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A Longitudinal Study of Elementary School Climate and Achievement: Testing a Protective Resilience Model

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A LONGITUDINAL STUDY OF ELEMENTARY SCHOOL CLIMATE AND ACHIEVEMENT: TESTING A PROTECTIVE RESILIENCE MODEL

By

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Under the Direction of Christopher C. Henrich, PhD

ABSTRACT

This study sought to fill a gap in resilience and school climate theory. Research has found that the protective model of resilience allows resources and assets to act as moderators to protect individuals from risk. The protective model thus provides a way to understand how the school environment can protect youth from individual level risk. School climate, providing a holistic measure of the school environment may act as a resource to protect youth from risk on academic achievement. This dissertation first investigated how school climate should be defined in a longitudinal study and then hypothesized that student, parent, and personnel perceptions of positive school climate will protect youth from individual risk on grades and test scores. The study relied on elementary student data provided from a large urban school district in the southeast of the United States of America. Findings showed that school climate perceptions stay consistent over a three-year span and that the relationship of student risk on test scores or grades was not conditional on student, parent and faculty reported school climate. Other findings, limitations and applications are discussed.

INDEX WORDS: resilience, school climate, student achievement

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DEDICATION

This manuscript is dedicated to my husband, Jason, for not always understanding what I was talking about but for pretending to anyway and to my father, Joe, for teaching me what resilient really means.

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1. INTRODUCTION

Resilience theory provides a basis to understand how individuals respond to risk (Masten, 2014). In resilience research, an individual encounters or inherits risk and overcomes negative outcomes due to protective factors (Garmezy, Masten, & Tellegen, 1984). The two main models the current study utilizes are the compensatory model and the protective model. The compensatory model is a main effect model in which risk has a direct relationship an outcome and protective factors also have a direct relationship to the same outcome (Zimmerman & Arunkamar, 1994). The protective model is a moderation model in which the risk has a direct relationship to an outcome but a protective factor buffers this relationship. To define risk, some use a cumulative risk index to account for the snowball effects of risk and any relationships between different risks (Sameroff, 2006). Protective factors can either be assets or resources depending on how the individual interacts with them. Assets are attributes an individual already possesses and resources are external to the individual (Windle, 2011). Within the context of resilience, school climate may act as an important resource for children.

School Climate provides a multidimensional measure of the school environment. The National School Climate Council (2007) defines a positive and sustainable school climate as one which promotes youth development and learning where all individuals are engaged and respected while developing, living and contributing to a shared school vision. The current study relies on resilience theory to assess if school climate can act as a protective factor in the compensatory and protective models of resilience for elementary students who are placed at risk.

1.1 Resilience

Resilience is defined as the capacity of a dynamic system to adapt successfully to disturbances that threaten function or development (Masten, 2014). Resilience theory stresses

that following exposure to risk, protective factors reduce the amount of adverse outcomes (Garmezy, Masten & Tellegen, 1984; Khanlou & Wray, 2014). Resilience is not a static trait and has been classified as a process, continuum and a global concept (Khanlou & Wray, 2014; Masten & Powell, 2003; Zimmerman et al., 2013). Resilience is a process that develops over time and is dependent on interactions with other individuals and environments. It is also a continuum as the amount of resilience an individual needs or has differs based on the amount of risk they are experiencing. Resilience is a global concept because it can apply to multiple domains of life. A caveat to resilience research is that for an individual to experience resilience, they must first experience risk (Luthar, Cicchetti, & Becker, 2000). Individuals are identified as resilient when despite experiencing risk, they have positive outcomes or reduced negative outcomes because of protective factors working in their favor (Fergus & Zimmerman, 2005; Masten, 2014). According to researchers, when individuals are competent in one area, they tend to be competent in other areas by way of competence cascades (Heckman, 2006; Masten & Cicchetti, 2010). Within competence cascades, it is theorized that skills from one domain will cross into another and lead to competence in the other. For example, students who are competent in math will carry those skills into science (Masten, 2014). Thus, positive outcomes following risk will lead to individuals being competent in all areas because competence begets competence.

1.1.1 Models of Resilience

There are two general approaches to studying resilience, person-focused models and variable-focused models. Both the person-focused and the variable-focused models provide researchers with valuable information about how individuals are resilient. Person-focused and variable-focused approaches have fundamentally different assumptions as described in the

following paragraphs and can lead to different generalizations about resilience (Bergman, Magnusson, & El-Khouri, 2003; Magnusson, 2003; von Eye & Bogat, 2006)

In person-focused models, the goal is to describe differences between individuals in how risk is related to later adjustment (Laursen & Hoff, 2006). Person-focused models rely on case studies, profile analysis, cluster analysis or trajectory analysis to identify subgroups of individuals who possess inherent risks and are successful following risk. Individuals are classified into categories of high and low risk and adjustment based on their response to risk. The main benefit of a person-focused model is that it provides an in-depth look at one group of individuals (Laursen & Hoff, 2006). Because person-focused models allow researchers to compare subgroups of individuals on risks and outcomes, the main limitation is that results are focused on a particular subpopulation and may not be generalizable to others.

In comparison, studies using the variable-focused method examine how protective factors interact with differing risks and outcomes. Variable-focused models investigate changes in outcomes due to the things an individual encounters in their environment rather than demographic factors (Laursen & Hoff, 2006). Thus, variable-focused models are designed to understand patterns in behavior response because they focus on variables as the unit of analysis rather than individuals (Garmezy, Masten, & Tellegen, 1984). Often, variable-focused models utilize multiple regression, or structural equation modeling (Laursen & Hoff, 2006). Both the variable-focused and person-focused models of resilience provide useful information about risk and resilience (Laursen & Hoff, 2006). The variable-focused model is more appropriate if a researcher is concerned with understanding the different variables which contribute to an individual being resilient and how different variables interact where the person-focused model is

more appropriate if a researcher is concerned with understanding how a specific population responds to risk (Laursen & Hoff, 2006).

Because the current study will be relying on variables that are applicable to a wider population, variable-focused models will be a better fit. There are several types of variable-focused resilience models. The compensatory model and the protective model are the most common variable-focused models studied (Garmezy et al., 1984; Masten, 2014). The compensatory model is a main effect model or is when there is a direct effect of a risk factor on an outcome and a protective factor on an outcome (Zimmerman & Arunkamar, 1994). In the compensatory model, the protective factor acts directly on the outcome and compensates for the risk but not by direct interaction with the risk. In this model, risk such as child abuse has a direct positive relationship to a negative outcome such as suicidality. However, community support has a direct negative relationship to suicidality. A second example is that emotional distress has a direct positive relationship to substance use and family support and parental involvement in school have a direct negative relationship to substance (Fleming, Kim, Harachi, & Catalano, 2002). Another example suggests that school connectedness compensates for the cumulative risk of prior violence, substance use, and victimization on the outcome of violent behaviors (Borowsky, Ireland, & Resnick, 2002).

In the protective model, a protective factor moderates the effect of risk on a negative outcome. An example of the protective model is family income buffering against the effects of neighborhood problems on adolescent substance use such that when a neighborhood has systemic problems, youth with family that has a higher income will engage in less substance use than those whose family has a lower income (Duncan, Duncan, & Strycker, 2000). The protective model can be further broken-down based on how the protective factor interacts with

the risk. Protective-stabilizing models suggest that protective factors mitigate the effects of risk on outcomes and lead to stability for an individual, as if the risk had never occurred (Fergus & Zimmerman, 2005; Luthar, Cicchetti, & Becker, 2000). For example, when parents do not provide support for youth the child may develop delinquent behaviors. However, having an adult mentor could mitigate the effects of unsupportive parents, and the child would develop as positively as he or she would have prior to the risk (Fergus & Zimmerman, 2005). The protective-reactive model proposes that the protective factor diminishes the correlation between the risk and outcome, reducing the negative outcome (Fergus & Zimmerman, 2005; Luthar, Cicchetti, & Baker, 2000). In the protective-reactive model, a child who has faced adversity will not have lowered positive outcomes in comparison to children who had not faced adversity. However, the resources available to them will lead to better outcomes than those who faced the same adversity without resources. The protective-reactive model is also a moderation model. Fergus and Zimmerman (2005) use the example that the relationship between risk of drug abuse and the outcome of sexual risk-taking is weaker for youth who receive sexual education. The protective-protective model suggests that the protective factor enhances the effect of a different protective factor to produce an outcome and is also sometimes called the protective-enhancing model (Fergus & Zimmerman, 2005; Luthar, Cicchetti, & Becker, 2000). An example of the protective-protective model is parental involvement and academic support both individually lead to positive outcomes for youth defined as at-risk, but when both are present, the effect is mitigated (Fergus & Zimmerman, 2005). However, some have argued that the protective-protective model is not a resilience model because it does not include risk unless the target population is defined as at-risk for a negative outcome.

A third model, the challenge model, suggests a curvilinear relationship between risk and is based on the amount of risk present (Luthar & Zelazo, 2003). Thus, a moderate level of a risk factor is related to positive outcomes where high levels of the same variable are related to adverse outcomes. It can be said that in this model, the risk factor acts as its own buffer. Developmental researchers refer to the challenge model as an inoculation process (Rutter, 1987; Zimmerman & Arunkumar, 1994). The premise behind this model is that low and moderate levels of risk exposure give youth a chance to practice skills. An example of the challenge model uses family conflict. If youth experience no family conflict they may not learn to cope with conflict outside the home, but when there is too much family conflict youth can become hopeless or aggressive (Fergus & Zimmerman, 2005). The challenge model is less common in resilience research because it is hard to define what appropriate levels of risk are in a population.

The compensatory, protective and challenge models of resilience have provided starting points for the evaluation of how protective factors influence risk and outcomes using the variable-focused method. In all of the models, and resilience literature at large, the main idea is that protective factors may reduce the effects of negative outcomes and promote positive outcomes for youth following risk exposure. Using the different resilience models, researchers have evaluated a variety of risk and protective factors and how they differ in their level of influence on individuals and positive and negative outcomes. In review of the different models of resilience, it becomes clear that the compensatory and protective models of resilience are the most common models. If a researcher is mainly concerned with how a protective factor acts as a buffer, then the most appropriate model would be the protective model. Thus, it is both the compensatory and protective models that the current study will utilize.

1.1.2 Risk Factors

The study of resilience primarily emerged from risk research (Masten & Tellegan, 2012). Risk factors are the characteristics of an individual or the environment that are associated with maladaptive outcomes (Compas et al., 1995). Risk factors have been suggested to have a stronger influence on youth when the factors influence the social environment, and negative outcomes are dependent on both the social context and individual's personality (Jessor, 1993).

