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# A Quantative Study of the Relationships Among Teacher Social Capital, School Leadership and School Performance in Colorado Schools

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A QUANTATIVE STUDY OF THE RELATIONSHIPS AMONG TEACHER SOCIAL  
CAPITAL, SCHOOL LEADERSHIP AND SCHOOL PERFORMANCE IN  
COLORADO SCHOOLS

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A Doctoral Research Project

Presented to

The Faculty of the Morgridge College of Education

University of Denver

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In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

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By

Ellen Jane Winiarczyk

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### **Abstract**

This study examined the relationship between teacher perceptions of teacher social capital, school leadership and school performance in schools across Colorado. The following three research questions framed the study: 1) What is the evidence of teacher social capital within teacher perceptions of their school working conditions?; 2) What is the relationship between teacher perceptions of school leaders and teacher social capital?; and 3) What is the relationship between teacher social capital and school academic performance? Using data from the 2015 Teaching, Empowering, Leading and Learning (TELL) survey of teachers, school leaders and other professional staff on teacher working conditions, this quantitative study used exploratory factor analysis, correlation and multiple linear regression to analyze data from over 997 schools. The regression analysis resulted in a strong finding that teacher bonding social capital explained 10% of the variance of school academic achievement. Teacher bonding social capital in combination with “precondition/energizers” variables (a factor comprised of school environmental conditions including opportunities, motivations and abilities) can explain up to a total of 18% of the variance in school academic outcomes. These two factors together are important levers for school leaders, teacher leaders and district principal supervisors to focus on in their efforts to improve school performance. In addition, two key actions for leaders is to develop and support the parent and community culture in schools as these were significant and positive sub-factors of teacher bonding social capital.

### **Acknowledgements**

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## **Introduction**

Social capital is defined as the intangible resources of social connections and people networks that can be accessed and used to create action (Lin, 2001). There is a growing literature base that examines the social capital and social network relationships in schools that teachers and leaders create together, forming professional learning communities and improving student achievement (Molinari & Slegers, 2014; Deal, Purington, & Waetjen, 2009). Social capital in schools has been found to play important role in predicting a school's organizational performance and instructional quality (Leana & Pil, 2006). School leaders interact with and form relationships with teachers and these associations act as connections that may involve transferring resources such as work-related information, advice, and social support (Moolenaar & Slegers, 2015; Leana & Pil, 2006). The resulting social capital improves teaching practice by building trust, enhancing teacher motivation, and enabling an environment where teachers work together to develop new instructional techniques (Leana & Pil, 2006).

In schools a social network is developed as teachers seek out other teachers and other staff for advice, modeling teaching, or as a mentor and the emerging relationship network between teachers builds connectivity and support systems that benefit teachers, and students, as they share resources and solve problems together (Deal, Purington, & Waetjen, 2009). Resulting relationships may develop a school environment that fosters professional learning and sharing that serves to develop teacher knowledge, skills and resources and can be found to be an effective practice for school improvement (DuFour, Eakers, & DuFour, 2005).

Leithwood and Sun (2012) note “the linkage between principal leadership and student achievement is inextricably tied to the actions of others in the school” (p. 423). Leaders who thoughtfully use their school-based internal relationships access the social influence and

resources of those relationships and can impact teacher effectiveness and student achievement (Yukl, et al., 2002; Louis, et al., 2010). Organizational scholars have advocated for motivating followers through interpersonal relationships to better understand how a leaders' position in their workplace, or school, social network can be a strategic approach in maximizing the knowledge and material resources available in that network (Balkundi & Kilduff, 2006).

School leaders face many issues as they work to improve student achievement. Teacher social capital has been identified as an approach to improve student achievement and school performance when developed across teachers and staff (Leana & Pil, 2006). One challenge is to understand how to measure teacher social capital and use the findings to guide school improvement. This report details a quantitative research study conducted to explore the relationship between teacher social capital, school leadership and school performance in schools across Colorado, U.S.A. The study uses data from Colorado's 2015 Teaching, Empowering, Leading and Learning (TELL) survey of teachers, school leaders and other professional staff that gathers teacher perceptions of teaching and learning conditions in schools and districts administered by the New Teacher Center (NTC, 2016). This research hopes to inform teacher leaders, school leaders (principals and assistant principals) and principal supervisors about key components of teacher social capital and school leadership that may influence a schools' teaching environment and improve school performance and assist with school reforms.

TELL survey data was used because it represented a large statewide sample of teacher perceptions of the school working conditions and leadership within their schools. A close examination of TELL items found that many items are aligned with social capital constructs.. TELL was initiated in 2002 in North Carolina to assess teacher perceptions of the school environment and now includes a core set of questions that address nine in-school teaching

conditions. They are: 1) Time, 2) Facilities and Resources, 3) Community Support and Involvement, 4) Managing Student Conduct, 5) Teacher Leadership, 6) School Leadership, 7) Professional Development, 8) Instructional Practices and Support, and 9) New Teacher Support. (New Teacher Center, 2016). TELL data is used by state departments of education, school districts and schools to inform teachers’ and leaders’ school improvement efforts by examining the data collected from the school’s survey respondents (i.e., teachers, principals, assistant principals, school counselors, school psychologists) (New Teacher Center, 2013). The New Teacher Center and Colorado Department of Education provide a few online resources are available to assist teachers, school leaders or district personnel in interpreting TELL data. Teachers and leaders can examine TELL data to inform them about school working conditions. Social networks and teacher social capital are nested within the working conditions of schools, and using TELL data as a tool to uncover and understand teacher social capital has the potential to focus and influence school improvement efforts and may impact student achievement.

Minckler’s (2011) model of a system of teacher social capital was used as a conceptual framework for this study because it provided a comprehensive structure of in-school teacher social capital factors and school leadership factors could be linked to components within the TELL survey. Using two constructs within this model of teacher social capital, Precondition/Energizers (P/E) and Teacher Bonding Social Capital (TBOSC), TELL questions were examined to determine if they fit the construct’s definition and then categorized within these constructs for analysis for coherence, reliability and structure. These constructs, and their respective sub-scales are defined in Table 1 and discussed further in the Data Source section of this paper.

Table 1

*Scale and Subscale Definitions (Minckler, 2011)*

Scale	Subscale	Definition
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Precondition/ Energizer (P/E)		Components of the school environment needed for the development and operation of a teacher social network. Opportunity, motivation and ability (capacity) are needed to foster collaboration essential for the formation of teacher social capital (Adler & Kwon, 2002).
	Opportunity	Internal, and external, social ties in work settings where social relations may develop due to proximity, occupation, interest similarity, or work assignment (Scott, 1961; Adler & Kwon, 2002)
	Ability	The competencies and resources residing in the social network that can potentially be mobilized via relationships (Adler & Kwon, 2002). Resources can be tangible such as materials and equipment, as well as intangible such as skills, knowledge or information. Professional development and external organizations are venues for enriching the ability of a social network.
	Motivation	The need to participate in a social interaction from donors (persons who give) and recipients (persons who receive) in a transaction.
Teacher Bonding Social Capital (TBOSC)		The cohesiveness or strength of relationships among the teachers within the school (Minckler, 2011)
	Effective Teaching Beliefs & Practices (ETBP)	Addresses the degree to which teachers share the beliefs and practices of effective teachers (as identified in effective teaching research).
	Collaboration (Collab)	Addresses the degree to which the teachers collaborate to improve the quality of teaching and learning.
	Community Identity (CommID)	Reflect the degree to which the teacher identifies with or has her identity shaped as a community member of teachers within the school. Community identity indicates a mutual influence and shared emotional connection.
	Culture of Community (CultComm)	The degree to which the teachers within the school are experiencing community characterized by shared values and goals. Additionally, in this culture, teachers are experiencing high levels of trust and caring.

Three research questions guided this study: 1) What is the evidence of teacher social capital within teacher perceptions of their school working conditions; 2) What is the relationship

between teacher perceptions of school leaders and teacher social capital; and 3) What is the relationship between teacher social capital and school academic performance?

## **Literature Review**

### **Social Capital**

Social capital in education has been examined through a lens of external influences on student achievement over the last 40 years. The idea that teacher social capital within a school may also factor into school achievement has been a more recent addition (past 10 years) to research efforts. Initially, the concept of capital was typically used in economics and business and defined by economists as accumulated wealth, assets, labor and stock (Irving, 1896; Bourdieu, 1986). The idea that capital can be a social resource was fostered by Coleman (1988) as emanating from the skills, knowledge and education contained within a group, and popularized by Putnam (2000) in his examination of diminishing social relationships in the U.S. that support civic engagement in American communities. Coleman's (1988) social capital research, however, began a more concerted effort into linking children's academic success to a "strong sense of connection with their communities" and fostering social networks so children feel safe and can trust those around them (Minckler, 2011, p. 68; Carbonaro, 2004). Research that has examined education and social capital has looked at influences outside of the school such as parents and community; (Coleman & Hoffer, 1987); family structure (Teachman, Paasch, & Carver, 1996); the influences of parents (Coleman, 1988; Muller & Ellison, 2001); parent and peers (Dika & Singh, 2002); and ethnic community interactions (Muller & Ellison, 2001) as building on student achievement. Positive correlations have been found among a sense of community, children's social capital, and wellbeing (self-reported) in a three year longitudinal study of child data from Australian communities (Tennent, Farrell, and Tayler, 2005). This

research on education and social capital underscores the importance of social capital that children bring to school from outside the school community. Thus, children who (a) demonstrate a sense of connection to their communities, (b) can develop social networks around them, and (c) feel safe and have trusting people around them are more likely to have successful school experiences and outcomes, and stay in school (Tennent, Farrell, and Tayler, 2005). Developing social networks in schools that share capital (e.g., resources, information, knowledge, etc.) clearly benefits students, but also teachers. Further research into social capital in schools has been shown to increase student engagement & achievement, and (Meire, 1999; Croninger & Lee 2001; Garcia-Reid, 2007; Uekawa, Aladjem, and Zhang, 2006) and teaching quality in schools (Leana & Pil, 2006; Minckler, 2011). This next section will review a snapshot of the literature that informs teacher social capital in schools.

Uekawa, Aladjem, & Zhang (2006) used 2002-2004 data from the National Longitudinal Evaluation of Comprehensive School Reform to examine the effects of teacher social capital on school reform efforts. Their survey research measured teacher social capital using three indicators: (a) collegial cohesion (strength of teacher relationships), (2) collective commitment (level of commitment to common goals), and (3) collegial influence (degree of influence on each other over instructional issues). Their findings indicated that while some reform programs increased teacher social capital more than others, those that emphasized shared vision and goals resulted in higher levels of teacher social capital (Uekawa, Aladjem, & Zhang, 2006).

Penuel, Riel, Krause, and Frank (2009) used mixed methods (social network analysis, surveys and interviews) to examine two elementary schools enacting significant school reform changes to determine their success. The school that had greater success in reform efforts reported “greater trust, respect and mutual regard developed among faculty” that was explained by the

“leadership beliefs and practices” specifically trusting internal resources, knowledge and experience of teachers already working in the school rather than outside expert help (Penuel, et al., 2009 p. 141). They found that “facilitating collaboration requires leadership that values teacher expertise, knowledge of the current distribution of resources and expertise in a school, and knowledge of practices, routines and artifacts that are in place that explain the distribution” (Penuel, et al., 2009, p. 155).

