from the classroom to national policies on education. In the classroom, instilling trust can be a powerful tool for teachers, enticing students to learn and strive toward better outcomes. And, a guideline is provided because increasing benevolence is clearly the most important element to increasing trust. Thus, as a classroom teacher, one would do well to remember that authentic authority is transformational, and far better a motivator than reliance on power. Additionally, teachers might increase the perception of benevolence by demonstrating a genuine interest in students, caring about their well-being and future. Here research on caring may provide guidance (Noblit, 1993; Teven and McCrosky, 1993; Valenzuela, 1997).

School administrators and district personnel might also be mindful of these research findings as they make hiring decisions, offer teacher training, and other incentives. School principals and district office personnel should look for employees who

demonstrate all three components of trust. Whether hiring a new secretary, attendance clerk, chemistry teacher, or principal, it is vital to weigh apparent affective traits like benevolence along with credentials certifying competence. For existing employees, schools could follow the lead of business organizations many of whom now provide training in how to develop, maintain and repair trust, and incentives for those who do.

But the implications of this research go beyond what takes place in schools. Every state and the federal government have elected officials and bureaucratic agencies that create and implement policies intended to improve the education of young people. This dissertation also has important implications for those policy makers. Here again, the selection and training of teachers would wisely be mindful of the social aspect of schools. Currently, under No Child Left Behind, teachers must be “highly qualified,” with an emphasis on demonstrating subject matter competence. Indeed, the growth of alternative certification programs have, in part, grown from this notion that mere subject matter competence or business experience is enough to make a good teacher who will be successful in the classroom (Mitchell & Romero, 2010). This dissertation provides support for the assertion that competence is essential but demonstrates that it is not enough. Thus, state mandated teacher training programs and certification, whether traditional or alternative, must provide a well round curricula that includes an emphasis on creating a climate of trust.

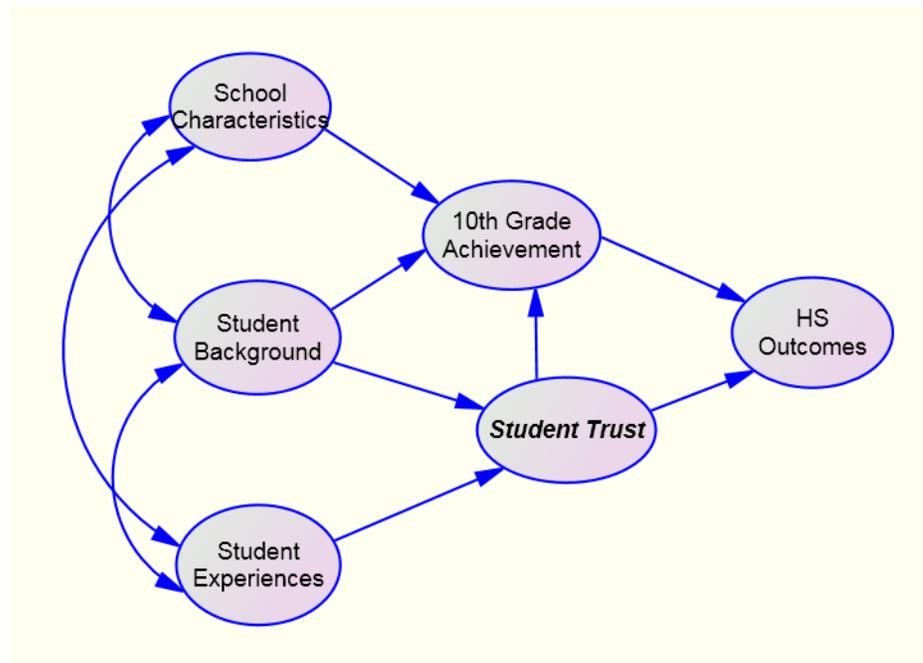
Future Research

This dissertation provides solid foundation for future research on student trust. It establishes that student trust is productive and has an impact on high school outcomes; that it involves three essential and distinguishable elements; that all three are vital, with benevolence sharing the most variance with trust. With this foundation place, the path for future research is laid out next.

If we return to the model established in Figure 4.2, a full conceptual model of trust was proposed, of which this research could only examine a portion. That model is repeated here (as Figure 6.1) for ease of discussion. The full conceptual model included two additional latent constructs, School Characteristics and Student Experiences, which are believed to be either direct or indirect antecedents of trust. These constructs are represented in Figure 6.1 by ovals to the right of trust.

Figure 6.1

Full Conceptual Model



Future research needs to investigate the antecedents of trust. What school characteristics might generate greater student trust? Are there particular school practices or structures that may impact trust formation? Past research has pointed to important differences in school size for student performance. Likewise, Catholic or other religious schools might use the shared values present to generate greater amounts of student trust. ELS data might be used for these analyses. Other school characteristics such as the percent of students in poverty, English language status, and ethnicity of schools may play a role, as well.