Defining risk includes numerous complications. To start, what some individuals perceive as risk might differ from what a researcher has defined as risk and often the fact that risk is not a static trait and will likely change over time (Arrington & Wilson, 2000). Further, researchers often deem youth “at-risk” without defining what variables led to risk which then leads to misinterpretation by others (Arrington & Wilson, 2000). An ecological perspective of risk utilizes a multidimensional approach where individuals interact with risk on different levels of the environment may help overcome definition limitations by taking various systems into account (Hixson & Tinzmann, 1990; Luthar, Cicchetti, & Becker, 2000; Resnick & Burt, 1996). The ecological approach considers how an individual interacts with their social systems based on Bronfenbrenner’s Bioecological Theory (Khanlou & Wray, 2014). As a result, risk can include factors on individual, family, or other environmental levels.

At the individual level, common risk factors for lower academic achievement for youth include socioeconomic status, homelessness, ethnicity, gender or learning disabilities (Arrington & Wilson, 2000; Fergus & Zimmerman, 2005; Masten, 2014). The individual risk of poverty has been related to social and health problems for youth (Fiester, 2010). Poverty during childhood has been related to many short-term and long-term negative outcomes such as lowered school achievement and public-health problems (Brooks-Gunn & Duncan, 1997; McCord, 1997). On

the family level, the risk of academic failure and behavioral problems can arise either from genetic influences that were passed down from the family or factors in the environment (Masten, 2014). The most studied family-level risk variables include interparental conflict, maltreatment or neglect, and overall poor family function (Masten, 2014) although other types have also been considered.

School-level risk is also important because schools provide one of the primary environments where students can interact with peers and non-family members, learn skills, and receive social and emotional support (Doll et al., 2009). Broadly, risks within the school context such as lowered support, reduced safety, and inadequate teaching have led to diminished competence, engagement, achievement, and attendance for students. Further, risk in school has been linked to bullying and overall school-level aggression (Masten, 2014). Reduced safety within the school and neighborhood have been associated with decreased school attendance, grades, and increased misbehavior (Hilarski, 2004). Christle, Jolivette, and Nelson (2005) found that school-level risk factors such as poor suspension practices and lower overall socioeconomic status may contribute more to poor academic outcomes than individual demographic and behavioral factors. The percent of students receiving free and reduced lunch, Board of Education violations, and school-level retention rate also are associated with lowered academic achievement for youth. When considering social interactions at the school-level, school staff's negative perceptions of student success and lowered family involvement also increased negative outcomes for youth. Negative outcomes from school-level risk are further exacerbated by individual level socioeconomic status, race, family structure, and health (Christle, Jolivette, & Nelson, 2005).

Based on Bronfenbrenner's Bioecological Theory (1994), risk at any level can be associated with specific adverse outcomes or more broadly to poor adaption and a variety of problems for youth. Often, risk factors have been related to each other, and the presence of one risk factor may reflect an underlying process that is undermining development. Cumulative risk, or the build-up of risk over time, is a standard method to characterize risk in which the number of risk factors an individual has experienced in their life is summed (Arrington & Wilson, 2000; Zimmerman et al., 2013). This inventory of the number of risk factors in an individual's life provides a simple standard for assessing multiple risk factors. The goal of this approach is to account for the snowball effects of risk and any relationships between different risks (Sameroff, 2006). Youth who experience numerous risk factors are more likely to have psychological disorders (Rutter, 1981). Further, risk is increased when the environment the individual is in increases their vulnerability (Arrington & Wilson, 2000). For example, prior victimization, substance use, and problems in school have a cumulative effect leading to violent behaviors over time (Fergus & Zimmerman, 2005). The number of problem behaviors in an individual's life increase as the number of risk factors increase and to study a single risk factor might underestimate the risk exposure the child has experienced (Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987). The snowball effect of risk suggests that when something negative occurs in one domain of a child's life, it will also influence function in other domains (Masten, 2014). For example, if a child experiences a negative event at home, it could alter his or her function at school and vice versa. Cumulative risk allows a method to assess the full ecological context where the individuals operate to assess its effects on outcomes.

1.1.3 Protective Factors

Protective factors are included in models of resilience as factors that mitigate the negative outcomes of risk and/or promote positive adaption. Protective factors are thought to provide a buffer from risk for individuals. Khanlou and Wray (2014) suggest that resilience is a process moving from adversity to positive adaption by way of protective factors intervening following adversity.

Protective factors can either be considered assets or resources depending on the source of the factor. Assets are factors which individuals already possess within themselves, such as intrinsic motivation. Other examples of assets are positive self-esteem, internal locus of control, religiosity and anger control skills (Bryne & Mazanov, 2001; Griffin, Scheier, Botvin, & Miller, 1999; Wills, Yaeger, & Sandy, 2003) Resources are protective factors that are external to the individual such as positive relationships or effective academic instruction (Zimmerman et al., 2013). Other resources include neighborhood safety and adult mentorship (Christle, Jolivette, & Nelson, 2005; Zimmerman, Bingenheimer, & Notaro, 2002). Masten (2014) also has suggested that youth who possess assets choose activities that will increase their assets. Therefore, assets and resources can act in a transactional manner or as multiple layers of protection for youth (Windle, 2011). For example, youth who possess a strong sense of religiosity are more likely to be involved in volunteer and mentoring efforts which increase their self-esteem and religiosity further to bolster their response to risk (Masten, 2001).

Masten (2014) has developed a "short list" of protective factors that have been validated in multiple research studies. On the individual level, protective assets can include intelligence, self-control, coping, and self-efficacy. These assets have been suggested as protective because they implicate specific systems within the individual that allow youth to become adaptive. For

example, higher intelligence scores can enable people to apply stronger decision making skills to novel situations and overcome risk (Masten, 2014). On the other hand, self-control promotes self-regulation which can help youth make critical decisions when faced with risk. Other protective assets have been suggested for reducing specific negative outcomes. For example, pro-social beliefs, coping, and anger control skills have been proposed as assets protecting from violent behavior (Fergus & Zimmerman, 2005).

Masten (2014) also made a short list of family-level resources that are associated with resilience in youth such as attachment and communication. Parenting factors can also act as protective resources. Parental involvement and family economic resources can lead to positive outcomes for youth (Arrington & Wilson, 2000; Rai, et al., 2003). Major frameworks guiding resilience have indicated that parental warmth is another protective resource for youth (Luthar et al., 2000). Parental monitoring and family connectedness also have been found as significant resources to reduce youth substance use (Rai et al., 2003).

At the school-level, protective factors all broadly fall under an effective school system that teach youth social and emotional skills which can promote adaption in new situations (Blair, 2002; Elias, Zins, Graczyk, & Weissberg, 2003). Schools can also provide youth relationships with competent adults outside of the family who give youth support and act as role models to influence motivation. Teachers provide youth with opportunities to master content and build self-efficacy and self-control providing a link between protective assets and protective resources (Galassi & Akos, 2007). School leadership and dedicated staff have been found to be protective on a school-wide basis by implementing and following policies that provide safety and support to all students (Thapa, Cohen, Guffey, & Higgins-D’Alessandro, 2013). Shumow, Vandell, and Posner (1999) found that parental involvement in school was a strong protective factor for youth

who are in the most disadvantaged areas. Gutman and Midgley (2000) found a similar result in that the interaction of school and family support provides the best protection for youth.

Overall, positive school experiences can be a key factor in buffering or reducing risk for youth (Christle et al., 2005; Gilligan, 2000; Masten, 2014; Shumow et al., 1999). According to Christle and colleagues (2005), supportive school leadership and effective academic instruction minimize the risk of youth delinquency at low-performing schools. Further, schools that have a high percentage of low socioeconomic youth who are also high achievers have higher attendance rates and perceptions of effective academic instruction. Researchers further indicate that youth who are inherently at risk are protected by positive school experiences from negative outcomes (Christle et al., 2005).

Khanlou and Wray (2014) conducted a literature review on how individuals facing risk can benefit from a relationship between individual and environmental protective factors. The relationship between environment and individual leads to a whole-school approach to resilience that aims to create partnerships between youth, schools, and community. Khanlou and Wray (2014) concluded that the best model of resilience is not individual based but instead a collective process between multiple resources and individual assets. As community resilience provides a framework for how systems cope and adapt, a combination of factors and environments can influence youth placed at risk. Community resilience research suggests that models can either be systems-centered or components-centered in providing support to those at risk (Mutsau & Billiat, 2015). Leveraging the school system to increase resilience, individual protective assets and school protective resources can lead to a decrease in negative outcomes for at-risk youth (Cowen et al., 1996). For example, when integrating individual and environmental factors, an individual's involvement in community service related to their interests provides a place for an

individual's internal assets to flourish and provides a place to interact with external agencies leading to more positive outcomes (Zimmerman et al., 2013).

One of the most widely studied school-level resource is school climate (Johnson & Stevens, 2006). Positive school climate can lead to positive relationships between youth, parents and teachers as the entire school community is working to support the school vision and development (Cohen, McCabe, Michelli, & Pickeral, 2009; Zullig, Huebner, & Patton, 2011). Thus, when youth attend schools with positive climates, they are more likely to have the resources necessary to demonstrate resilience in the face of risk.

1.2 School Climate

The National School Climate Council (2007) broadly defined school climate as "patterns of people's experiences of school life and reflects norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures (p.4)." In other words, school climate refers to the quality and character of the school life or environment (Johnson & Stevens, 2006; Yang et al., 2013). Thus, most research has focused on school climate as a characteristic of the school that provides an organizational indicator of the health of a school (Koth, Bradshaw, & Leaf, 2008). Although research has defined school climate as a measure of the school, largely research has relied on aggregated reports of individual-level perceptions of climate to measure climate as a school factor (Koth, Bradshaw, & Leaf, 2008). Further, school climate research originated from an intersection in organizational culture and school effects research and thus, relies heavily on organizational theory to define climate at the school-level (Anderson, 1982). To better clarify school climate, The National School Climate Council (2007) further defined a positive and sustainable school climate as one which promotes youth development and learning where all individuals are engaged and respected while developing,

living and contributing to a shared school vision as well as the operations and physical environment of the school. Therefore, positive school climate is a multidimensional construct that is thought to promote positive outcomes for students (Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013).

School climate has the ability to influence a variety of factors for youth. The overall construct of school climate is related to academic achievement, healthy development, and school satisfaction. This connection includes varying factors, indicators and processes at the individual, classroom, and school-level (Brookover et al., 1978; Cohen et al., 2009; Hopson, Schiller, & Lawson, 2014; Thapa et al., 2013; Yang et al., 2013; Zullig, Huebner, & Patton, 2011). The relationship between positive development and school climate may be particularly important for youth who are low-income because they are often the most at risk for academic, emotional and behavioral problems and schools often lack the financial resources to support them (Alvirdrez & Weinstein, 1994; Kuperminc, Leadbeater, & Blatt, 2001). Low-income youth are thought to benefit most from a positive school climate because it creates a safe place for youth to develop (Kuperminc, Leadbeater, & Blatt, 2001).