Leana and Pil (2006) examined data collected from 88 urban schools in the same district from interviews, surveys and time diaries. These researchers hoped to measure internal social capital (specifically the dimensions of trust, sharing resources/information, and shared vision) and tracked principal time with people from outside the school (external social capital). They hypothesized that higher levels of internal and external social capital in a school is associated with higher levels of school performance and that quality instruction may mediate the relationship between internal and external social capital and student achievement as measured by percent of students meeting or exceeding state math and reading standards (Leana & Pil, 2006). They found that internal and external social capital was significantly correlated with student achievement test scores and low student socioeconomic status had a negative influence on student achievement. In addition, they determined that instructional quality is a significant predictor of math and reading achievement and that internal and external social capital has a significant influence on math achievement, but not on reading achievement (Leana & Pil, 2006). They also found that social capital supported positive organizational performance (Leana & Pil, 2006).

Bridwell-Mitchell and Cooc (2016) use a stratified random sample of four elementary schools from a longitudinal data set of teacher networks to determine how teachers maintained

their community ties rather than teachers' ties to individual teachers. The researchers used surveys administered over 7 different time frames (e.g., fall, spring, etc.) to collect demographic data and information pertaining to teacher perceptions of other teachers' teaching quality, and the frequency of contact with other teachers in their school. This gave the researchers data on the same teachers over 18 months to understand movement in their community relationships. The analysis used a logistic cross-classified model as a hierarchical model. Their key outcome was whether teachers upheld their relationship connections with their community colleagues and they found that teachers maintained an average of 5.33 community colleagues over time from school year to school year (accounting for attrition, etc.) and that time is not related to whether teachers stay connected to earlier teacher colleagues (Bridwell-Mitchell & Cooc, 2016). Teacher's age, gender and status in their school are related to staying current with community ties maintaining the social capital connections between these colleague groups. The researchers also found that too much community cohesion may work against innovative ideas as teachers may be too similar in thought to come up with new ideas (Bridwell-Mitchell & Cooc, 2016). Of particular importance to school leaders, this research found that reorganizing school structures (e.g., grade levels, subject areas, etc.) does not foster social capital in informal teacher communities, but that creating community cohesion is important to ensuring structural changes will be successful (Bridwell-Mitchell & Cooc, 2016).

Networks in schools form structures that provide for "opportunities and constraints" for groups and individual teachers as they use data to inform their teaching strategies, find additional resources, or access advice networks to find answers to persistent problems in a school (Deal, et al., 2009). Collegial relationships (e.g., frequency and strengths between network ties) have been found to facilitate more effective teaching networks (Purinton, 2005). Deal, Purinton and

Waetjen's (2009) book *Making Sense of Social Networks in Schools* illustrates how social networks form in schools to develop strong collegial cultures and how school leaders can leverage the informal and formal networks to improve teaching quality and facilitate school change. Informed by the authors' research into school social networks this book identifies strategies school teachers and leaders can use to develop the social networks embedded within their school environments.

### **School Leadership and Teacher Social Capital**

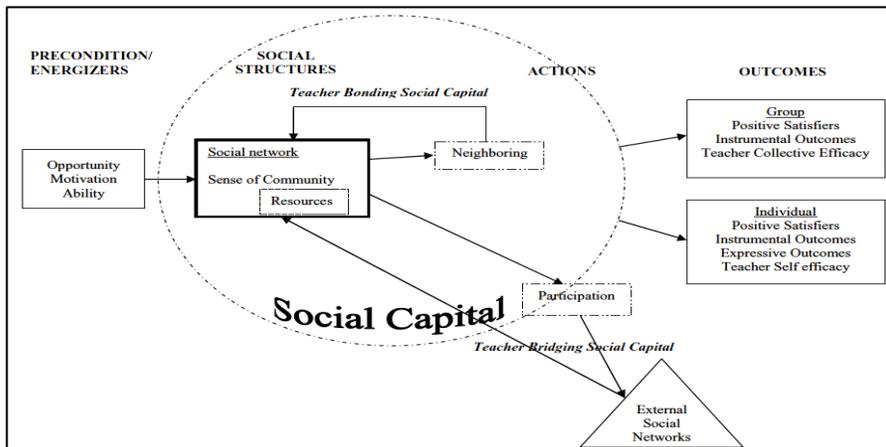
Education research has found that quality teachers and excellent teaching methods are the primary levers to increase student achievement, however, research has shown that school leaders are a strong secondary lever to increase student achievement (Marzano, Waters, McNulty, 2005; Leithwood, Louis, Anderson, & Wahlstrom, 2004). While the 1980s effective schools research clarify the function and role of principals as instructional managers who define the school's mission, manage the instructional program, and lead the school climate (Hallinger & Murphy, 1986), school districts are shifting school leader's work from managing operations to instructional ways of leading that build more collaborative school environments and improve instruction (Darling Hammond, Meyerson, LaPointe & Orr, 2007; Louis, Mayrowetz, Murphy, & Smylie, 2013; Drago-Stevenson & Blum-DeStefano, 2014). School leaders play an important role in improving student performance, but also in shaping the environment in which teachers work (Louis, Mayrowetz, Murphy, & Smylie, 2013; Drago-Stevenson & Blum-DeStefano, 2014). School leadership that uses instructional ways of leading develop more collaborative school environments and improve instruction (Darling Hammond, Meyerson, LaPointe & Orr, 2007; Louis, Mayrowetz, Murphy, & Smylie, 2013; Drago-Stevenson & Blum-DeStefano, 2014). School leadership has become more focused on instruction and distributed across the

school community, and leaders are embracing practices such as heightened teacher monitoring, leading and guiding school level professional development, developing in-school schedules and structures that enable data driven decision making, fostering collaborative teacher structures, working with teacher leaders and coaches, modeling teaching, and helping to build and facilitate professional learning communities (Wallace, 2013; Levin & Datnow, 2012; Darling-Hammond, et al., 2010; Drago-Severson & Blum-DeStephano, 2014). School leaders are in a unique place to implement processes and structures that foster school network development that may foster teacher social capital expansion.

### Conceptual Framework

Lin’s (2001) definition of social capital as “resources embedded in social structure that are accessed and/or mobilized in purposive actions” informs the conceptual framework guiding this study. The social interaction of teachers within the school environment can influence teachers action and this influence that may be found to be a small but not insignificant ingredient that improves student achievement (Minckler, 2011). To organize how social capital may reside in this school community I use Minckler’s (2011) conceptual framework of teacher social capital components (Figure 1.).

Figure 1. A model of a system of teacher social capital (Minkler, 2011).



Components include: 1) Precondition/Energizers, or environmental elements that create the conditions to develop social capital, 2) Social Structures such as Teacher Bonding Social Capital and Teacher Bridging Social Capital that identify how people interact within and external to the school, 3) Actions that include participation with colleagues within the school, and neighboring, or mutual assistance, behaviors that bridge teachers to external organizations and people, and 4) outcomes for groups and individuals that may lead to teacher efficacy, satisfiers (e.g., power, reputation, recognition, growth or achievement), and expressive results (emotional and physiological effects) (Minckler, 2011).

Influencing social capital in a school are the school leaders who shape many aspects of the school environment thus impacting social capital development in different ways. School leaders guide the vision, mission, expressed values and norms of a school shaping school culture and focusing teachers on important efforts in reform, curriculum, and other areas (Murphy, 2006, Leithwood, Aitken, & Jantzi, 2001). Instructional leadership is a complex construct in educational research that has had a variety of definitional iterations, however, it is largely defined as leadership that focuses on instruction with a clear purpose and commitment to student learning (Zepeda, 2013). Schools are also increasing their distribution of leadership to include teacher leaders, teacher coaches, mentors, and other structures that engage school leaders and teachers in heightening the instructional skills, knowledge and methods of classroom teachers (Spillane & Kim, 2004). It remains, however, that school leaders “help build a shared meaning among members of the school staff regarding their purposes and create high levels of commitment to accomplish these purposes” (Leithwood and Jantzi, 1990, p. 10).

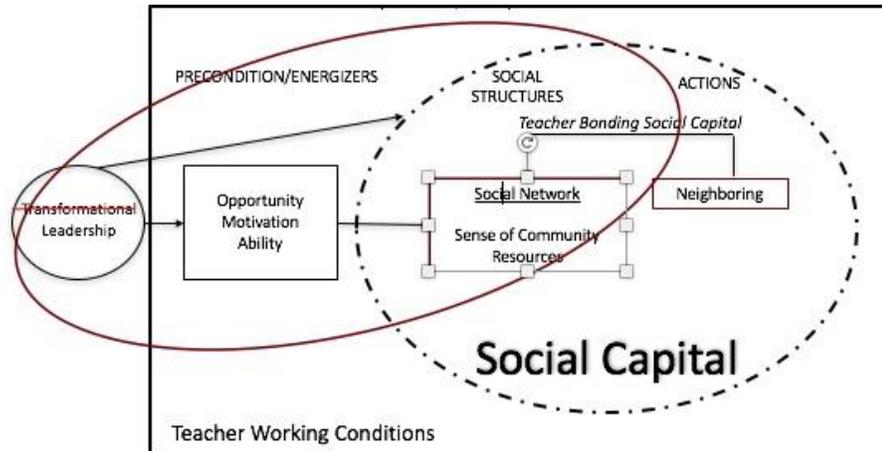
Transformational leadership practices are naturally suited to building relationships as they serve to activate followers through inspiration and intrinsic motivation that by its very

nature develops bonds between leader and follower (Hallinger & Heck, 1998; Hallinger & Heck, 2010). Minkler (2011) draws a link between transformational leadership components to teacher social capital within a school and outside of the school. School leaders applying transformational leadership practices are predisposed to emphasizing behaviors that engender relationship building and are afforded a natural opportunity to build social capital (Moolinar & Slegers, 2015). Leithwood and Sun (2012) note “the linkage between principal leadership and student achievement is inextricably tied to the actions of others in the school” (p. 423). Leaders who thoughtfully use their school-based internal relationships access the social influence and resources of those relationships and impact teacher effectiveness and student achievement (Yukl, et al., 2002; Louis, et al., 2010). Organizational scholars have advocated for motivating followers through interpersonal relationships to better understand how a leader’s position in their workplace, school, or social network can be used in a strategic approach to maximize the knowledge and material resources available in that network (Balkundi & Kilduff, 2006). The importance of developing social capital throughout a school’s teacher network may have important implications to the intentional relationship building school leaders, teacher leaders and teachers can practice to improve teaching quality and student achievement.

Three components of Minkler’s model of teacher social capital (Figure 1) are used in this study to better understand their relationships. They are: 1) Precondition/Energizers (P/E), 2) Teacher Bonding Social Capital (TBOSC) and 3) School Leadership (Leadership). Note that this study does not label leadership as “transformational” due to a lack of specific transformational components not represented in TELL items, thus school leadership was used. TELL questions, or items, were examined through the lens of the three constructs’ definitions to identify items that

closely aligned with the definitions (Table 1). The circled components of Leadership, Precondition/Energizers and Teacher Bonding Social Capital are explored in this study.