This dissertation also only considered socio-economic status when considering student background. Future research could offer insight into the role of other items such as family composition (including divorced or single parents). Student ethnicity and immigration status should be considered. The potential interaction of trust with race and ethnicity of students is a critical question, especially in light of the persistent achievement gap. Work needs to be done to fully understand the development of trust across and within ethnic groups, and its role in achievement.

While not in the scope of this research, much is yet to be learned about how trust in schools is actually developed, maintained, lost and repaired (Kochanek, 2005). There is business research on this topic, but whether or not it translates to classrooms and corridors is unknown. Additionally, qualitative research to gain a better understanding of how trust is enacted in every day classroom settings and in teacher-student relationships would complement and enhance what is learned from quantitative research.

Lastly, the Educational Longitudinal Study used in this research is a valuable tool for research on high school students, student achievement, and important transitions from and beyond high school. There are few datasets that offer the wealth and variety of information about high school students that ELS offers. It was not however, designed with the study of trust in mind. Fortunately questions designed to assess social capital, motivation and student attitudes were deliberately included. Future research on student trust, however, would benefit from a survey or additional survey questions specifically written to study trust, benevolence, competence and integrity. Such a survey would be

useful not only to validate the results of this inquiry but also to enable researchers to make a more thorough and nuanced look at the role of student trust in schools.

If past is prologue, we must expect that work to reform and improve schools will be with us for a long time. In fact, we are just now beginning to see the outlines of “Race to the Top,” the Obama Administration’s reform effort. This research suggests that, as Elton Mayo once discovered, the human side of organizations is a powerful force. It is, in fact, time to consider more than just how bright the lights are. It is time to see schools and treat schools as complicated social structures, and social structures where trust plays a vital role.

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- 2 'Disagree'
- 3 'Agree'
- 4 'Strongly agree'

If a school rule is broken, students know what kind of punishment will follow **BYS21Cr** **BYS21C**

Description: ELS variable BY21C reverse coded. Values are:
 1 'Strongly disagree'
 2 'Disagree'
 3 'Agree'
 4 'Strongly agree'

Tenth Grade Achievement Factor

Construct	Dissertation	ELS
Variable description	variable	variable
10th Grade Achievement		
<i>Reading IRT estimated number right</i>	BYTXRIRR	BYTXRIRR
Description: Base year, 10 th grade, reading Item Response Theory (IRT) estimated number right based on 51 items. See Ingels et al (2207) for a more detailed discussion.		
<i>F1 math IRT estimated number right for base year scores</i>	F1TXMBIR	F1TXMBIR
Description: Base year, 10 th grade, math Item Response Theory (IRT) estimated number right based on 85 items. See Ingels et al, (2207) for a more detailed discussion.		
<i>GPA for all 10th grade courses</i>	F1RGP10	F1RGP10
Description: Tenth grade GPA based on traditional 4.0 scale with A=4.0, B=3.0, C=2.0, D=1.0, F=0.0		

High School Outcomes Factor

Construct	Dissertation	ELS
variable description	variable	variable
High School Outcomes		
<i>Graduation status</i>	GRADUATE	F2HSSTAT
Description: Graduation status as of Second Follow-up survey in 2006. Recode of ELS variable F2HSSTAT, High School Completion Status. Collapses ten responses to create a four value ordinal variable. Values are: 4=Graduate with regular high school diploma (F2HSSTAT values 1-4), 3= GED or certificate of completion (F2HSSTAT values 5-6), 2= Still enrolled in high school or working toward GED (F2HSSTAT values 7-8), 1=Drop-out or Non-graduate (F2HSSTAT value 9). See ELS:2002 Data File Documentation for more information on F2HSSTAT.		
<i>F1 post-secondary plans right after high school</i>	F1PSEPLN	F1PSEPLN
Description: Student post secondary plans right after high school from First Follow-up survey in 2006. Values are: 1=does not plan to continue education, 2=does not know or has unspecified plans, 3=vocational, technical or trade school, 4=two-year college, 5=4-year university, 6=early graduate already attending post-secondary institution. See ELS:2002 Data File Documentation for more detail.		
<i>F1 highest math course of a half year or more</i>	F1HIMATH	F1HIMATH
Description: Second Follow Up survey highest math course taken for at least half a year. Values are: 1=No math or other, 2=Pre-algebra, general or consumer math, 3=Algebra I, 4=Geomtry, 5=Algebra II, 6=Trigonometry, Pre-calculus, 6=calculus. See ELS:2002 Data File Documentation for more detail.		
	F1TXM1IR	F1TXM1IR
<i>F1 math IRT estimated number right for base year scores</i>		

Description: First Follow Up survey, 12th grade, math Item Response Theory (IRT) estimated number right based on 85 items. See Ingels et al, (2207) for a more detailed discussion.

GPA for all courses

F1RGP

F1RGP

Description: GPA for all courses taken, based on traditional 4.0 scale with A=4.0, B=3.0, C=2.0, D=1.0, F=0.0