Although theory has suggested that school climate is a broad construct, researchers have also acknowledged that it is multi-dimensional (Zullig, Koopman, Patton & Ubbes, 2010). Multiple domains of school climate have been suggested to aid in characterizing positive climate. Given that school climate is largely focused on social relationships and feelings of safety, almost all models include these two factors. Zullig, Koopman, Patton, and Ubbes, (2010) defined five main domains of school climate: order, such as classroom organization, safety and discipline; academic outcomes such as academic instruction and academic norms; social relationships with

peers and teachers; clean and inviting school facilities; and school connectedness through relationships with others.

In a follow-up study, an 8-factor structure of school climate was hypothesized (Zullig et al., 2010) based on the creation of the survey including 8 distinct sections. This 8-factor structure included: positive student-teacher relationships, school connectedness, academic support, order and discipline, physical environment, social environment, perceived favoritism by teachers and academic satisfaction (Zullig et al., 2010). However, only five of the eight factors were significantly related to school satisfaction, these five factors were academic support, positive relationships, school connectedness, order and discipline and academic outcomes. In a literature review, Thapa, Cohen, Guffey, and Higgins-D'Alessandro (2013) also defined five primary domains of school climate which are similar to Zullig and colleagues (2010) original model. The five essential areas established by Thapa and colleagues include safety, relationships, teaching and learning, physical environment, and school improvement processes; and can be further defined with more specific elements (Thapa et al., 2013). Thapa and colleagues and Zullig and colleagues share the domains of safety or order, relationships, academic achievement or teaching and learning, and physical environment. When comparing empirical research on school climate to the model outlined by Zullig and colleagues (2010), support for the five domain structure of school climate becomes apparent.

In the domain of order, safety and discipline; rules and norms, physical safety, respect and socio-emotional safety are the main components**.** Schools with less support, structure and pro-social relationships are more likely to have higher absenteeism and reduced achievement (Astor, Guerra, & VanAcker, 2010). A breakdown of safety at the school-level is also related to students not feeling physically or emotionally safe at school. This breakdown has been found to

occur more frequently in large schools (Lleras, 2008). Another part of safety includes the importance of fair rules and norms. Schools that display consistent rules have lower suspension rates (Thapa et al., 2013). The National School Safety Center states that school safety such as a safety plan, systematic incident report system, and clear security policies should be on every educators' agenda.

The social relationship domain focuses on student-peer relationships, teacher-student relationships and social support (Zullig, et al., 2010). Positive school climates are associated with a better foundation in social development and academic learning through a greater attachment to school (Thapa et al., 2013). School connectedness has been linked to student motivation and engagement and has been defined as students believing adults in their school care about them as individuals (Blum et al., 2004; Catalano et al., 2004). Adult support is a major focus of the relationship domain as adults can provide scaffolding and create an environment in which students believe the school is invested in their education.

Given that a school's primary function is teaching and providing skills and scaffolding for youth, the teaching and learning domain is one of the most important concepts and is inherent in the model (Thapa et al., 2013). Collaborative learning and mutual trust in the school environment can lead to positive school climate (Kerr et al., 2004). Within this domain, items are focused on academics including recognition, academic norms, satisfaction classes and quality academic instruction (Zullig et al., 2010).

The school facilities domain includes conditions of the physical building, resources and supplies of a school (Zullig et al., 2010). The physical size of a school has been established as related to school connectedness and safety and in turn can influence academic performance (McNeely et al., 2002). The condition of the physical building of a school can impact academic

performance and engagement. The student learning environment also influences students' perceptions of school and a well-maintained environment with appropriate supplies can largely influence how youth view their school. However, because schools are located in neighborhoods, often the physical composition of the school may reflect the neighborhood and community surrounding it and can reinforce neighborhood issues (Leventhal & Brooks-Gunn, 2004).

The final domain of school connectedness as defined by Zullig and colleagues focuses on overall feelings about school, feelings of value and attachment to school (Zullig et al., 2010). In comparison, Thapa and colleagues (2013) defined the fifth domain as school improvement processes which include the implementation of programs within schools. The school improvement process domain is based on ecological systems theory. Using schools in Chicago, Bryk, Sebring, Allensworth, Luppescu, and Easton (2010) found that multiple ecological systems interact to support school improvement efforts, such as strong relationships between parents, community and school. Throughout the multiple domains defined, parental involvement is not included as its own domain though research has suggested that parental involvement can positively impact student outcomes (Zullig et al., 2010). Most research however includes parental involvement as a separate measure from school climate when it could fit within the model of school climate itself. Based on an ecological model, it is important that parental involvement be considered as a part of school climate which attempts to provide overlap of the different systems. Research from the School Survey on Crime and Safety found that parental involvement and school climate both reduce the levels of violence in schools. When considering just schools who utilize a parental involvement program, the effects are greater (Lesneskie & Block, 2017). Further, when schools are the unit of study rather than individuals, researchers have found that parental connectedness can interact with school connectedness to lead to positive

outcomes (Brookmeyer et al., 2006). Thus, a case could be made that the final domain of school climate could be defined as parental involvement.

The current study first investigated if school climate follows the 5-factor model outlined by Zullig and colleagues (2010) and if those constructs created a unified measure of school climate. This model was chosen as it provides a theoretical basis which can be paired with the current accountability system used in the State where the population is located. This model tested first if the five domains are found and if they loaded onto a higher-order factor of school climate making school climate both multidimensional and one unified construct. Because school climate is a broadly defined term that can incorporate multiple individuals, levels and processes within a school it may be beneficial to think of school climate as separate domains operating at the school-level. Given that school climate research largely emerged from organizational sciences, studies have measured school climate using aggregated reports of individual perceptions to create a school-level view of climate (Koth, Bradshaw, & Leaf, 2008) and at the individual level (Brookmeyer et al., 2006). When considering school climate a characteristic of the school and utilizing school-level analyses, it provides an indicator of organizational health (Koth, Bradshaw & Leaf, 2008). In comparison, when using individual level data, it provides an indicator of students' perceptions of the organization (Brookmeyer et al., 2006). By thinking of school climate as multiple domains it becomes possible to understand if some domains influence students more than others and how the domains load onto one large factor of school climate.

Further, it has been suggested that sustained positive school climate over time will increase youth's engagement with school and will lead to more positive outcomes as children develop (Cohen, Pickeral, & McCloskey, 2009). However, there is a large void in the literature

because researchers have continually stressed the need for understanding sustained school climate over time but have not tested how consistent it is over time.

1.3 Developmental Perspective

When considering the different parts of youths' lives, school environments have the potential to affect development in a variety of ways. Schools can play a significant role in youth becoming competent adults and largely influence every aspect of development including social, emotional and cognitive intelligence because schools are one of the primary sources where youth learn social scaffolding as well as core competencies. Therefore, schools offer a place for youth to develop and gain the skills necessary to prosper.

The elementary school-level has been found specifically to influence later development (Silva et al., 2015). Academically effective preschool followed by an effective elementary school increases positive youth development by providing youth with essential skills. At the primary school-level, the quality of teaching influences children's social and intellectual development. This effect is -greater for youth eligible for free and reduced meals (Silva et al., 2015). Further, longitudinal studies have found that programs and positive interactions during the elementary school years will reduce problems in middle school and that there are multidimensional benefits for fifth graders through eighteen years old (Hawkins et al., 1999). During the elementary school years, children learn behaviors from socializing with family, adults, and peers. However, as youth age, the influence of peers increases over that of parents or teachers (Catalano et al., 2002). If the individuals a child feels bonded to display pro-social norms then the child may avoid problem behaviors and have positive development (Catalano et al., 2002).

As students move from elementary to middle school, large changes can be seen in their psychological development. For instance, Wigfield and Eccles (1994) found youth's self-esteem

did not change across elementary school years but did decrease once they transitioned to middle school. This trend was also seen for achievement values and competence beliefs. The transition from elementary to middle school requires youth to change their orientation regarding rules and procedures, and a strong foundation of competence and confidence in elementary school will provide an easier transition for students into the turbulent time of middle school (Akos, 2002). To this end, the elementary school years may be particularly important to provide the foundation for which positive youth development can continue.

Research on resilience has suggested that for one to be resilient, one must have positive outcomes following risk (Masten, 2014). A major area of focus in resilience research is on competence cascades. According to competence cascades, when youth are competent in one area, they tend to be competent in other areas, and this will continue over time (Heckman, 2006). However, this connection is not automatic and often requires support from others. Thus, if schools help youth develop competence in social, emotional and cognitive intelligence, youth will likely gain competence in other aspects of life over time with continued support (Masten & Cicchetti, 2010).

Positive school climate could provide a different lens to understand resilience in schools because school climate may buffer the effects of risk for students. Positive school climate for elementary students has proven to lead to positive outcomes for youth both academically and socially. Further, positive school climate in elementary school has also been shown to increase positive outcomes during middle school. Battistich, Schaps and Wilson (2004) found that when rural, white youth experienced a positive climate in elementary school, they showed higher academic performance in middle school. These results confirm that positive school climate influences youth over time. However, as youth get older, their perceptions of school climate may

decline. This reduction in student perceptions of school climate has been associated with increases in behavioral problems (Wang & Dishion, 2012).

When analyzing the benefits of positive school climate for at-risk youth, prior research has mostly focused on both elementary school and middle school students. However, no research to date has focused on sustained school climate as a protective factor for at-risk elementary school students. During elementary school, students are gaining skills that are critical for competence across the lifespan. Thus, the current study aims to provide a clearer understanding of how sustained school climate can protect school-age youth from cumulative, predictive risk and ultimately lead to positive development and competence.

2. THE CURRENT STUDY

In the protective model of resilience, resources and assets act as moderators of the effects of individual and environmental risk on individual outcomes (Fergus & Zimmerman, 2005). An ecological model of positive development is often used to understand the relationships between individual risk and school protective factors on academic outcomes (Constantine, Benard, & Diaz, 1999; Gilligan, 2000; Shumow, Vandell, & Posner, 1999). Theoretically, school climate as a resource fits within the protective model of resilience as a buffer of risk on reduced academic achievement, but empirically it has not been studied within this model. When considering school climate as a measurement of the school environment, research has found that school climate buffered the relationship between individual poverty and negative behavior in a primarily white sample of middle and high school students (Hopson & Lee, 2011). However, they did not find that school climate buffered the relationship between individual poverty and grades due to the majority of the sample having high grades regardless of risk.

Thus, where there was negative outcomes, school climate did protect youth, however when achievement was already high, there wasn't anything to protect youth from. Research on school climate has suggested that positive climate is an integral protective factor for youth that provides a measure of the school organization (Griffith, 1999; Hopson & Lee, 2011). When focusing on elementary students, school climate has been found to provide social order and positive action leading to increased academic performance and satisfaction (Griffith, 1999).