Figure 2. Teacher social capital components studies in this research study.



Precondition/Energizers are identified as “the substrate upon which teacher bonding social capital can develop and be nurtured” while Teacher Bonding Social Capital is determined by the degree to which teachers have opportunity to collaborate, are motivated to do so, and have abilities to share when collaborating (Minckler, 2011, p. 147). Precondition/Energizers are necessary to support the development of teacher social capital and include opportunities, motivation and ability (Minkler, 2011). School leadership helps to create the culture and outline the school’s direction and purpose (Minckler, 2011). By studying the Precondition/Energizers, Teacher Bonding Social Capital and School Leadership components individually and together this study will gain specific insight into the ingredients that cultivate, foster and develop teacher social capital in a school.

### Methodology

The Colorado 2015 Teaching, Empowering, Leading and Learning (TELL) data set was obtained from the Colorado Department of Education (CDE) in an Excel format and stored in a secure, password protected electronic file at the University of Denver. The 205 item survey of

licensed and charter school educators assesses the perceptions of teaching conditions at the school and school district and is intended to provide input into school and district improvements (CDE, 2016). The survey is divided into 9 sections that include 1) Time, 2) Facilities and Resources, 3) Community Support and Involvement, 4) Managing Student Conduct, 5) Teacher Leadership, 6) School leadership, 7) Professional Development, 8) Instructional Practices and Support, and 9) New Teacher Support. In Colorado TELL is offered every two years to teachers, principals, assistant principals and other school personnel (e.g., school counselor, school psychologist, social worker, etc.) online. Participants have access to the survey for 30 days and use their school's password protected code to gain access to the survey. Schools that attain a 50% or more teacher and staff participation rate are included in the final data set released to schools and the public for school improvement as well as further examination and analysis. This study identified schools as elementary (grades K-6), middle (grades 6-8) and high schools (grades 9-12).

The sample for this study included elementary, middle and secondary school teachers, in Colorado who participated in the 2015 TELL survey whose schools had 50% staff participation in the survey. TELL was selected as the data set for this study due its availability, the size of the data set, the diversity of questions and that the questions were found to fit the construct definitions outlined by Minckler (2011) in her teacher social capital model. In addition, the TELL instrument was found to have content validity (Hirsch, 2009). For this study, a subset of teacher only responses were extracted from 2015 TELL data received from the Colorado Department of Education (CDE) that included 21,325 teacher cases distributed across 997 elementary and middle schools. Schools that had less than 5 respondents to the survey were eliminated.

The P/E and TBOSC multiple item scales include sub-scales to more clearly identify concepts that enable teacher social capital development. *Precondition/Energizers* have three additional subscales that foster the collaboration essential for the formation of teacher social capital (Adler & Kwon, 2002). They are: 1) *Opportunity* – the internal, and external, social ties in work settings where social relations may develop due to proximity, occupation, interest similarity, or work assignment (Scott, 1961), 2) *Motivation* – the need to participate in a social interaction from donors (persons who give) and recipients (persons who receive) in a transaction, and 3) *Ability* - the competencies and resources residing in the social network that can potentially be mobilized via relationships (Adler & Kwon, 2002).

The construct *Teacher Bonding Social Capital (TBOSC)* has scales that include: 1) *Effective Teaching Belief and Practices (ETBP)* which addresses the degree to which teachers share the beliefs and practices of effective teachers (as identified in effective teaching research); 2) *Collaboration* addresses the degree to which the teachers collaborate to improve the quality of teaching and learning; 3) *Community Identity* reflects the degree to which the teacher identifies with or has her identity shaped as a community member of teachers within the school and indicates mutual influence and shared emotional connection; 4) *Culture of Community* is the degree to which teachers in a school experience community characterized by shared values and goals, and where teachers also experience high levels of trust and caring (Minckler 2011). Scale and sub-scale definitions are found in Table 1.

Minkler (2011) identifies School Leadership and its contributing relationship to Precondition/Energizers and Teacher Bonding Social Capital, and found transformational leadership as an important factor in developing teacher social capital. Although the components of transformational leadership are well known as highly successful school leadership practices

(Leithwood & Jantzi, 1990, Leithwood, Louis, Anderson & Wahlstrom, 2004), they were not used for this study as there was not a substantial number of items to support naming school leadership specifically as transformational.

School performance data is drawn from the Colorado Department of Education (CDE) data 2013-14, the year just prior to the spring 2015 administration of the TELL survey, and the last year of consistent longitudinal student assessment data in the state. In 2009, the Colorado Department of Education (CDE) developed the District and School Performance Framework (DPF, SPF) as a part of the state's system of school accountability and support to provide a common framework to understand school performance at each school level and help to improve efforts in reading, writing and mathematics (CDE, 2016). In the 2013-2014 academic year, the Transitional Colorado Assessment Program (TCAP) was developed to bridge the state's assessment transition from the Colorado Student Assessment Program (CSAP) as the state developed new Colorado Academic Standards (CAS). The state then transitioned to Partnership for Assessment of Readiness for College and Careers, or PARCC, assessments which they currently use.

Because state school performance data was in a period of assessment transition in 2015, TCAP data was determined to be the best data in which to examine school performance for this research. CDE developed four measures to gauge school performance. They are: 1) academic achievement, 2) academic growth, 3) academic growth gaps, and 4) post-secondary and workforce readiness. For this study, I determined that three school performance measures were viable. They are: 1) academic achievement, 2) academic growth, and 3) academic growth gaps.

Academic achievement is calculated by the percentage of students scoring proficient or advanced on TCAP in math, reading and writing in grades three through ten (CDE, 2015).

Academic growth is defined as the median and adequate student growth percentiles in reading, writing and math, for the school and district using TCAP. Academic growth gaps are the median and adequate student growth percentile in reading, writing and math in disaggregated groups on TCAP. In other words, growth gaps ask if there are differences in the level of achievement of groups of students of different races, ethnicities, native languages or socio-economic status (CDE, 2014). Districts and schools receive a rating on each of the performance indicators: Exceeds (4 points), Meets (3 points), Approaching (2 points), Does not meet (1 point). In this study indicators were converted to numeric ratings (points) and used to examine academic achievement and growth as well as growth gaps.

The nature of the focus of this study, *teacher bonding social capital*, raises the question of whether a 2-level model, teachers nested in schools, is needed to fully understand the interactions of variables and their relationship to student outcomes data. To test whether a more complex hierarchical model was needed, I tested the impact of teachers' membership in a school using a dummy variable in the linear regression models. While I did find statistical significance for the school membership variable, the variance explained in every case was less than one percent (significance was due to the very large dataset). I therefore decided to proceed with a more straight-forward linear regression rather than hierarchical models, to keep the analysis and findings more easily interpretable for sophisticated, non-research audiences.

### **Data Analysis**

The TELL survey's 205 items were examined to identify their fit to the constructs and their sub-scales. One hundred and five (105) items corresponded with the constructs and their subscale definitions including 49 Teacher Bonding Social Capital items, 36 Precondition/Energizer items and 20 School Leadership items (Table 2). This table includes items that were

eliminated after the first exploratory factor analysis used to determine if each construct’s subscales would hold together and if items did not load on a specific factor.

Table 2

*Exploratory Factor Analysis (EFA) Scales and Subscales Items and Eliminated Items*

Scale/Subscale	Exploratory Factor Analysis Items	Items Eliminated After EFA
<b>Precondition/ Energizers (3 subscales, 36 items)</b>		
Ability (23 items)	Parents/guardians support teachers, contributing to their success with students.	
Ability	Professional development enhances teachers' ability to implement instructional strategies that meet diverse student learning needs.	
Ability	Teachers and students have access to current, diverse and ability-appropriate materials through the library.	
Ability	Professional development enhances teachers' abilities to improve student learning.	
Ability	Professional development deepens teachers' content knowledge.	
Ability	Provided supports (i.e., instructional coaching, professional learning communities) translate to improvements in instructional practices by teachers.	
Ability	Teachers in this school have the support needed to provide culturally- and developmentally-responsive instruction to support the academic and behavioral needs of every student.	
Ability	As a beginning teacher, I have received the following kinds of supports during this school year: Formally assigned mentor	Eliminated
Ability	As a beginning teacher, I have received the following kinds of supports during this school year: Seminars specifically designed for new teachers	Eliminated
Ability	As a beginning teacher, I have received the following kinds of supports during this school year: Formal time to meet with mentor during school hours	Eliminated
Ability	On average, how often did you engage in each of the following activities with your mentor during this school year? Observing my mentor's teaching	Eliminated
Ability	Overall, the additional support I received as a new teacher during this school year improved my instructional practice.	Eliminated
Ability	Community members support teachers, contributing to their success with students.	

Ability	Overall, the additional support I received as a new teacher during this school year has helped me to impact my students' learning.	Eliminated
Ability	Overall, the additional support I received as a new teacher during this school year has been important in my decision to continue teaching at this school.	Eliminated
Ability	Please indicate the role teachers have at your school in each of the following areas: Selecting instructional materials and resources	
Ability	Administration supports teachers' efforts to maintain discipline in the classroom.	
Ability	Teachers are recognized as educational experts.	
Ability	Please indicate the role teachers have at your school in each of the following areas: The selection of teachers new to this school	
Ability	Sufficient resources are available for professional development in my school.	
Ability	Professional development provides teachers with the knowledge and skills most needed to teach effectively.	
Ability	Please indicate the role teachers have at your school in each of the following areas: Establishing student discipline procedures	
Ability	Teachers have an appropriate level of influence on decision making in this school.	
Motivation (3 items)	Of the hours spent on school-related activities outside of the regular school day, how many are spent on other school-related activities such as preparation, grading, parent conferences or attending meetings?	
Motivation	In an average week, how much time do you devote communicating with parents/guardians and/or the community during the school day	
Motivation	In an average week of teaching, how many hours do you spend on school-related activities outside of the regular school day (before or after school, and/or on weekends)?	
Opportunity (10 items)	In an average week, how much time do you devote professional development during the school day	Eliminated
Opportunity	As a beginning teacher, I have received the following kinds of supports during this school year: Regular communication with principals, other administrator, or department chair	Eliminated
Opportunity	How much did the support you received from your mentor influence your practice in the following areas during this school year? Connecting with key resource professionals (e.g., coaches, counselors, etc.)	Eliminated
Opportunity	Teachers have sufficient access to appropriate instructional materials and resources.	
Opportunity	Teachers have sufficient access to a broad range of professional personnel.	

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Opportunity	Teachers are relied upon to make decisions about educational issues.	
Opportunity	Teachers are provided opportunities to take on formal leadership roles in the school (e.g., mentor, instructional coach).	
Opportunity	In an average week, how much time do you devote required committee and/or staff meetings during the school day.	Eliminated
Opportunity	Professional development provides ongoing opportunities for teachers to work with colleagues to refine teaching practices.	
Opportunity	An appropriate amount of time is provided for professional development.	
<b>Teacher Bonding Social Capital (4 subscales)</b>		
Collaborate (11 items)	Teachers have time available to collaborate with colleagues.	
Collaborate	In an average week, how much time do you devote to: collaborative planning time during the school day	Eliminated
Collaborate	As a beginning teacher, I have received the following kinds of supports during this school year: access to professional learning communities where I could discuss concerns with other teacher(s)	Eliminated
Collaborate	How much did the support you received from your mentor influence your practice in the following areas during this school year: Working collaboratively with other teachers at my school	Eliminated
Collaborate	Teachers receive appropriate training and guidance from school library staff to help students to become proficient in 21st century skills.	Eliminated
Collaborate	The faculty has an effective process for making group decisions to solve problems.	
Collaborate	Please indicate the role teachers have at your school in each of the following areas: School improvement planning	
Collaborate	This school has an effective approach (e.g., referral/identification process, scheduling, collaborative teaming, supplemental resources, accommodation practices) in place to meet the needs of students in special education.	
Collaborate	This school has an effective approach (e.g., identification process, scheduling, collaborative teaming, instruction for language development) in place to meet the needs of English language learners.	
Collaborate	Teachers work in professional learning communities to develop and align instructional practices.	

Collaborate	As a beginning teacher, I have received the following kinds of supports during this school year: common planning time with other teachers	Eliminated
Culture of community (18 items)	Teachers in this school trust each other.	
Culture of community	Teachers are trusted to make sound professional decisions about instruction.	
Culture of community	Teachers are effective leaders in this school.	
Culture of community	Teachers are encouraged to reflect on their own practice.	
Culture of community	Teachers are encouraged to try new things to improve instruction.	
Culture of community	Teachers have autonomy to make decisions about instructional delivery (i.e., pacing, materials, and pedagogy).	
Culture of community	Overall, my school is a good place to work and learn.	
Culture of community	As a beginning teacher, I have received the following kinds of supports during this school year: release time to observe other teachers	Eliminated
Culture of community	On average, how often did you engage in each of the following activities with your mentor during this school year: reflecting on the effectiveness of my teaching together	Eliminated
Culture of community	How much did the support you received from your mentor influence your practice in the following areas during this school year: creating a supportive, equitable classroom where differences are valued	Eliminated
Culture of community	How much did the support you received from your mentor influence your practice in the following areas during this school year: enlisting the help of family members, parents, and/or guardians	Eliminated
Culture of community	There is an atmosphere of trust and mutual respect in this school.	
Culture of community	The faculty and leadership have a shared vision.	
Culture of community	Teachers feel comfortable raising issues and concerns that are important to them.	
Culture of community	The school works directly with parents/guardians to improve the educational climate in students' homes.	
Culture of community	This school maintains clear, two-way communication with the community.	
Culture of community	This school does a good job of encouraging parent/guardian involvement.	

Culture of community	Teachers provide parents/guardians with useful information about student learning.	
Effective teaching beliefs & practices (ETBP) (17 items)	Teachers have sufficient instructional time to meet the needs of all students.	
ETBP	Follow-up is provided from professional development in this school.	
ETBP	Teachers in this school use formative assessments in their classroom to make appropriate adjustments to instruction.	Eliminated
ETBP	On average, how often did you engage in analyzing student work with your mentor during this school year	Eliminated
ETBP	On average, how often did you engage in reviewing results of students' assessments with your mentor during this school year?	Eliminated
ETBP	How much did the support you received from your mentor influence your practice in instructional strategies during this school year?	Eliminated
ETBP	How much did the support you received from your mentor influence your practice in subject matter I teach during this school year?	Eliminated
ETBP	How much did the support you received from your mentor influence your practice in using data to identify student needs during this school year?	Eliminated
ETBP	How much did the support you received from your mentor influence your practice in differentiating instruction based upon individual student needs and characteristics during this school year?	Eliminated
ETBP	The non-instructional time provided for teachers in my school is sufficient.	
ETBP	Teachers are allowed to focus on educating students with minimal interruptions.	
ETBP	Please indicate the role teachers have at your school in each of the following areas: Devising teaching techniques	
ETBP	Please indicate the role teachers have at your school in each of the following areas: Setting grading and student assessment practices	
ETBP	The teacher evaluation process improves teachers' instructional strategies.	
ETBP	Teachers are protected from duties that interfere with their essential role of educating students.	
ETBP	Please indicate the role teachers have at your school in each of the following areas: Determining the content of in-service professional development programs	
ETBP	The components of the teacher evaluation process accurately identify effectiveness.	
Community identity (3 items)	In this school we take steps to solve problems.	
Community identity	Teachers in this school receive informal feedback about their teaching on an ongoing basis.	

Community identity	Providing emotional support	
Leadership (20 items)	Administration consistently enforces rules for student conduct.	
Leadership	The school leadership focuses on the professional growth of staff.	
Leadership	The school leadership makes a sustained effort to address teacher concerns about: Leadership issues	
Leadership	The school leadership makes a sustained effort to address teacher concerns about: Facilities and resources	
Leadership	The school leadership makes a sustained effort to address teacher concerns about: The use of time in my school	
Leadership	The school leadership makes a sustained effort to address teacher concerns about: Professional development	
Leadership	The school leadership makes a sustained effort to address teacher concerns about: Empowering teachers	
Leadership	The school leadership makes a sustained effort to address teacher concerns about: Community engagement	
Leadership	The school leadership makes a sustained effort to address teacher concerns about: Student learning	
Leadership	The school leadership makes a sustained effort to address teacher concerns about: New teacher support	
Leadership	Overall, the school leadership in my school is effective.	
Leadership	School leadership participates in professional development opportunities with teachers.	Eliminated
Leadership	Teachers are assigned classes that maximize their likelihood of success with students.	Eliminated
Leadership	The school leadership communicates clear expectations to students and parents.	
Leadership	The school leadership communicates with the faculty adequately.	
Leadership	The school leadership works to minimize disruptions for teachers, allowing teachers to focus on educating students.	
Leadership	The school leadership consistently supports teachers.	
Leadership	Teachers are held to high professional standards for delivering instruction.	
Leadership	The school leadership facilitates using data to improve student learning.	
Leadership	The faculty are recognized for accomplishments.	

Respondents answered each item using Likert-like scaled items that used different rating scales. Table 3 identifies the different rating scales used in the TELL survey that ranged from 1 to 5, 1 to 6 and a 1 = yes and 2 = no scale. For the analysis scales were converted to z scores and then factor scores to neutralize the difference in scale responses.

Table 3

*TELL 2015 Likert-like Scales Used*

Number of TELL Items	1	2	3	4	5	6
72	Strongly disagree	Disagree	Agree	Strongly agree	Don't know.	
7	No role at all	Small role	Moderate role	Large role	Don't Know	
6	None	Less than or equal to 1 hour	More than 1 hour but less than or equal to 3 hours	More than 3 hours but less than or equal to 5 hours	More than 5 hours but less than or equal to 10 hours	More than 10 hours
4	Never	Less than once per month	Once per month	Several times per month	Once per week	Almost daily
6	Yes	No				

The 2015 TELL data was organized to ensure that cases with missing data and schools with less than five respondents were eliminated and organized into a teacher only response data set. The scale and sub-scale reliability analysis yielded two important pieces of information relevant to working with this data set. First, TELL responses from first year teachers were found to be significantly different from the other teachers in the school, and added substantial measurement error to the dataset. I decided to eliminate these novice teachers from the analysis. Given that the fact that novice teachers may by definition, not yet be major players in the teaching bonding social capital in the school (due to their newness), and given that their answers were substantially more varied than responses from more experienced teachers in the school, I believe this study gains a clearer picture of the Teacher Bonding Social Capital (TBOSC) and related variables when using only teachers with two or more years of teaching experience in the school. Thus first year teacher cases were eliminated. The early exploratory factor analysis using principal components analysis did determine the elimination of several items (see Table 2).

Table 4 summarizes the Cronbach's alpha results for the exploration of each scale and

subscale, and items that were eliminated items to improve each subscale’s reliability score (see Table 2). The Precondition/Energizer scale contained a total 36 items initially, and was reduced to 24 items when examined for reliability ( $\alpha = .903$ ). Specifically, the Opportunity subscale initially contained 10 items while 4 were eliminated (two items each from TELL sections Time and New Teacher Mentoring) ( $\alpha = .783$ ). The Motivation subscale contained three items initially, however the first reliability analysis revealed a Cronbach’s alpha of .646. With the elimination of one Time section item the resulting two item alpha was .804. No items were eliminated from the Ability sub-scale.

Table 4

*Exploratory Scale and Subscale Reliability Coefficient Scores*

Scale or Subscale	Cronbach's Alpha (after items eliminated)	Initial Number of Items	No. of Items after reliability analysis
Precondition/ Energizers	.903	36	24
Opportunity	.783	10	6
Ability	.904	23	16
Motivation	.804	3	2
TBOSC	.930	49	32
ETBP	.804	17	10
Community Identity	.577	3	2
Culture of Community	.891	18	14
Collaboration	.885	11	6
Leadership	.938	20	20

The TBOSC scale revealed strong reliability ( $\alpha = .930$ ) after the 49 item scale was reduced to 32 items. TBOSC subscale Effective Teaching Beliefs and Practices began with 17 items and was reduced to 10 items revealing an alpha of .804. Six items eliminated were from

the New Teacher Mentoring section and the seventh item eliminated was the question “Teachers in this school use formative assessments in their classroom to make appropriate adjustments to instruction” (item Q9.1.d). TBOSC sub-scale Community Identity had 3 items, but one item was eliminated as it was from the New Teacher Mentoring section. Community Identity items resulted in an alpha of .577. The Culture of Community subscale had 18 initial items identified and was reduced to 14 items ( $\alpha = .930$ ). All four of the eliminated items were from the New Teacher Mentoring section. TBOSC subscale Community was reduced from 11 items to 6 items and reliability resulted in an alpha of .885. The full Leadership scale retained all 20 items initially identified ( $\alpha = .937$ ).

To further refine the subscales and identify if items in the existing subscales loaded to form new factors, an Exploratory Factor Analysis (EFA) of the three constructs was performed. Principal Components Analysis (PCA) extraction method was used to examine each of the three scales to determine the strength of item associations within each scale, validate the existing constructs or identify new subscale associations, and further reduce the scale items. PCA also identified the variance explained by each factor producing a mathematically unique solution to the relationship of the items within a scale (Frankfort-Nachmias & Leon-Guerrero, 2011).

An orthogonal Varimax rotation was used for each scale’s analysis to minimize the factor complexity so that factors were uncorrelated with each other to ensure that items were clearly associated with their factor and to maximize the variance of loadings on each factor. Components with an eigenvalue greater than 1.0 were selected as the solution for each construct and factor with a loading of .500 or greater was used to identify practically significant items that loaded strongly on each component solution.

The PCA conducted on the Precondition/Energizer scale identified a 5 factor solution and is represented in Table 5 and includes each subscale’s new names and reliability data. Subscale names include: 1) Professional Development for Instruction, 2) Teacher Expertise, 3) Teachers Access to Resource Supports (eliminated), 4) Parent and Community Support, and 5) Time Supports.