Sustained school climate is an important factor in positive youth development (National School Climate Council, 2007; Tharpa et al., 2013). Sustained school climate has been found to lead to positive youth development and the skills necessary for students to lead productive and successful lives (Cohen, McCabe, Michelli, & Pickeral, 2009). For example, an individual level

longitudinal study found that increasing connectedness and climate in elementary school leads to better adjustment in middle school for fifth graders (Battistich, Schaps, & Wilson, 2004). By using a longitudinal design, it is possible to assess sustained school climate across years (Anderson, 1982). Although many studies have suggested a positive relationship between sustained school climate and positive outcomes, there have not been any longitudinal studies that examine how school climate as a school characteristic changes over time. The dearth becomes larger when considering elementary school climate, specifically.

The goal of this dissertation is to assess the effects of sustained school climate as an organizational resource for the effects of individual and school-level risk on individual academic achievement over time. The study uses the protective model of resilience and incorporates the multidimensionality of school climate to understand how school-level climate can protect students from individual and school-level risk on reduced academic achievement in elementary school. When considering both the resilience and the school climate literature, it becomes apparent that for youth placed at risk, sustained school climate may protect youth from the effects of risk on reduced academic achievement (Battistich, Schaps, & Wilson, 2014; Hopson & Lee, 2011). When youth are placed at risk, to overcome negative outcomes, youth will need support from the institutions and organizations around them. Because sustained school climate provides a measurement of the organizational environment, it makes sense that a positive climate would reduce negative outcomes for youth.

2.1 Research Questions

To fully understand how school climate is protective for youth and how school climate may vary across time three main research questions are addressed:

Research Question 1a: What is the dimensionality of school climate?

Studies of school climate have defined school climate as multiple domains which feed into the larger construct of school climate. Thus, the first step of analyses was to conduct confirmatory factor analysis to assess if school climate was best defined in the current study as one factor or multiple domains by respondent. The second step in the analyses was to test a higher-order factor structure where the best fitting model domains were then loaded onto a higher-order factor of climate. In order to assess the domains, the items were loaded onto three domains for students and five domains for parents and personnel. The three domains for students are expected to be safety, teaching & learning and relationships. The five factors for parents and personnel are expected to be teaching & learning, safety, relationships, physical environment and parental involvement or parental connectedness. The domains hypothesized were based on the domains previously found by Zullig and colleagues (2010). However, the student survey included fewer domains because there were fewer items which could not be loaded onto the parental involvement or physical environment domains. The survey also focused on parental involvement for personnel and parents rather than school connectedness, so parental involvement will be used as a measure of parental connectedness to the school. Testing for the higher-order factor helped clarify if items load onto domains that fit into a unified construct of school climate based on the fit of the model in comparison to the lower order model. Three models were tested and assessed for fit. The first model tested included 3 factors for students and 5 factors for personnel and parents. All of these factors were expected to load onto a higher order factor of school climate. The final models run were exploratory in nature to test if other factor models were a better fit. Once all models have been run they were compared using fit indices and item standardized factor loadings. Results of the models were used to inform subsequent analyses

Research Question 1b: How does school climate change over time?

Studies have suggested that sustained school climate is beneficial for youth, but few have studied it longitudinally (Cohen, Pickeral, & McCloskey, 2009). Growth curve analysis will be used to assess if there is systematic linear change over time for aggregated school climate as reported by students, parents and personnel. This model will assess if schools can be characterized by how their climate is changing over time. In order to conduct linear growth curve analyses, composite scores of school climate will be created based on the prior models. Linear growth curve analysis tests how climate changes over time and if the change is systematic. The results of the growth curve analysis will inform how climate is included in research question 2.

Research Question 2: Does school-level climate act as a protective factor in the relationship between individual risk and academic achievement for elementary students?

The current study hypothesizes that positive school climate will act as a protective factor on the effects of individual and school-level risk indexes on academic achievement. The model adds to the literature because no studies have looked at school climate as a moderator of risk in elementary students' achievement. The model will assess a multi-level, longitudinal protective model of resilience by including an individual level risk index, school-level risk index and school climate. The method in which school climate is assessed will be based on the results from the first research question. By including individual level risk and individual outcomes with school-level protective factors it becomes possible to understand how the multiple levels can interact to protect youth.

To assess research question two, four different models were assessed. The first two models assessed the compensatory model of resilience in which the direct relationship of risk and climate on academic achievement. The second two models will assess the protective models of resilience in which climate will buffer the relationship between risk and lowered academic

achievement. It is hypothesized that perceptions of school climate by parent, personnel and student will protect youth from individual risk on academic achievement over time both directly and by buffering the relationship between risk and lowered achievement.

3. METHODOLOGY

3.1 Sample

The sample consisted of 3,031 2nd grade students during the 2014 school year enrolled in 52 elementary schools in one urban school district that were followed to 2017. For risk variables, the data were collected from the students 2nd grade year (2014), the outcome variables are from students 5th grade year (2017) and the control variables of previous test scores and grades are from the students 3rd grade year (2015) due to it being the first year students are assessed on the state exam. In 2014, the total number of students enrolled in the school district was 50,131. Table 1 shows the demographic information for the sample during 2014. The current study conducted secondary data analyses of anonymous survey data and de-identified data from the school district.

The student level data were requested and de-identified from the school district. Survey data were collected anonymously and provided for three years. The school climate variables were derived from the state's survey which was designed to gather information on school climate and safety from teachers, parents, and students. Participants completed the state’s online survey anonymously, and a passive consent process was utilized. Thus, perception of school climate was aggregated to the school-level from anonymous respondent data.

Table 1. Demographics of Sample in 2014

Demographics	Count of Students Enrolled	Percent of Students Enrolled
Total Sample	3,031	
Gender		
Female	1,458	48.1%

	Male	1,573	51.9%
Ethnicity			
	Black	2,120	69.9%
	All Other Races	911	30.1%

3.2 Measures

Student-Level Variables. Student Level Risk Index was created from information from students' 2nd grade enrollment in 2014 to account for the snowball effects of risk (Sameroff, 2006). The variables used to create the index were housed by the school district's student information system. The Student Risk Index ranged from zero to five and variables will be dummy-coded as zero or one. The Student Risk Index includes free and reduced lunch status, homelessness status, frequency of behavior incidents, suspension days and attendance rate. Although this exact risk index has not previously been used, similar indexes which utilize status and behavioral risk have been used (Finn, 1993; McCann & Austin, 1988). The items included in the risk index were guided by theory in composite risk and by what the school district was using to define students at risk of failure. **Free and reduced lunch status** (FRL) was included as a measure of poverty for students. The variable was coded as not eligible (0) or eligible (1) for free and reduced lunch. To be eligible for free or reduced lunch families must be under a particular income level per household size, for example an income level of $26,000 for a house of four, or already receiving supplemental nutrition assistance program benefits (USDA, 2016). **Homelessness status** was also included as a measure of poverty and coded as a homeless student (1) or non-homeless student (0). Students are marked as homeless if they have been identified as living in a shelter, hospital or foster home. **Frequency of behavior incidents** during the school year was included as a continuous variable and defined as a count of behavior incidents which the student was involved. The measure does not require a resolution for the incident. A behavior

incident is any incident which required intervention from a teacher or staff member. The school district provides a handbook of actions which are considered behavioral events to all parents, staff, and students. The frequency of behavior incidents was coded having any behavior incidents (1) or having no behavior incidents (0). **Suspension rate** was included to examine the length of suspensions in comparison to membership days resulting in a measure of days suspended per school year. The suspension rate was coded as previously suspended (1) or never suspended (0). The suspension rate included both in school and out of school suspension but did not include expulsion or alternative school placement. Although similar to the frequency of behavior incidents, the suspension rate is calculated differently as an individual could be involved in a behavior incident and not receive a resolution of suspension. **Attendance Rate** was included in which the number of days' present was divided by school membership days. The number of days present included partial days. If a student received out of school suspension, it was also counted against them in the attendance rate. The membership days per school year for each student totals to 180 days and includes active school days. The attendance rate was coded as low or high attendance based on 10% absence. If a student had an attendance rate greater than 90% they were coded as high attendance (0). If a student had an attendance rate less than or equal to 90% they were coded as low attendance (1).

Ethnicity was included as a covariate and coded as Black (1) and all other races (0) based on the demographic information of the sample being primarily Black. **Gender** (female/male) was also included as a covariate. **Mobility** was included as a covariate if an individual moved schools at any point during the 2014 through 2017 school years. These covariates were included to assess if achievement levels differed between races, gender or mobility.

School-Level Variables. A **School Risk Index** were created from aggregates of student-level data housed in the school district's student information system from the 2014 school year. The risk index was created based on previous research suggesting the variables individually lead schools to be defined as having risk however the current risk index had not been used. This index ranges from zero to five and was defined by prior research on school risk. **Free and Reduced Lunch Eligible Percent** was aggregated to the percent of students' eligible for free and reduced lunch. Using the National Center of Educational Statistics definition of risk, schools with 75% or greater FRL were coded as high FRL (1) and those under 75% were coded as low FRL (0). **Number of Homeless Students** was aggregated to the distinct count of enrolled students who were homeless. The average was used as a cut off to create low (0) and high (1) homelessness. **The Number of Violent Incidents** was included as a measure of dangerous behavior. According to the Unsafe School Choice Option, schools are considered unsafe if there is more than one violent incident in a school year. Violent incidents include robbery, battery, kidnapping, rape and manslaughter. The number of violent incidents were coded as one or more violent incident (1) or no violent incidents (0). **Suspension Rate** was included as a measure of out of school and in school suspensions by enrollment. The suspension rate was calculated by the number of suspension days total by school divided by total enrollment days. The mean was used to create a variable of high or low suspensions. Thus, schools were coded as high suspensions (1) if they are greater than or equal to .25 and low suspensions if they are less than .25. **Attendance Rate** by school was included and defined as the percent of students missing greater than 10% of the school year as low attendance (1) and the percent of students missing less than 10% of the school year as high attendance (0).

School-Level Climate. The protective factor in the study was the school-level variable of school climate**.** School climate was measured by parent, teacher, and student surveys across three years. The State collected the survey information and then distributed results to school districts. The survey is given yearly from October to March by school administrators on school computers and is anonymous. The school climate survey was developed by the state in conjunction with researchers to assess positive climate schools for accountability. The domains included in the survey were defined by the state and were aligned to the domains defined by Zullig and colleagues (2010). The elementary student school survey consists of eleven items; the teacher survey consists of thirty-one items, and the parent survey consists of twenty-four items. The student survey can be broken into the domains of teaching & learning, relationships, and safety. The list of which items group into each domains can be found in Table 2.