Table 5

*Preconditioner/Energizer Subscale EFA Results (including items by subscale and reliability coefficients)*

Preconditioner/Energizer Subscale	Items	Cronbach’s Alpha .893 (overall scale)
Component 1: Professional Development for Instruction (8 items)	<p>Provided supports (i.e., instructional coaching, professional learning communities) translate to improvements in instructional practices by teachers.</p> <p>Professional development provides ongoing opportunities for teachers to work with colleagues to refine teaching practices.</p> <p>Professional development deepens teachers' content knowledge.</p> <p>Professional development enhances teachers' abilities to improve student learning.</p> <p>Professional development enhances teachers' ability to implement instructional strategies that meet diverse student learning needs.</p> <p>Sufficient resources are available for professional development in my school.</p> <p>Professional development provides teachers with the knowledge and skills most needed to teach effectively.</p> <p>An appropriate amount of time is provided for professional development.</p>	.922
Component 2: Teacher Expertise (9 items)	<p>Teachers are relied upon to make decisions about educational issues.</p> <p>Teachers are recognized as educational experts.</p> <p>Teachers have an appropriate level of influence on decision making in this school.</p>	.868

	<p>Teachers are provided opportunities to take on formal leadership roles in the school (e.g., mentor, instructional coach).</p> <p>What is the role teachers have at your school in selecting instructional materials and resources.</p> <p>What is the role teachers have at your school in the selection of teachers new to this school.</p> <p>What is the role teachers have at your school in establishing student discipline procedures.</p> <p>Teachers in this school have the support needed to provide culturally- and developmentally-responsive instruction to support the academic and behavioral needs of every student.</p> <p>Administration supports teachers' efforts to maintain discipline in the classroom.</p>	
Component 3: Teachers Access to Resource Supports (3 items)	<p>Teachers have sufficient access to appropriate instructional materials and resources.</p> <p>Teachers and students have access to current, diverse and ability-appropriate materials through the library.</p> <p>Teachers have sufficient access to a broad range of professional personnel.</p>	.653 (Eliminated)
Component 4: Parent and Community Support (2 items)	<p>Parents/guardians support teachers, contributing to their success with students.</p> <p>Community members support teachers, contributing to their success with students.</p>	.819
Component 5: Time Supports (2 items)	<p>In an average week of teaching, how many hours do you spend on school-related activities outside of the regular school day (before or after school, and/or on weekends)?</p> <p>Other school-related activities such as preparation, grading, parent conferences or attending meetings?</p>	.804

Reliability coefficients were obtained for the components with an overall scale alpha of .893. Component 3 was dropped from the Precondition/Energizer scale due to a low alpha of .653. The resulting 21 items in 4 subscales were kept to finalize the P/E scale with an alpha of .893. Table 6 outlines the newly named P/E factors as: 1. Professional Development for

Instruction; 2. Teacher Expertise; 3. Parent and Community Supports; and 4. Time Supports and their corresponding items.

Table 6 illustrates the Precondition/Energizer scale’s PCA rotated component matrix showing the factor loadings for each of the five components and the variables.

Table 6

*Preconditioner/Energizer PCA Factor Loading and New Factor Names*

Items / New Factor Name	<b>1. Professional Development for Instruction</b>	<b>2. Teacher Expertise</b>	<b>3 Teacher Access to Resource Supports (Eliminated)</b>	<b>4. Parent &amp; Community Supports</b>	<b>5. Time Supports</b>
Instructional Practices & Supports: Provided supports (i.e., instructional coaching, professional learning communities) translate to improvements in instructional practices by teachers.	<b>0.558</b>	0.345	0.176	0.102	-0.043
Professional development provides ongoing opportunities for teachers to work with colleagues to refine teaching practices.	<b>0.805</b>	0.238	0.175	0.079	-0.010
Teachers are encouraged to reflect on their own practice.	<b>0.756</b>	0.263	0.001	0.156	-0.055
Professional development enhances teachers' abilities to improve student learning.	<b>0.822</b>	0.293	0.085	0.096	-0.013
Professional development enhances teachers' ability to implement instructional strategies that meet diverse student learning needs.	<b>0.804</b>	0.279	0.113	0.087	-0.033
Sufficient resources are available for professional development in my school.	<b>0.698</b>	0.189	0.368	0.055	-0.007
Professional development provides teachers with the knowledge and skills most needed to teach effectively.	<b>0.829</b>	0.254	0.155	0.094	-0.013
An appropriate amount of time is provided for professional development.	<b>0.672</b>	0.139	0.250	0.033	-0.047
Teachers are relied upon to make decisions about educational issues.	0.287	<b>0.752</b>	0.151	0.130	-0.055
Teachers are recognized as educational experts.	0.281	<b>0.724</b>	0.184	0.156	-0.060
Teachers have an appropriate level of influence on decision making in this school.	0.233	<b>0.695</b>	0.076	0.045	-0.057
Teachers are provided opportunities to take on formal leadership roles in the school (e.g., mentor, instructional coach).	0.301	<b>0.621</b>	0.204	0.072	-0.011
Teacher role in: Selecting instructional materials and resources	0.061	<b>0.531</b>	0.317	0.023	0.020

Teacher role in: The selection of teachers new to this school	0.143	<b>0.590</b>	0.097	0.045	0.065
Teacher role in: Establishing student discipline procedures	0.239	<b>0.630</b>	-0.016	0.158	-0.026
Teachers in this school have the support needed to provide culturally- and developmentally-responsive instruction to support the academic and behavioral needs of every student.	0.355	<b>0.473</b>	0.305	0.222	-0.057
Administration supports teachers' efforts to maintain discipline in the classroom.	0.236	<b>0.625</b>	0.134	0.253	-0.014
Teachers have sufficient access to appropriate instructional materials and resources.	0.229	0.232	<b>0.670</b>	0.122	-0.064
Teachers and students have access to current, diverse and ability-appropriate materials through the library	0.162	0.116	<b>0.714</b>	0.178	-0.003
Teachers have sufficient access to a broad range of professional personnel.	0.237	0.234	<b>0.666</b>	0.055	-0.034
Community members support teachers, contributing to their success with students.	0.163	0.237	0.174	<b>0.845</b>	-0.014
Parents/guardians support teachers, contributing to their success with students.	0.144	0.227	0.165	<b>0.860</b>	-0.001
In an average week of teaching, how many hours do you spend on school-related activities outside of the regular school day (before or after school, and/or on weekends)?	-0.048	-0.026	-0.028	-0.009	<b>0.909</b>
Other school-related activities such as preparation, grading, parent conferences or attending meetings?	-0.047	-0.021	-0.047	-0.007	<b>0.909</b>

The PCA conducted on the Teacher Bonding Social Capital (TBOSC) scale identified a 7 factor solution and is represented in Table 7 and includes each scale's new name and reliability data. The new subscale names include: 1) Teacher Leader Culture, 2) Effective Use of Teacher Time, 3) Community Parent Culture, 4) Teacher Role in Instruction, 5) Effective Teaching Practice, 6) Teacher Evaluation, and 7) Teacher Supports for English Language Learners and Special Education (eliminated).

Table 7

*Teacher Bonding Social Capital Subscale EFA Results (including items by subscale and reliability coefficients)*

Teacher Bonding Social Capital Subscale	Items	Cronbach's Alpha
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<p>Component 1: Teacher Leader Culture (9 items)</p>	<p>There is an atmosphere of trust and mutual respect in this school.                  In this school we take steps to solve problems.                  Teachers feel comfortable raising issues and concerns that are important to them.                  The faculty has an effective process for making group decisions to solve problems.                  Teachers in this school trust each other.                  The faculty and leadership have a shared vision.                  Teachers are effective leaders in this school.                  Teachers are trusted to make sound professional decisions about instruction.                  Overall, my school is a good place to work and learn.</p>	<p>.909</p>
<p>Component 2: Effective use of Teacher Time (5 items)</p>	<p>Teachers have time available to collaborate with colleagues.                  Teachers are allowed to focus on educating students with minimal interruptions.                  Teachers are protected from duties that interfere with their essential role of educating students.                  Teachers have sufficient instructional time to meet the needs of all students.                  The non-instructional time provided for teachers in my school is sufficient.</p>	<p>.783</p>
<p>Component 3: Community Parent Culture (4 items) (all in Culture of Community)</p>	<p>The school works directly with parents/guardians to improve the educational climate in students' homes.                  This school maintains clear, two-way communication with the community.                  This school does a good job of encouraging parent/guardian involvement.                  Teachers provide parents/guardians with useful information about student learning.</p>	<p>.779</p>
<p>Component 4: Teacher Role in Instruction (3 items)</p>	<p>What is the role teachers have at your school in setting grading and student assessment practices.                  What is the role teachers have at your school in devising teaching techniques.                  Teachers have autonomy to make decisions about instructional delivery (i.e., pacing, materials, and pedagogy).</p>	<p>.707</p>
<p>Component 5: Effective Teaching Practice (3 items)</p>	<p>Teachers work in professional learning communities to develop and align instructional practices.                  Teachers are encouraged to reflect on their own practice.                  Follow-up is provided from professional development in this school.</p>	<p>.638</p>

Component 6: Teacher Evaluation (2 items)	The components of the teacher evaluation process accurately identify effectiveness. The teacher evaluation process improves teachers' instructional strategies.	.854
Component 7: Teacher Supports for English Language Learners and Special Education (2 items)	This school has an effective approach (e.g., identification process, scheduling, collaborative teaming, instruction for language development) in place to meet the needs of English language learners. This school has an effective approach (e.g., referral/identification process, scheduling, collaborative teaming, supplemental resources, accommodation practices) in place to meet the needs of students in special education.	.641

Table 8 illustrates the Teacher Bonding Social Capital (TBOSC) scale's PCA rotated component matrix showing the factor loadings for each of the 7 components and the variables.

Table 8

*TBOSC PCA Factor Loading and New Factor Names*

Item/New Factor Names	1 Teacher Leadership Culture	2 Effective Use of Teacher Time Use	3 Communi- ty Parent Communi- cation	4 Teacher Role in Instructi- on	5 Effecti- ve Teachi- ng Practic- e	6 Teacher Evaluati- on	7 Teacher Supports ELL & SPED (Eliminat- ed)
There is an atmosphere of trust and mutual respect in this school.	<b>0.782</b>	0.150	0.129	0.128	0.151	0.144	0.065
There is an atmosphere of trust and mutual respect in this school.	<b>0.725</b>	0.146	0.231	0.145	0.205	0.099	0.076
Teachers feel comfortable raising issues and concerns that are important to them.	<b>0.712</b>	0.167	0.115	0.196	0.153	0.219	0.041
The faculty has an effective process for making group decisions to solve problems.	<b>0.692</b>	0.136	0.202	0.114	0.23	0.125	0.059
The faculty has an effective process for making group decisions to solve problems.	<b>0.682</b>	0.087	0.101	0.047	0.128	0.016	0.106
The faculty and leadership have a shared vision.	<b>0.67</b>	0.129	0.172	0.112	0.211	0.208	0.07
Teachers are effective leaders in this school.	<b>0.665</b>	0.097	0.208	0.177	0.215	0.035	0.085