Table 2. List of Elementary Student Items & Domains

Domain	Item Number	Text
Teaching & Learning	1	I like school.
Teaching & Learning	2	I feel like I do well in school.
Teaching & Learning	3	My school wants me to do well.
School Safety	4	My school has clear rules for behavior.
School Safety	5	I feel safe at school.
Relationships	6	Teachers treat me with respect.
School Safety	7	Good behavior is noticed at my school.
School Safety	8	Students in my class behave so that teachers can teach.
Relationships	9	I get along with other students.
Relationships	10	Students treat each other well.
Relationships	11	There is an adult at my school who will help me if I need it.

The parent and personnel surveys include similar questions. The parent and teacher surveys can be broken into the domains of relationships, safety, teaching and learning, physical environment and parental involvement. A list of which items load onto which domains for the

parent survey can be found in Table 3 and the list of which items load onto which domains for the personnel survey can be found in Table 4. Survey questions are also located in the appendices.

Table 3. Parent Items & Domains

Domain	Item Number	Text
Teaching & Learning	1	Teachers at my student's school have high standards for achievement.
Teaching & Learning	2	Teachers at my student's school frequently recognize students for good behavior.
Teaching & Learning	3	Teachers at my student's school work hard to make sure that students do well.
Teaching & Learning	4	Teachers at my student's school promote academic success for all students.
School Safety	5	My student's school sets clear rules for behavior.
School Safety	6	My student feels safe at school.
School Safety	7	My student feels safe going to and from school.
School Safety	8	School rules are consistently enforced at my student's school.
School Safety	9	School rules and procedures at my student's school are fair.
Relationships	10	My student likes school.
Relationships	11	My student feels successful at school.
Relationships	12	My student is frequently recognized for good behavior.
Relationships	13	I feel comfortable talking to teachers at my student's school.
Relationships	14	Staff at my student's school communicates well with parents.
Relationships	15	I feel welcome at my student's school.
Relationships	16	All students are treated fairly at my student's school.
Relationships	17	Teachers at my student's school treat all students with respect.
Physical Environment	18	My student's school building is well maintained.
Physical Environment	19	My student's textbooks are up to date and in good condition.
Physical Environment	20	Teachers at my student's school keep their classrooms clean and organized.
Parent Involvement	21	I am involved in the decision making process at my student's school.
Parent Involvement	22	I am actively involved in activities at my student's school.

Parent Involvement	23	I attend parent/teacher conferences at my student's school.
Parent Involvement	24	I frequently volunteer to help on special projects at my student's school.

Table 4. Personnel Items & Domains

Domain	Item Number	Text
Relationships	1	I feel supported by other teachers at my school.
Relationships	2	I get along well with other staff members at my school.
Relationships	3	I feel like I am an important part of my school.
Relationships	4	I enjoy working in teams (e.g. grade level, content) at my school.
Relationships	5	I feel like I fit in among other staff members at my school.
Relationships	6	I feel connected to the teachers at my school.
Teaching & Learning	7	Teachers at my school frequently recognize students for good behavior.
Teaching & Learning	8	Teachers at my school have high standards for achievement.
Teaching & Learning	9	My school promotes academic success for all students.
Teaching & Learning	10	All students are treated fairly by the adults at my school.
Teaching & Learning	11	Teachers at my school treat students fairly regardless of race, ethnicity, or culture.
Teaching & Learning	12	Teachers at my school work hard to make sure that students do well.
School Safety	13	I feel safe at my school.
School Safety	14	I have been concerned about my physical safety at school.
School Safety	15	If I report unsafe or dangerous behaviors, I can be sure the problem will be taken care of.
School Safety	16	I feel safe when entering and leaving my school building.
School Safety	17	Some students carry weapons (e.g., guns or knives) at my school.
Physical Environment	18	My school building is well maintained.
Physical Environment	19	Instructional materials are up to date and in good condition.
Physical Environment	20	Teachers at my school keep their classrooms clean and organized.
Physical Environment	21	Teachers make an effort to keep the school building and facilities clean.
Relationships	22	Students at my school would help another student who was being bullied.

Relationships	23	Students at my school get along well with one another.
Relationships	24	Students at my school get along well with the teachers and other adults.
Relationships	25	Students at my school treat each other with respect.
Relationships	26	Students at my school treat other students fairly regardless of race, ethnicity, or culture.
Relationships	27	Students at my school show respect to other students regardless of their academic ability.
Relationships	28	Students at my school demonstrate behaviors that allow teachers to teach, and students to learn.
Parent Involvement	29	Parents at my school attend PTA meetings or parent/teacher conferences.
Parent Involvement	30	At this school, parents frequently volunteer to help on special projects.
Parent Involvement	31	Parents at this school frequently attend school activities.

Students respond to statements such as “I like school” on a 4-point scale of always, often, sometimes and never. Teachers and parents both respond on a 4-point scale of strongly agree, somewhat agree, somewhat disagree and strongly disagree. The response rate varies by respondent. For the 2017 climate survey, on average 244 students, 53 parents, and 57 teachers responded per elementary school within the school district. The school climate survey for elementary students has been validated by La Salle, Zabek and Meyers (2016) for fourth and fifth graders in Georgia. Using confirmatory factor analysis, La Salle, Zabek, and Meyers (2016) had good model fit when loading all of the items as one factor. However, this model did not include parent or teacher respondents and did not consider the different domains of school climate.

Outcomes: Academic Achievement. Academic achievement was assessed by the scale scores on a standardized state test which is used to assess the level of knowledge in English Language Arts (ELA) and Math and average grade on core subjects (Math, English, Science & Social Studies). The 2015 and 2017 scores were used for the state test. Average grade on core

subjects used the 2015 and 2017 school years and is measured on a 100 point scale where students' average scores were divided by the number of credits earned. The 2015 test scores from students 3^{rd} grade and average grade were included as covariates in the model and the outcome was 2017 domain scale scores on ELA and Math and average grade on core subjects. The 3^{rd} grade test scores and grades are utilized as a covariate in the model because they are the earliest assessments students receive.

The state tests were validated during creation by psychometrics and content specialists (GADOE, 2017). In order to have validity, the test must first measure what it is intended to. In order for this to be true, state content standards are used to develop the items on the exam. All items are also field tested (GADOE, 2017). The State assured that there is validity of the exams due to their careful attention to development and scoring. Further, the exams have also been found to be reliable with a Cronbach's alpha range from .90 to a .92 for 5^{th} grade (GADOE, 2017). Thus, the state testes have a high level of validity as they serve the purpose they were intended for and reliable in that they provide consistent results (GADOE, 2017).

On the exam, students receive scale scores by domain area which are also converted to a measure of proficiency. The scale scores range from 180 – 830 in 3^{rd} grade and 210-760 in 5^{th} grade for English Language Arts. The scale scores for math range from 290-705 for 3^{rd} grade and 265-725 for 5^{th} grade. Within each grade and subject, achievement levels are defined which help to sort students into categories of below proficiency or proficient and above. In order for students to be rated as proficient and above in ELA or Math, they must receive a score above 524.

Missing Data. Missing data occurred due to school consolidations, inconsistent student level data, or students leaving the district. To handle missing data due to school consolidations, the school the student was at during the outcome year was used for school-level factors. A

variable that defines mobility was also included if the student changed schools within the district between the 3^{rd}-grade test and the 5^{th}-grade test. There are 1,032 students who moved between their 3^{rd} grade and 5^{th} grade years. For students who had moved schools, the school at which they attended during the 2017 school year was used for the school-level factors and school climate. The only case in which a student was completely removed from the study was if they did not have 5^{th}-grade outcome data. There were 1,917 students removed completely due to missing outcome data because they left the school district between their 2^{nd} and 5^{th} grade school years. However, an analysis of the means showed that the average risk index and 3^{rd} grade test scores were similar to the sample included in the study. A frequency analysis of the demographic variables also showed that the students that were removed had similar ethnicities, and genders to the sample included in the study. The final sample for the study included 3,031 students clustered within 50-55 schools. If there were missing data but the individual was not removed following the criteria outlined then full information maximum likelihood fitting was used in the model for research question two so that all available information is used to estimate the model. Full information maximum likelihood uses the estimated population parameters that will most likely produce the estimates from that sample data.

3.3 Analyses

Statistical analysis for research question 1a. To determine if the items in each survey over time measured both multiple domains and a unified latent construct of school climate, multi-group confirmatory factor analysis (CFA) using Mplus statistical software was employed. The grouping variable of year was included for school year 2015, 2016 and 2017. Previous researchers suggested that school climate functions as multiple domains that come together to create the overarching construct of school climate (Zullig et al., 2010). In order to assess the

domains, the items were loaded onto three domains for students and five domains for parents and personnel. The three domains for students were expected to be safety, teaching & learning and relationships. The five factors for parents and personnel were expected to be teaching & learning, safety, relationships, physical environment and physical environment. All domains were then loaded onto a higher-order factor of school climate. Four models for each respondent were tested and assessed for fit. The first model tested included 3 factors for students and 5 factors for personnel and parents. All of these factors were expected to load onto a higher order factor of school climate. The second model tested if items loaded onto one large one factor model. The final models run were exploratory in nature to test if other factor models are a better fit. The best fitting model that also followed theory was used in the subsequent analyses. It was hypothesized that survey indicators would fit a model with five constructs for teachers and parents with a higher-order factor of school climate and three constructs for students and a higher-order factor of school climate (Figures 1-3). A robust maximum likelihood (MLR) estimator was used for this model. Due to the nature of the data being clustered by school, it was assumed the data are complex survey data where individual's responses were clustered by school for the student, teacher, and parent surveys. The data were considered complex survey data due to the sampling method used, clustering within schools and the different response rates by survey.

The next step of analyses was to check that factors and intercepts load the same at each time point, thus to establish measurement invariance. To establish measurement invariance, individual responses were loaded onto latent constructs to see if over time they are consistent. The reason testing for measurement invariance was important is because items might mean different things across years and thus the school climate survey might not hold across years. Due to issues related to x^2 and sample size, the main fit indices that were used to assess measurement

invariance was RMSEA and CFI. Cut-offs were defined by Wu, Li, and Zumbo (2007), change in CFI of less than or equal to a decrease of .01 and RMSEA less than or equal to .05. The first model tested for configural invariance which examined whether respondents from different years used the same conceptual framework to answer the items (Wu, Li, & Zumbo, 2007). This model was tested by constraining the factorial structure to be the same across years. The second model tested for metric invariance which examined if the strengths of the relationships between items and their underlying construct were the same across years (Wu, Li, & Zumbo, 2007). The final model tested for scalar invariance. Scalar invariance shows that observed scores were related to the latent score or individuals who have the same score on the latent construct obtain the same score on the observed variable regardless of the year. To have strong measurement invariance means that an individual's group membership to a survey year does not alter the probability of a specific observed score (Wu, Li, & Zumbo, 2017). Strong measurement invariance is defined as a model having scalar invariance. Specifically, explaining variation is meaningful regardless of the year because the same construct is being measured across time. To test for measurement invariance, configural, metric, and scalar models were tested for fit.