Teachers are trusted to make sound professional decisions about instruction.	<b>0.598</b>	0.242	0.132	0.416	0.113	0.143	0.062
Overall, my school is a good place to work and learn.	<b>0.55</b>	0.177	0.161	0.138	0.077	0.088	0.111
Teachers have time available to collaborate with colleagues.	0.101	<b>0.715</b>	0.039	0.027	0.326	-0.007	0.001
Teachers are allowed to focus on educating students with minimal interruptions.	0.288	<b>0.642</b>	0.133	0.152	0.013	0.172	0.061
Teachers have sufficient instructional time to meet the needs of all students.	0.098	<b>0.681</b>	0.052	0.133	-0.028	0.078	0.111
The non-instructional time provided for teachers in my school is sufficient.	0.105	<b>0.751</b>	0.056	0.086	0.177	0.046	0.032
Teachers are protected from duties that interfere with their essential role of educating students.	0.247	<b>0.615</b>	0.096	0.141	0.057	0.155	0.037
The school works directly with parents/guardians to improve the educational climate in students' homes.	0.162	0.09	<b>0.683</b>	0.119	0.054	0.112	0.138
This school maintains clear, two-way communication with the community.	0.274	0.121	<b>0.756</b>	0.1	0.114	0.064	0.075
This school does a good job of encouraging parent/guardian involvement.	0.261	0.086	<b>0.783</b>	0.076	0.118	0.062	0.058
Teachers provide parents/guardians with useful information about student learning.	0.143	0.035	<b>0.673</b>	0.027	0.172	-0.022	0.063
What is the role teachers have in: Setting grading and student assessment practices	0.086	0.129	0.072	<b>0.767</b>	0.079	0.088	0.034
What is the role teachers have in: Devising teaching techniques	0.231	0.114	0.09	<b>0.763</b>	0.082	0.033	0.056
Teachers have autonomy to make decisions about instructional delivery (i.e., pacing, materials, and pedagogy).	0.254	0.19	0.063	<b>0.611</b>	0.076	0.083	0.219
Teachers work in professional learning communities to develop and align instructional	0.216	0.173	0.093	0.052	<b>0.625</b>	-0.041	0.226
Teachers are encouraged to reflect on their own practice.	0.256	0.105	0.153	0.101	<b>0.618</b>	0.104	0.112

Follow-up is provided from professional development in this school.	0.233	0.124	0.16	0.075	<b>0.612</b>	0.267	0.082
What is the role teachers have in: Determining the content of in-service professional development programs	0.218	0.102	0.12	0.454	0.442	0.181	-0.107
The components of the teacher evaluation process accurately identify effectiveness.	0.183	0.164	0.057	0.13	0.099	<b>0.847</b>	0.059
The teacher evaluation process improves teachers' instructional strategies.	0.237	0.15	0.063	0.131	0.146	<b>0.829</b>	0.065
Teachers in this school receive informal feedback about their teaching on an ongoing basis.	0.359	0.111	0.135	0.005	0.377	0.42	0.049
What is the role teachers have in: School improvement planning	0.329	0.058	0.175	0.305	0.379	0.216	-0.076
This school has an effective approach (e.g., referral/identification process, scheduling, collaborative teaming, supplemental resources, accommodation practices) in place to meet the needs of students in special education.	0.197	0.116	0.129	0.112	0.123	0.073	<b>0.764</b>
This school has an effective approach (e.g., identification process, scheduling, collaborative teaming, instruction for language development) in place to meet the needs of English language learners.	0.103	0.061	0.148	0.074	0.155	0.048	<b>0.795</b>
Teachers are encouraged to try new things to improve instruction.	0.327	0.102	0.118	0.326	0.41	0.025	0.205

Component 7 was dropped from the scale for to three reasons: 1) two items in this component did not fit within the construct of TBOSC, 2) this subscale has relatively low reliability ( $\alpha = .641$ ), and 3) this component explained a small part of the variance (3.02%). Component 5 (2 items) also had a low Cronbach's alpha (.638), however that component was

retained because the component's items clearly fit within the TBOSC construct definition that describes teacher interactions with each other as relevant to developing teacher social capital in a school.

The 20 item School Leadership scale loaded into two components. They were named 1) Leaders Support Instruction, and 2) Leaders Address Concerns. Ten items loaded onto Leaders Support Instruction ( $\alpha = .907$ ), and 8 items loaded onto Leaders Address Concerns ( $\alpha = .899$ ). Two items were eliminated because they didn't load strongly onto either subscale. Leadership subscale new names, items and reliability data are identified in Table 9.

Table 9

*School Leadership Scale/Subscale EFA Results (including items by subscale and reliability coefficients)*

School Leadership Subscale	Items	Cronbach Alpha
Component 1: Leadership Supports Instruction (10 items)	The school leadership communicates with the faculty adequately. The school leadership communicates clear expectations to students and parents. The school leadership consistently supports teachers. Teachers are held to high professional standards for delivering instruction. The school leadership facilitates using data to improve student learning. Administration consistently enforces rules for student conduct. The school leadership focuses on the professional growth of staff. Overall, the school leadership in my school is effective. The school leadership works to minimize disruptions for teachers, allowing teachers to focus on educating students. The faculty are recognized for accomplishments.	.907
Component 2: Leaders Address Teacher Concerns (8 items)	The school leadership makes a sustained effort to address teacher concerns about: Leadership issues. Facilities and resources. The use of time in my school. Professional development. Empowering teachers. Community engagement. Student learning.	.899

	New teacher support.	
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Table 10 illustrates the factor loadings for the two School Leadership subscales: 1) Leadership Supports Instruction, and 2) Leaders Address Teacher Concerns.

Table 10

*School Leadership Factor Loading*

Item	1. Leadership Supports Instruction	2. Leaders Address Teacher Concerns
The school leadership communicates with the faculty adequately.	<b>0.728</b>	0.357
The school leadership consistently supports teachers.	<b>0.725</b>	0.404
The school leadership communicates clear expectations to students and parents.	<b>0.705</b>	0.321
Administration consistently enforces rules for student conduct.	<b>0.68</b>	0.259
The school leadership facilitates using data to improve student learning.	<b>0.655</b>	0.218
Teachers are held to high professional standards for delivering instruction.	<b>0.651</b>	0.161
The school leadership focuses on the professional growth of staff.	<b>0.64</b>	0.4
Overall, the school leadership in my school is effective.	<b>0.623</b>	0.341
The school leadership works to minimize disruptions for teachers, allowing teachers to focus on educating students.	<b>0.606</b>	0.363
The faculty are recognized for accomplishments.	<b>0.604</b>	0.362
The school leadership makes a sustained effort to address teacher concerns about: The use of time in my school.	0.327	<b>0.751</b>
The school leadership makes a sustained effort to address teacher concerns about: Facilities and resources.	0.24	<b>0.748</b>
The school leadership makes a sustained effort to address teacher concerns about: Empowering teachers.	0.442	<b>0.713</b>
The school leadership makes a sustained effort to address teacher concerns about: Community engagement.	0.237	<b>0.712</b>
The school leadership makes a sustained effort to address teacher concerns about: Professional development.	0.348	<b>0.705</b>
The school leadership makes a sustained effort to address teacher concerns about: Leadership issues.	0.385	<b>0.695</b>
The school leadership makes a sustained effort to address teacher concerns about: student learning.	0.469	<b>0.628</b>
The school leadership makes a sustained effort to address teacher concerns about: New teacher support.	0.212	<b>0.589</b>
Teachers are assigned classes that maximize their likelihood of success with students.	0.314	0.332

School leadership participates in professional development opportunities with teachers.	0.412	0.192
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Next in the analysis the scores from each subscale item were converted to z scores to standardize them to accommodate the range of variance and slightly and different response scales (some questions were on 2, some on 5, and some on 6 point scales). Z scores are useful to “normalize” the responses from different items that have different means and/or standard deviations (Hair, et al., 2010).

The z scores for the items in each subscale were then calculated into a factor score for each subscale. “Factor scores are the composite (latent) scores for each subject on each factor which is a grouping of variables (survey items) (Odom, 2011, p. 6). Calculating the factor scores for each subscale enables the researcher to examine the relationship of the subscales to each other in a correlation matrix.

Pearson’s correlation coefficient matrix and an exploratory linear regression analysis were conducted to examine the relationship between the Precondition/Energizer (P/E), Teacher Bonding Social Capital (TBOSC) and School Leadership factor scales and to clearly answer the research questions. Regression analysis was also conducted to understand the relationship between these factors and school performance measures.

### **Findings**

Correlation and exploratory linear regression analyses examined the relationship between the Precondition/Energizers (P/E), Teacher Bonding Social Capital (TBOSC) and School Leadership factor scales and school performance measures. A better understanding of these relationships will address the research questions: 1) What is the evidence of teacher social capital within teacher perceptions of their school working conditions; 2) What is the relationship

between teacher perceptions of school leaders and teacher social capital; and 3) What is the relationship between teacher social capital and school academic performance?

### **Precondition/Energizers, Teacher Bonding Social Capital, School Leadership Relationships**

This section addresses the research question: What is the evidence of teacher social capital within teacher perceptions of their school working conditions? Three factor scales Precondition/Energizers (P/E), Teacher Bonding Social Capital (TBOSC), and School Leadership were compared using Pearson's correlation coefficient to analyze the strength of the relationships (see Table 11 in Appendix 1 for correlation matrix of all factor scales). All relationships were statistically significant. The correlations reviewed in this section represent the strongest relationships. See Appendix 2 for a listing of all interactions.

1. TBOSC factor Teacher Leader Culture correlates strongly with:
  - P/E factor Teacher Expertise ( $r^2 = .837$ ,  $p = .01$ )
  - Leadership factor Leaders Support Instruction ( $r^2 = .848$ ,  $p = .01$ )
  - Leadership factor Leadership Addresses Teacher Concerns ( $r^2 = .728$ ,  $p = .01$ )
2. TBOSC factor Effective Teaching Practice correlates strongly with:
  - P/E factor Professional Development for Instruction ( $r^2 = .715$ ,  $p = .01$ )
3. Leadership factor Leaders Support Instruction correlates strongly with
  - P/E factor Teacher Expertise ( $r^2 = .791$ ,  $p = .01$ )
  - Leadership factor Leaders Address Teacher Concerns ( $r^2 = .771$ ,  $p = .01$ ).

In summary, evidence of teacher social capital was found through the exploratory factor analysis that resulted in the two scales Precondition/Energizers (4 factors) and Teacher Bonding Social Capital (6 factors). The relationship between these two scales and the two School Leadership factors indicates either strong or moderate relationships. The strongest relationships

exist between TBOSC Teacher Leader Culture and the P/E factor Teacher Expertise ( $r^2 = .837$ ,  $p = .01$ ) and the School Leadership factor Leaders Support Instruction ( $r^2 = .848$ ,  $p = .01$ ).

Examples of these strong relationships are between Leaders Support Instruction scale and all factors in the P/E (4) and TBOSC (6) scales, and between the School Leadership factor Leaders Address Teacher Concerns and the P/E scale Parent and Community Support. When schools develop a teacher leader culture that includes shared vision, trust and mutual respect, as well as processes to raise issues, solve problems, and make sound decisions, teachers are recognized as experts and take on leadership roles, influence decision making, and play important roles in teaching and learning. All school leaders in these schools (e.g., teacher leaders, principals, assistant principals, lead teachers, etc.) support instruction by holding teachers to high professional standards, facilitating using data to improve student learning, focusing on the right professional development for teachers, communicating effectively, minimizing teacher disruptions, enforcing student conduct rules, and recognizing faculty for their accomplishments.