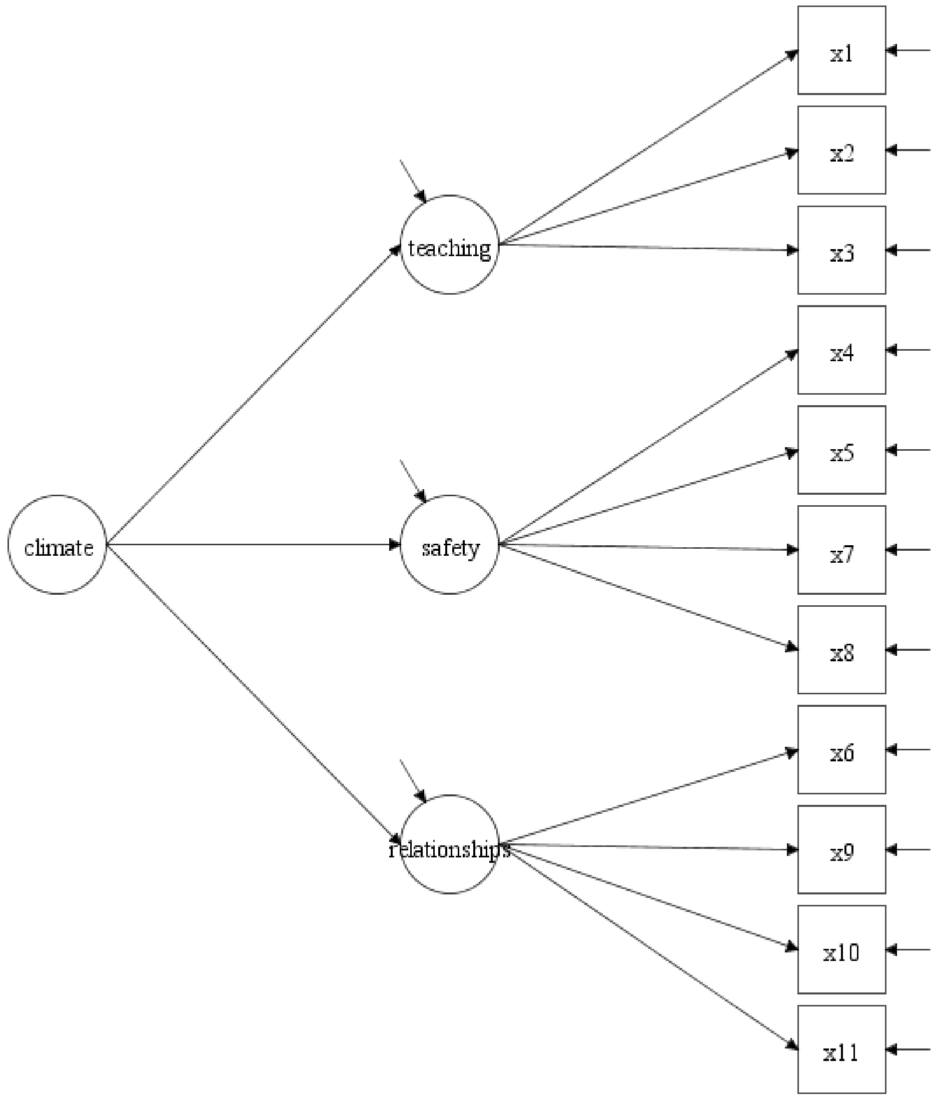

Figure 1. Confirmatory Factor Analysis for Student Survey

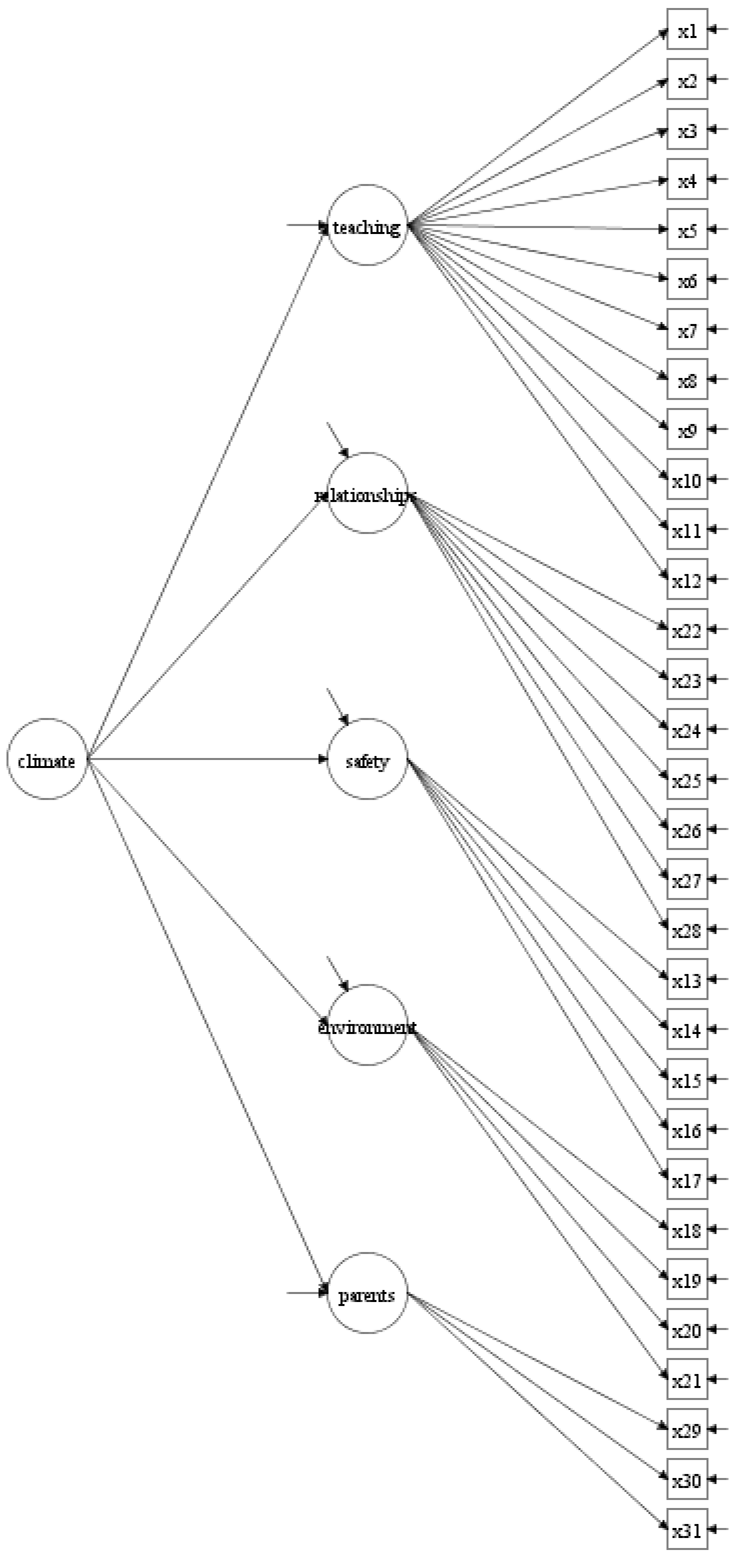

Figure 2. Confirmatory Factor Analysis for Personnel Survey

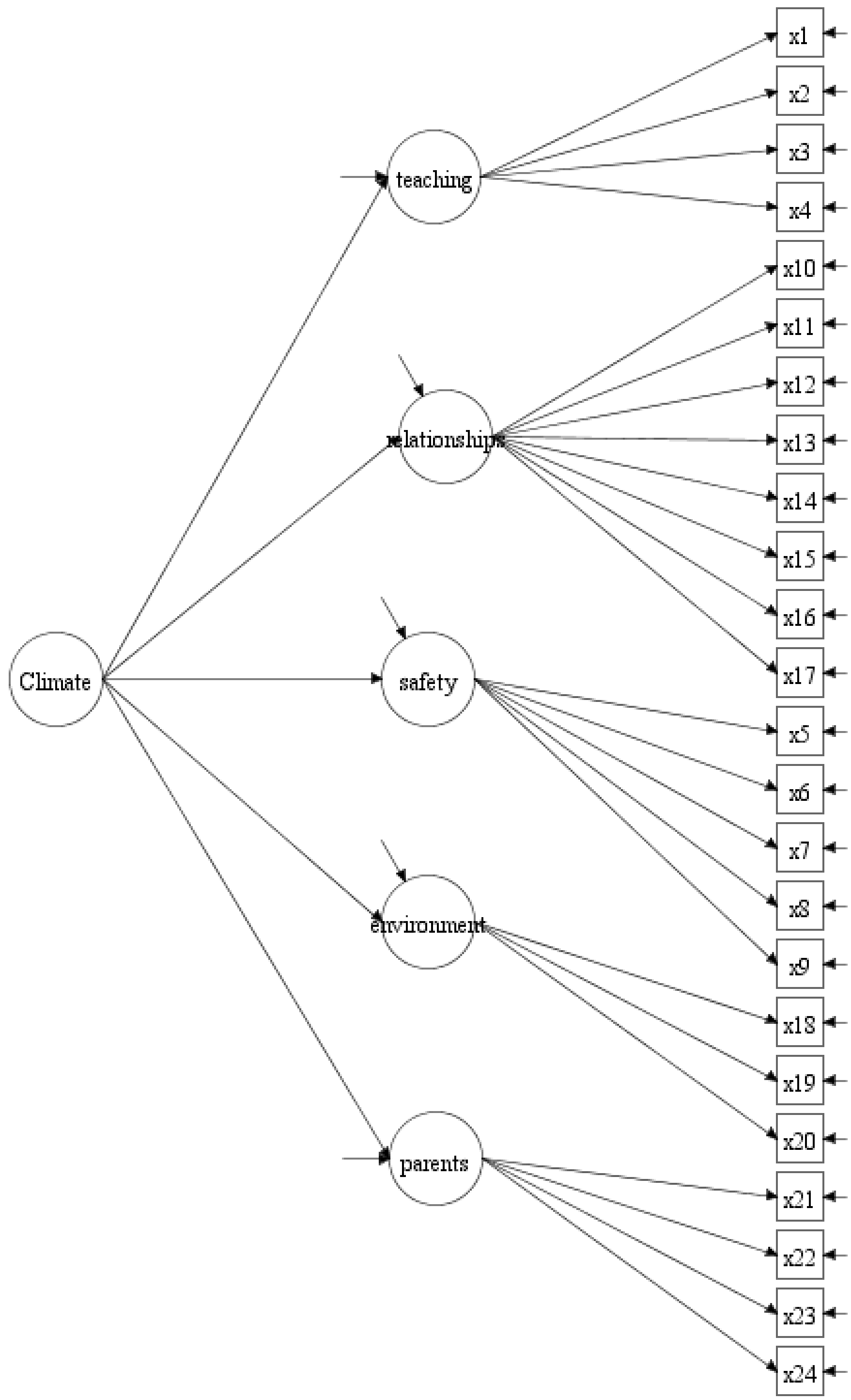

Figure 3. Confirmatory Factor Analysis for Parent Survey

Statistical analysis for research question 1b. Research has suggested that sustained school climate is beneficial. Once measurement invariance was established and thus the same construct was being measured over time, composite scores of climate for the three-years of data were created. The composite scores created were the average response across all items by respondent at the school-level. A linear growth curve analysis using the composite scores of school-level by respondent was used to assess if there was systematic linear change over time (Figure 4). The slope of the model in Figure 4 is the linear change. The results of the growth curve analysis then informed how climate was included in research question 2.