The P/E factor Teacher Expertise had strong or moderate relationships with all P/E, TBOSC and Leadership factor scales. TBOSC factor Effective Teaching Practice correlates moderately with two P/E factors Professional Development for Instruction and Teacher Expertise. TBOSC factor Effective Teaching Practice correlates weakly with P/E factor Parent and Community Support, P/E factor Time Supports and the TBOSC factor Teacher Role in Instruction. Lastly, the P/E factor Time Supports had a significant, but weak and negative relationship with all factors.

### **Perceptions of School Leadership and Teacher Social Capital**

This section addresses the second and third research questions: 2) What is the relationship between teacher perceptions of school leaders and teacher social capital; and 3) What is the relationship between teacher social capital and school academic performance?

An exploratory linear regression analysis of the two Leadership factor scales (independent variables, IV) and two Precondition/Energizers (P/E) factor scales of Professional Development for Instruction and Teacher Expertise factors (dependent variable, DV) resulted in moderately strong  $r^2$  of .40 ( $p < .0001$ ) with P/E scale Professional Development for Instruction scale and strong  $r^2$  of .64 ( $p < .0001$ ) with Teacher Expertise scale. Weak relationships were found between the two Leadership factor scales and the remaining two P/E subscales of Parent and Community Support ( $r^2 = .175$ ,  $p < .0001$ ) and Time Supports ( $r^2 = .01$ ,  $p < .0001$ ). A stepwise regression for elaboration identified that the School Leadership factor Leaders Support Instruction is strongly related to P/E factor Teacher Expertise explaining 62% of the variance ( $p < .0001$ ) and is moderately related to P/E factor Professional Development for Instruction, explaining 39% of variance ( $p < .0001$ ).

Next an exploratory linear regression analysis of the two School Leadership factor scales (IV) and two Teacher Bonding Social Capital (TBOSC) (DV) factors found that TBOSC factor Teacher Leader Culture (DV) resulted in strong  $r^2$  of .74 ( $p < .0001$ ), and a moderately strong  $r^2$  of .40 ( $p < .0001$ ) for Effective Teaching Practice. Weaker relationships with the four remaining TBOSC factor scales and the Leadership factor scales resulted in  $r^2$  of .31 ( $p < .0001$ ) with TBOSC factor Community and Parent Culture;  $r^2$  of .25 ( $p < .0001$ ) with TBOSC factor Effective Use of Teacher Time;  $r^2$  of .24 ( $p < .0001$ ) with TBOSC factor Teacher Evaluation; and  $r^2$  of .21 ( $p < .0001$ ) TBOSC factor Teacher Role in Instruction.

A stepwise regression for elaboration identified that the School Leadership factor scale Leaders Support Instruction is strongly related to TBOSC factor Teacher Leader Culture explaining 72% of the variance ( $p < .0001$ ). School Leadership factor Leaders Support Instruction is moderately related to TBOSC factor Effective Teaching Practice explaining 38% of the variance ( $p < .0001$ ), and a slightly weaker support of TBOSC factor Community and Parent Culture ( $r^2$  of .38,  $p < .0001$ ). Still weaker relationships with School Leadership factor Leaders Support Instruction resulted in  $r^2$  of .24 ( $p < .0001$ ) with TBOSC factor Effective Use of Teacher Time,  $r^2$  of .23 ( $p < .0001$ ) with TBOSC factor Teacher Evaluation, and  $r^2$  of .19 ( $p < .0001$ ) for TBOSC factor Teacher Role in Instruction.

A linear regression of the combined Leadership factor scales (IV) and the P/E factor scales (IV) resulted in a strong  $r^2$  of .80 ( $p < .0001$ ) with the TBOSC factor Teacher Leadership Culture and  $r^2$  of .57 ( $p < .0001$ ) with TBOSC factor Effective Teaching Practice. The combined School Leadership and P/E factor scales resulted in moderate  $r^2$  of .42 ( $p < .0001$ ) with TBOSC factor Community and Parent Culture as well as  $r^2$  of .39 ( $p < .0001$ ) TBOSC factor Teacher Role in Instruction. Weaker relationships are found between the  $r^2$  of .34 ( $p < .0001$ ) with TBOSC factor Effective Use of Teacher Time and  $r^2$  of .28 with TBOSC factor Teacher Evaluation.

A stepwise regression for elaboration identified that the School Leadership factor scale Leaders Support Instruction is strongly related to TBOSC factor Teacher Leader Culture, explaining 72% of the variance ( $p < .0001$ ) and when P/E factor scale Teacher Expertise is added 80% of the variance is explained.

A stepwise regression for elaboration identified that the P/E factor Professional Development for Instruction has a moderately strong relationship with TBOSC factor Effective

Teaching Practice, explaining 52% of the variance ( $p < .0001$ ); however, no other factors added strength to this model to support TBOSC factor Effective Teaching Practice.

A stepwise regression for elaboration identified that the Leadership factor scale Leaders Support Instruction is weakly related to TBOSC factor Community and Parent Culture, explaining 30% of the variance ( $p < .0001$ ), however with the P/E factor Parent and Community Support added the relationship is moderate explaining 40% of the variance ( $p < .0001$ ).

A stepwise regression for elaboration identified that the P/E factor Teacher Expertise is weakly related to TBOSC factor Effective Use of Teacher Time, explaining 27% of the variance ( $p < .0001$ ). When P/E factor Professional Development for Instruction is added the relationship increases to explain 31% of the variance ( $p < .0001$ ).

A stepwise regression for elaboration identified that the P/E factor scale Teacher Expertise is moderately related to TBOSC factor Teacher Role in Instruction, explaining 38% of the variance ( $p < .0001$ ), however no other factors added strength to this model to support Teacher Role in Instruction.

A stepwise regression for elaboration identified that the Leadership factor scales Leaders Support Instruction is weakly related to TBOSC factor Teacher Evaluation, explaining 23% of the variance, however no other factors added strength to this model to support Teacher Evaluation.

In summary, School Leadership factor scales have a strong relationship to the TBOSC factors Teacher Leader Culture and Effective Teaching Practice, specifically the Leadership factor Leaders Support Instruction has a strong relationship with TBOSC factor Teacher Leader Culture. School Leadership factor Leaders Support Instruction also has a moderately strong relationship with TBOSC factor Effective Teaching Practice. The Leadership factors had weak

relationships with the remaining five TBOSC factor scales of Effective Use of Teacher Time, Community Parent Culture, Teacher Role in Instruction, Effective Teaching Practice, and Teacher Evaluation .

When School Leadership factors are combined with Precondition/Energizers their strongest relationship are with TBOSC factors: 1) Teacher Leadership Culture, 2) Teacher Evaluation, and 3) Community and Parent Culture. The School Leadership factor Leadership Supports Instruction strongly supports TBOSC factor Teacher Leadership Culture and becomes stronger with P/E scale Teacher Expertise and has a moderate relationship to TBOSC factor Community and Parent Culture and becomes moderately strong when P/E Parent and Community Support is added. The P/E factor scale of Professional Development for Instruction moderately supports Effective Teaching Practice.

The relationships identified in this analysis supports that school leadership has a strong to moderate relationship with the environmental conditions of Precondition/Energizers factors Professional Development for Instruction and Teacher Expertise, and in particular the Leadership factor Leaders Supports Instruction lends strength to this relationship. The practices that leaders do to communicate effectively to teachers with clear expectations and expect high standards of instruction develop the school conditions that support teachers with relevant and effective professional development. This professional development specifically improves instruction by refining teaching practices, deepens teachers content knowledge, enhances their ability to implement instructional strategies to meet diverse student learning needs. In addition, leaders also create the conditions that value teacher expertise by listening to their ideas and opinions, empowering teachers to make decisions, providing formal leadership roles and supporting their efforts to maintain discipline in their classrooms.

Leadership factors Leadership Addresses Teacher Concerns does not have a relationship with any of the Precondition/Energizers of a school environment that helps to develop teacher social capital. This Leadership factor consists of items that identify how school leaders make a sustained effort to address teacher concerns about leadership issues, facilities and resources, teacher time, professional development, empowering teachers, community engagement and student learning. It seems that if leaders focus on supporting important instructional areas for teachers such as communicating effectively, having clear expectations, having high expectations of instruction (e.g., using data to improve student learning) as well as effective professional development and enforcing student conduct rules then addressing teacher concerns is less needed due to leadership that supports instruction effectively.

### **Teacher Social Capital Relationship to School Academic Performance**

To examine the relationship between teacher social capital and school performance an exploratory linear regression analysis of the Teacher Bonding Social Capital (IV) and the school performance outcome scores of academic achievement (DV) resulted in  $r^2$  of .102 ( $p < .0001$ ). Additional exploratory linear regression analyses were conducted with academic growth ( $r^2$  of .054 ( $p < .0001$ )) and academic growth gaps ( $r^2$  of .040 ( $p < .0001$ )). A stepwise regression for elaboration identified the TBOSC factor scale of Community and Parent Culture (IV) as the first contributing factor to academic achievement (DV) ( $r^2$  of .072 ( $p < .0001$ )), academic growth (DV) ( $r^2$  of .047 ( $p < .0001$ )) and academic growth gaps (DV) ( $r^2$  of .035 ( $p < .0001$ )). The second contributing factor was TBOSC factor scale of Teacher Role in Instruction (IV) to academic achievement (DV) ( $r^2$  of .087 ( $p < .0001$ )), academic growth ( $r^2$  of .050 ( $p < .0001$ )). Also contributing as a second factor was TBOSC factor scale Teacher Leaders Culture to academic growth gaps ( $r^2$  of .038 ( $p < .0001$ )).

An exploratory linear regression analysis of the Teacher Bonding Social Capital (IV) and the Precondition/Energizer factor scales (IV) and the school performance outcome scores of academic achievement (DV) resulted in  $r^2$  of .18 ( $p < .0001$ ). Additional exploratory linear regression analyses were conducted with academic growth ( $r^2$  of .10 ( $p < .0001$ )) and academic growth gaps ( $r^2$  of .07X ( $p < .0001$ )). A stepwise regression for elaboration identified the P/E factor scale of Parent and Community Support (IV) as the first contributing factor to academic achievement (DV) ( $r^2$  of .137 ( $p < .0001$ )), academic growth (DV) ( $r^2$  of .092 ( $p < .0001$ )) and academic growth gaps (DV) ( $r^2$  of .062 ( $p < .0001$ )). Consistently the second contributing factor was TBOSC factor scale of Community and Parent Culture (IV) to academic achievement (DV) ( $r^2$  of .147 ( $p < .0001$ )), academic growth ( $r^2$  of .098 ( $p < .0001$ )) and academic growth gaps ( $r^2$  of .067 ( $p < .0001$ )).

In summary, Teacher Bonding Social Capital explains 10% of the variance of school academic achievement, but when coupled with the Precondition/Energizers these factors explain 18% of the variance of school academic achievement. Teacher Bonding Social Capital does not contribute as strongly to academic growth or academic growth gaps. This finding identified that Teacher Bonding Social Capital is an important factor for school and teacher leaders, as well as principal supervisors to attend to impact student achievement. When the school environmental conditions (Precondition/Energizers) are also attended to an almost doubling effect occurs to impact student achievement.

### **Discussion**

This research examined the relationship between teacher social capital, school leadership and their impact on school performance. The findings show that in schools where there are strong and trusting teacher relationships among colleagues, with school leadership, and with

parents and the community, improved student achievement results. This study used 2015 TELL data as a source of teacher perceptions of working conditions, to determine if some of the teacher working conditions the TELL survey examines could be a proxy for components of a system of teacher social capital and if it could, then examine the relationship between teacher social capital components, school leadership, and school performance. From this analysis school leaders, teacher leaders, and principal supervisors can identify specific in-school factors that can lead to concrete actions school and teacher leaders can take to develop teacher social capital in their schools and improve school performance.

Of all the in-school components that contribute to improving school performance this study found that Teacher Bonding Social Capital contributes 10% to existing in-school factors that improve school performance. When Precondition/Energizer factors (e.g., teacher expertise, professional development, time supports, parent and community instructional supports) are combined with Teacher Bonding Social Capital practices an additional 8% contribution to school performance results. Thus, the combined Precondition/Energizers and Teaching Bonding Social Capital factors contribute 18% toward improving school performance. For school and teacher leaders, paying attention to creating a school environment that develops teacher bonding social capital can make an important difference to students.

One way that school leaders and teachers can energize, or create an environment, that strengthens teacher social capital is by developing and supporting teacher leaders and a peer-to-peer teacher network. Examples include structuring time for professional development that provides for ongoing opportunities for teachers to work together to: 1) refine teaching practices, 2) meet diverse student learning needs, 3) increase their ability to improve student learning, and 4) develop teachers' knowledge and skills most needed to teach effectively. Opportunities to

reflect with each other is important to energizing the teacher social network as well. In addition, if teachers are regarded as experts in their field, and are depended upon to make decisions about educational issues such as teaching, scheduling, professional development and others, these practices will contribute to a strong school environment that can develop teacher social capital.

School and teacher leadership that fosters an atmosphere of mutual respect, and teachers as problem solvers also develops teacher social capital. These factors can be supported by school norms that are used and respected. In addition, school environments where teachers are comfortable raising issues and concerns important to them also develops teacher social capital.

When this finding is considered in light of the strong correlations found between the TBOSC scale Teacher Leadership Culture and the P/E scale Teacher Expertise ( $r = .837$ ,  $p = .01$ ), and the strong relationship finding from the regression analysis between the Leadership scales and TBOSC factors Teacher Leader Culture and Effective Teaching Practice, school leaders need to focus on developing a school atmosphere of trust, mutual respect, and shared vision, and need to value teachers as experts by providing for professional development that improves their instruction. In addition, school leaders that support instruction through effective communication to faculty, students, and parent/guardians, supports teachers by minimizing disruptions, and focuses on faculty professional growth rather than solely addressing specific teacher concerns will create a school atmosphere that develops teacher bonding social capital.

In schools where a culture of teacher leadership exists, this culture is strongly supported by teacher expertise (expert teachers make good teacher leaders) and school leaders.

Recognizing the experience teachers have by empowering them as decision makers, giving them a voice into school decisions and creating teacher leadership roles as instructional coaches, mentors and curriculum experts are ways to develop a strong teacher leadership culture. School

leaders that support instruction need to be effective communicators, use data to improve student learning, hold teachers to high standards and recognize them are ways to develop a culture of teacher leadership.

School leaders that support instruction contribute to the school environment (Precondition/Energizers) through professional development that deepens teacher expertise, improves instructional strategies to meet diverse student needs and gives teachers time to implement their new knowledge into teaching practices will also develop teacher social capital.

Currently, the Colorado Department of Education through the New Teacher Center, supports school interpretation of TELL data most often by examining the frequencies of responses to TELL items. This research identifies a different way to use TELL data through the lens of developing specific school leader practices that strengthen school conditions and help to develop teacher bonding social capital. A module to extract items from TELL that indicate the component scales of teacher social capital may be possible to examine school or district data to determine if teacher social capital exists in a school or district. Further analysis of different school level data will determine if this is possible using the TELL data.

### **Recommendations**

School districts across the U.S. are exploring ways to expand and support a teacher leadership culture in their schools while teachers and school leaders are adapting to embrace a more distributed way of guiding and improving the instructional practices in a school. This study identifies teacher leadership culture as an important teacher bonding social capital factor making the connection that developing teacher social capital in a school can support improved school performance. Of the 6 teacher bonding social capital factors that emerged from this study, teacher leaders culture, teacher expertise, effective teaching practice and community and parent

communication are areas to focus on in developing strong teacher social capital. Carefully crafting structures that build a school environment of shared vision, trust, respect, effective decision making processes and cooperative problem solving lends strength to developing teacher leadership and strong bonding.

Leaders must also pay attention to the factors that create the conditions by which teacher social capital may flourish. Leaders who foster relevant and effective teacher professional development, engage teachers in instructional decisions, support teachers instructionally and empower them in instruction, develop strong and supportive school environments in which teachers thrive, students learn, and schools attain higher performance standards. When school and teacher leaders acknowledge and develop teacher expertise and cultivate meaningful and practical professional development that specifically supports instruction, a school's most important customer, the student, can benefit greatly.

TELL data has the potential to yield more than frequency results of how teachers in a school perceive their working conditions. TELL data, at the district level, may assist in ascertaining the strength of teacher social capital in a district and in some schools as well as the strength of the relationship between school leadership in developing the environmental conditions that support teacher social capital. Nurturing healthy, professional, and relevant relationships among teachers in a school can foster leadership and resource sharing that benefits teachers, students and the community as schools may yield better achievement because of the capital developed.

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## APPENDIX A

Table 11. Correlation Matrix of Precondition/Energizers, Teacher Bonding Social Capital and School Leadership

	Professional Development for Instruction (P/E)	Teacher Expertise (P/E)	Parent and Community Support (P/E)	Time Supports (P/E)	Teacher Leadership Culture (TBOSC)	Effective Use of Teacher Time (TBOSC)	Community and Parent Culture (TBOSC)	Teacher Role in Instruction (TBOSC)	Effective Teaching Practice (TBOSC)	Teacher Evaluation (TBOSC)	Leaders Support Instruction (Lead)	Leaders Address Teacher Concerns (Lead)
Professional Development For Instruction (P/E)												
Teacher Expertise (P/E)	.625**											
Parent and Community Support (P/E)	.342**	.459**										
Time Supports (P/E)	-.097**	-.083**	-.032**									
Teacher Leadership Culture (TBOSC)	.592**	.837**	.419**	-.086**								
Effective Use of Teacher Time (TBOSC)	.480**	.519**	.317**	-.203**	.490**							
Community and Parent Culture (TBOSC)	.389**	.503**	.520**	-0.002	.524**	.304**						
Teacher Role in Instruction (TBOSC)	.358**	.609**	.300**	-.046**	.500**	.385**	.305**					
Effective Teaching Practice (TBOSC)	.715**	.557**	.303**	-.065**	.575**	.405**	.415**	.356**				
Teacher Evaluation (TBOSC)	.445**	.455**	.252**	-.101**	.454**	.357**	.244**	.316**	.381**			
Leaders Support Instruction (Lead)	.620**	.791**	.412**	-.077**	.848**	.486**	.544**	.437**	.614**	.477**		
Leaders Address Teacher Concerns (Lead)	.564**	.679**	.368**	-.080**	.728**	.447**	.497**	.431**	.562**	.433**	.771**	

## APPENDIX B

Moderate to Weak Correlations between Precondition/Energizers, Teacher Bonding Social Capital and School Leadership factor scales.

1. TBOSC factor scale Teacher Leader Culture correlates moderately with:
  - P/E factor Professional Development for Instruction ( $r^2 = .592$ ,  $p = .01$ )
  - P/E factor Parent and Community Support ( $r^2 = .419$ ,  $p = .01$ )
  - TBOSC factor Effective Teaching Practice ( $r^2 = .575$ ,  $p = .01$ )
  - TBOSC factor Community and Parent Culture ( $r^2 = .524$ ,  $p = .01$ )
  - TBOSC factor Teacher Role in Instruction ( $r^2 = .500$ ,  $p = .01$ )
  - TBOSC factor Effective Use of Teacher Time ( $r^2 = .490$ ,  $p = .01$ )
  - TBOSC factor Teacher Evaluation ( $r^2 = .454$ ,  $p = .01$ )
2. TBOSC factor scale Effective Teaching Practice correlates moderately with
  - TBOSC factor Effective Use of Teacher Time ( $r^2 = .405$ ,  $p = .01$ )
  - TBOSC factor Community and Parent Culture ( $r^2 = .415$ ,  $p = .01$ )
  - Leadership factor Leaders Support Instruction ( $r^2 = .614$ ,  $p = .01$ )
  - Leadership factor Leaders Address Teacher Concerns ( $r^2 = .562$ ,  $p = .01$ )
3. P/E factor scale Teacher Expertise correlates moderately with:
  - P/E factor scale Professional Development for Instruction ( $r^2 = .625$ ,  $p = .01$ )
  - TBOSC factor of Teacher Role in Instruction ( $r^2 = .609$ ,  $p = .01$ )
  - TBOSC factor Effective Teaching Practice ( $r^2 = .557$ ,  $p = .01$ )
  - TBOSC factor Effective Use of Teacher Time ( $r^2 = .519$ ,  $p = .01$ )
  - TBOSC factor Community and Parent Culture ( $r^2 = .503$ ,  $p = .01$ )
  - TBOSC factor Teacher Evaluation ( $r^2 = .444$ ,  $p = .01$ )

- Leadership factor Address Teacher Concerns ( $r^2 = .679, p = .01$ ).
4. P/E factor scale Professional Development for Instruction correlates moderately with
    - TBOSC factor Effective Use of Teacher Time ( $r^2 = .480, p = .01$ )
    - TBOSC factor Teacher Evaluation ( $r^2 = .445, p = .01$ )
    - Leadership factor Leaders Address Teacher Concerns ( $r^2 = .564, p = .01$ )
  5. Leaders Support Instruction correlates moderately with:
    - P/E factor Professional Development for Instruction ( $r^2 = .620, p = .01$ )
    - P/E factor Parent and Community Support ( $r^2 = .412, p = .01$ )
    - TBOSC factor Community and Parent Culture ( $r^2 = .544, p = .01$ )
    - TBOSC factor Effective Use of Teacher Time ( $r^2 = .486, p = .01$ )
    - TBOSC factor Teacher Evaluation ( $r^2 = .477, p = .01$ ),
    - TBOSC factor Teacher Role in Instruction ( $r^2 = .437, p = .01$ )
  6. Leadership factor scale Leaders Address Teacher Concerns correlates moderately with
    - TBOSC factor Community and Parent Culture ( $r^2 = .497, p = .01$ )
    - TBOSC factor Effective Use of Teacher Time ( $r^2 = .447, p = .01$ )
    - TBOSC factor Teacher Evaluation ( $r^2 = .433, p = .01$ )
    - TBOSC factor Teacher Role in Instruction ( $r^2 = .431, p = .01$ )
  7. TBOSC factor scale Community and Parent Culture correlates moderately with
    - P/E factor Parent and Community Support ( $r^2 = .520, p = .01$ )
  8. P/E factor Time Supports reported significant, but weak and negative relationship with all factor scales.