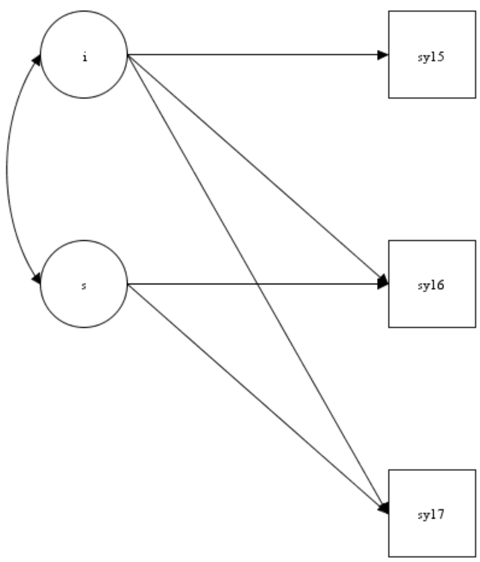

Figure 4. Linear Growth Curve Analysis

Statistical analysis for research question 2. The primary model tested was based on the protective model of resilience and assessed the moderation model of 2nd grade individual risk, 2nd grade school risk, average school climate for the students 3rd – 5th grades by survey, 3rd grade individual tests scores and average core subject grade and 5th grade individual test scores for ELA and Math and average core subject grade. The 3rd grade test scores have been included in the model so that what is being assessed is the residualized change for the outcome variables.

The compensatory model of resilience suggests that positive factors will have a direct negative relationship to adverse outcomes where the protective model of resilience suggests that positive factors will moderate the relationship between risk and adverse outcomes. A direct effect model and a two-level moderation model were used that allowed for individual level risk to predict individual test scores and average core subject grade while including school-level climate as a moderator (Figure 5). In these models, individual level variables including risk, ethnicity, gender and mobility as well as school climate variables and school risk were used to predict individual test scores in ELA and math and average core subject grades.

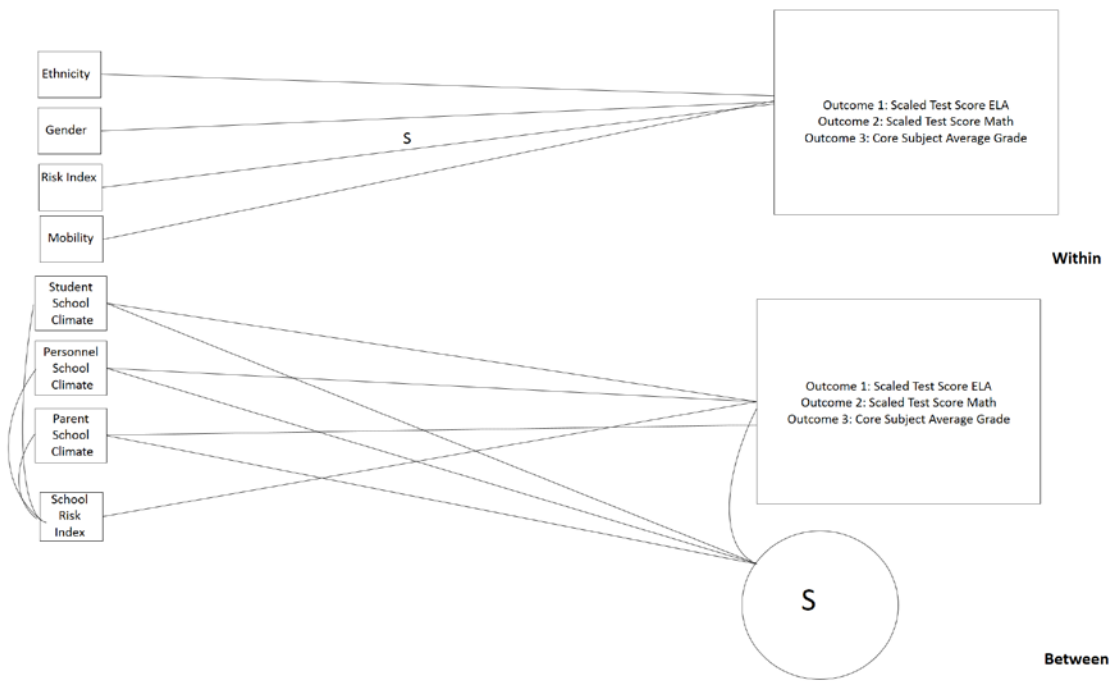

Figure 5. Two-Level Moderation Model

The main effect model and moderation model were tested simultaneously. The main effect model tested if individual risk predicted individual achievement. (Level 1 Equation). The moderation model tested if school climate moderated the effects of individual and school risk on

individual achievement (Level 2 Equations). It was hypothesized that students with a higher risk index would have lower achievement outcomes.

Level 1 Equation:

Test Score$_{ij=}$ $b_{0j}+b_{1j}$(Risk Index)$_{1j}$ $+b_{2j}$(Ethnicity)$_{2j}$ $+b_{3j}$(Gender)$_{3j}$ + b_{4j}(Prior Score)$_{4j}$ + b_{5j}(Mobility)$_{5j}$ + *error*

The level two model built on the main effect model and included the moderator model. The school-level risk index was also from the student's 2nd-grade enrollment. This model was referred to as an intercepts-as-outcomes model (Level 2 Equations). In the intercepts as outcomes model, the model being tested if the three school climate scores are related to GPA and test scores after controlling for the individual level risk index.

Personnel, parent and student school climate are the moderators that were added to the model and is assessed during the 3rd through 5th grades. The outcomes were assessed at the end of the students' fifth grade school year. The final equation used a slopes-as-outcomes model and tested research question two to see if school climate moderated the relationship between individual risk and individual test scores and GPA (Level 2 Equations).

Level 2 Equations:

Level 2- b_{0j}= □□+□(Parent Climate) + □(Student Climate) +□(Personnel Climate) + □(School Risk) + *residual intercept error variance*

Level 2- b_{1j}= □□+□(Parent Climate) + □(Student Climate) +□(Personnel Climate) + □(School Risk) + *residual slope variance*

4. RESULTS

4.1 Descriptive Statistics

Table 5 displays the descriptive statistics of the sample. Test scores and GPA reflect average performance of students.

Table 5. Descriptive Statistics of Variables

Variable	Mean	Std. Dev	Min	Max
Student Level:				
Mobility	.299	.458	0	1
Student Risk Index	.915	.783	0	5
GPA 2017	82.68	9.42	28	99.5
ELA Test Score	505.38	57.67	260	760
Math Test Score	507.72	57.86	366	725
School-level:				
School Risk Index	1.90	1.29	0	4

4. 2 Model Results

Research Question 1a: What is the dimensionality of school climate? Confirmatory factor analyses were conducted for the student, parent and personnel surveys. The models included year as a grouping variable (2015-2017) and clustering by school. All models were tested for fit and re-specified as necessary based on standardized factor loadings, modification indices and theory. The sample size of the student survey included 39,205 students for all three years. In 2015, there were 12,688 students, 12,721 students in 2016 and 13,796 students in 2017. The student survey also had 60 schools report data for 2015 and 2016 and 59 for 2017. The sample size of the parent survey included 11,316 parents for all three years. In 2015, there were 2,892 parents and 61 schools. In 2016 there were 4,951 parents and 60 schools and in 2017 there were 3,473 parents for 57 schools. The personnel survey had 9,763 total responses across three years. In 2015 there were 3,096 responses at 61 schools, in 2016 there were 3,264 responses at 60 schools and in 2017 there were 3,403 responses at 57 schools.

Student Survey. The student survey model loaded three items on the latent factor teaching and learning, four items on the latent factor relationships and four items on the latent factor of safety. The fit indices reflected moderate fit for the hypothesized three factor model were as follows: x^2= 8014.21, df = 155, p<.001. CFI = .86, RMSEA= .062(95% CI .061-.063) and the standardized loadings can be found in Table 6. The initial model also displayed very high factor correlations ranging from .93 to out of bounds across all years. In 2015, the safety factor was correlated at .93 with teaching and learning and 1.02 with relationship. The relationship factor was also correlated at .97 to teaching and learning in 2015. In 2016, the safety factor was correlated at .99 with teaching and learning and 1.04 with the relationship factor. Teaching and learning was also correlated at .99 with the relationship factor in 2016. In 2017, the safety factor was correlated at 1.01 with the teaching and learning factor and 1.05 with the relationship factor. The relationship factor was also correlated at .99 with teaching and learning in 2017. These results suggest that the three separate measures of climate are almost perfectly correlated and in some cases had errors due to high levels of colinearity leading the estimates to appear out of bounds.

Table 6. Student Survey Standardized Factor Loading from Proposed Model

	Teaching & Learning	Safety	Relationships
SY 2015:			
X1	.528		
X2	.337		
X3	.447		
X4		.433	
X5		.607	
X6		.487	
X7		.505	
X8			.594
X9			.513
X10			.563
X11			.513
SY 2016:			

X1	.556		
X2	.350		
X3	.451		
X4		.445	
X5		.615	
X6		.497	
X7		.517	
X8			.599
X9			.513
X10			.565
X11			.515
SY 2017:			
X1	.508		
X2	.324		
X3	.434		
X4		.421	
X5		.581	
X6		.464	
X7		.491	
X8			.569
X9			.493
X10			.551
X11			.506

The model was re-specified after the standardized factor loadings and modification indices were examined to reflect all eleven items loaded onto one latent factor of school climate. This is largely driven by the high correlations found between factors. Based on modification indices and theory, item ten, “Students treat each other well”, was correlated with item eight, “Students in my class behave so the teacher can teach”, and nine “I get along with other students”. Item three, “My school wants me to do well” was correlated with item four, “My school has clear rules for behavior”. Fit indices for the re-specified model showed a significant improvement of fit compared to the original model, x2 = 2949.13, df = 163, $p<.001$. CFI = .95, RMSEA = .036 (95% CI .035 - .037). Standardized factor loadings and residual variances are in Table 7. Overall, the re-specified model exhibited good fit for the student survey with the

exception of item two, “I feel like I do well in school” which had lower standardized factor loadings than the rest of the items but still contributed to the model.

Table 7. Standardized Factor Loadings for Best Fitting Model.

Item	Climate	Residual Variances
SY 2015:		
X1:	.529	.720
X2:	.330	.891
X3:	.447	.800
X4:	.433	.813
X5:	.615	.622
X6:	.619	.617
X7:	.481	.768
X8:	.439	.807
X9:	.467	.782
X10:	.475	.775
X11:	.535	.714
SY 2016:		
X1:	.553	.694
X2:	.338	.886
X3:	.444	.803
X4:	.451	.797
X5:	.631	.602
X6:	.638	.593
X7:	.498	.752
X8:	.457	.791
X9:	.480	.770
X10:	.491	.759
X11:	.550	.698
SY 2017:		
X1:	.517	.733
X2:	.321	.897
X3:	.438	.808
X4:	.430	.815
X5:	.603	.636
X6:	.603	.636
X7:	.470	.779
X8:	.437	.809
X9:	.457	.791
X10:	.472	.777
X11:	.536	.712

Once a model that fit and followed theory was found, measurement invariance across years was tested. Fit indices confirmed configural, metric and scalar invariance due to no large changes in the fit indices (Table 8). The standardized factor loadings and residual variances are shown in Table 9. Thus, the school climate survey as reported by students showed strong measurement invariance.

Table 8. Fit Indices for Invariance Tests for Student Survey

Model	x^2	*df*	*CFI*	*ΔCFI*	*RMSEA*	*Decision*
Model 1: Configural	3120.63	123	.95	--	.043	*Accept*
Model 2: Metric	3043.12	143	.95	.00	.039	*Accept*
Model 3: Scalar	2949.13	163	.95	.00	.036	*Accept*

Table 9. Standardized Factor Loadings & Residual Variances of Student Scalar Model

Item	Standardized Loading	Residual Variance
SY 2015:		
X1:	.529	.720
X2:	.330	.891
X3:	.447	.800
X4:	.433	.813
X5:	.615	.622
X6:	.619	.617
X7:	.481	.768
X8:	.439	.807
X9:	.467	.782
X10:	.475	.775
X11:	.535	.714
SY 2016:		
X1:	.553	.694
X2:	.338	.886
X3:	.444	.803
X4:	.451	.797
X5:	.631	.602
X6:	.638	.593
X7:	.498	.752
X8:	.457	.791
X9:	.480	.770
X10:	.491	.759
X11:	.550	.608
SY 2017:		
X1:	.517	.733
X2:	.321	.897

X3:	.438	.808
X4:	.430	.815
X5:	.603	.636
X6:	.603	.636
X7:	.470	.779
X8:	.437	.809
X9:	.457	.791
X10:	.472	.777
X11:	.536	.712

Parent Survey. The hypothesized model for parents was tested for fit. The model loaded four items onto the latent factor of teaching and learning, four items on the latent factor of safety, seven items on the latent factor of relationships, two items loaded onto physical environment and three items loaded onto parental involvement. The fit indices of the hypothesized model showed moderate fit and were as follows: x^2 = 7908.85, df = 802, p<.001. CFI = .92, RMSEA = .048 [95% CI .048-.049] and the standardized loadings can be found in Table 10.

Table 10. Parent Survey Standardized Factor Loadings for the Proposed Model

	Teaching & Learning	Safety	Relationships	Physical Environment	Parental Involvement
SY 2015:					
X1	.788				
X2	.801				
X3	.911				
X4	.917				
X5		.820			
X6		.783			
X7		.696			
X8		.853			
X9		.857			
X10			.720		
X11			.764		
X12			.714		
X13			.792		
X14			.754		
X15			.785		
X16			.843		
X17			.824		
X18				.666	
X19				.700	

X20				.792	
X21					.579
X22					.881
X23					.576
X24					.761
SY 2016:					
X1	.811				
X2	.802				
X3	.922				
X4	.923				
X5		.839			
X6		.785			
X7		.691			
X8		.872			
X9		.842			
X10			.740		
X11			.779		
X12			.755		
X13			.836		
X14			.802		
X15			.811		
X16			.862		
X17			.851		
X18				.699	
X19				.733	
X20				.822	
X21					.606
X22					.885
X23					.584
X24					.770
SY 2017:					
X1	.804				
X2	.811				
X3	.912				
X4	.912				
X5		.827			
X6		.803			
X7		.714			
X8		.865			
X9		.846			
X10			.724		
X11			.758		
X12			.743		
X13			.820		
X14			.788		
X15			.813		

X16			.851		
X17			.840		
X18				.680	
X19				.719	
X20				.814	
X21					.586
X22					.863
X23					.570
X24					.746

The model was re-specified after examining the modification indices and theory to include with statements of item six, “my student feels safe at school” with item seven, “my student feels safe going to and from school”. Item ten, “my student likes school was also correlated with item eleven, “my student feels successful at school”. Fit indices for the re-specified model showed improvement of fit, x^2 = 6105.39, df = 796, p<.001. CFI = .94, RMSEA = .042 [95% CI .041-.043]. The factor correlations between years were consistent and ranged from .40 to .89 showing that the factors were moderately correlated. The lowest correlations were found for parental involvement. The factor correlations for the 2017 model can be found in Table 11. Standardized factor loadings are in Table 12.

Table 11. Factor Correlations of 2017 Group for Parent Survey

	Teaching & Learning	Relationships	Safety	Physical Environment	Parental Involvement
Teaching & Learning					
Relationships	.83				
Safety	.80	.87			
Physical Environment	.67	.77	.75		
Parental Involvement	.43	.53	.44	.47	

Table 12. Parent Survey Standardized Factor Loadings for Best Fitting Model

	Teaching & Learning	Safety	Relationships	Physical Environment	Parental Involvement
SY 2015:					

X1	.788				
X2	.801				
X3	.911				
X4	.917				
X5		.825			
X6		.758			
X7		.661			
X8		.862			
X9		.866			
X10			.695		
X11			.742		
X12			.710		
X13			.792		
X14			.760		
X15			.789		
X16			.849		
X17			.828		
X18				.666	
X19				.701	
X20				.791	
X21					.579
X22					.880
X23					.576
X24					.761
SY 2016:					
X1	.811				
X2	.802				
X3	.922				
X4	.924				
X5		.840			
X6		.758			
X7		.653			
X8		.879			
X9		.849			
X10			.716		
X11			.759		
X12			.750		
X13			.834		
X14			.806		
X15			.814		
X16			.867		
X17			.856		
X18				.699	
X19				.734	
X20				.821	
X21					.606

X22					.885
X23					.583
X24					.770
SY 2017:					
X1	.804				
X2	.812				
X3	.912				
X4	.912				
X5		.832			
X6		.781			
X7		.684			
X8		.875			
X9		.855			
X10			.703		
X11			.739		
X12			.740		
X13			.821		
X14			.793		
X15			.816		
X16			.858		
X17			.845		
X18				.681	
X19				.720	
X20				.814	
X21					.586
X22					.863
X23					.570
X24					.746

The next models included the higher-order factor of school climate and were tested by year. For 2015, the model with the higher-order factor of school climate showed good fit, x^2 = 1857.02, df = 245, p<.001. CFI = .94, RMSEA = .048 [95% CI .046-.050]. The 2016 model also showed good fit, x^2 = 2646.29, df = 245, p<.001. CFI = .94, RMSEA = .044 [95% CI .043-.046]. Lastly, the 2017 model showed good fit, x^2 = 1681.18, df = 245, p<.001. CFI = .94, RMSEA = .041 [95% CI .039-.043]. The models loaded similarly across years and the standardized factor loadings for the models can be found in Table 13.

Table 13. Parent Survey Standardized Factor Loadings with Higher-Order Factor

	Teaching & Learning	Safety	Relationships	Physical Environment	Parental Involvement
SY 2015:					
X1	.789				
X2	.795				
X3	.911				
X4	.919				
X5		.825			
X6		.751			
X7		.651			
X8		.861			
X9		.870			
X10			.682		
X11			.750		
X12			.708		
X13			.785		
X14			.772		
X15			.781		
X16			.855		
X17			.827		
X18				.661	
X19				.720	
X20				.782	
X21					.553
X22					.888
X23					.578
X24					.760
Climate:	.849	.913	.973	.809	.483
SY 2016:					
X1	.818				
X2	.799				
X3	.924				
X4	.921				
X5		.837			
X6		.776			
X7		.678			
X8		.877			
X9		.844			
X10			.728		
X11			.758		
X12			.747		
X13			.840		
X14			.798		
X15			.817		
X16			.865		

X17			.857		
X18				.700	
X19				.715	
X20				.833	
X21					.598
X22					.877
X23					.618
X24					.773
Climate:	.862	.921	.968	.845	.551
SY 2017:					
X1	.792				
X2	.819				
X3	.910				
X4	.916				
X5		.835			
X6		.765			
X7		.663			
X8		.876			
X9		.863			
X10			.693		
X11			.731		
X12			.742		
X13			.815		
X14			.799		
X15			.818		
X16			.860		
X17			.846		
X18				.681	
X19				.733	
X20				.806	
X21					.615
X22					.870
X23					.516
X24					.745
Climate:	.863	.908	.961	.809	.527

To test for measurement invariance, the model without the higher-order factor was used. Fit indices confirmed configural, metric and scalar invariance (Table 14). The standardized factor loadings for the scalar model are shown in Table 15. Scalar invariance was found and thus, explaining variation is meaningful regardless of the year because the same construct of school climate is being measured across time. Because the models loaded similarly across years and the

fit indices did not change, strong measurement invariance was found and composite scores of average climate by year and school were created for subsequent analyses.

Table 14. Fit Indices for Invariance Tests for Parent Survey without Higher-Order

Model	x^2	df	CFI	ΔCFI	RMSEA	Decision
Model 1: Configural	6197.94	720	.94	--	.045	*Accept*
Model 2: Metric	6123.62	758	.94	.00	.043	*Accept*
Model 3: Scalar	6105.39	796	.94	.00	.042	*Accept*

Table 15. Parent Survey Standardized Factor Loadings for the Scalar

	Teaching & Learning	Safety	Relationships	Physical Environment	Parental Involvement
SY 2015:					
X1	.788				
X2	.801				
X3	.911				
X4	.917				
X5		.825			
X6		.758			
X7		.661			
X8		.862			
X9		.866			
X10			.695		
X11			.742		
X12			.710		
X13			.792		
X14			.760		
X15			.789		
X16			.849		
X17			.828		
X18				.666	
X19				.701	
X20				.791	
X21					.579
X22					.880
X23					.576
X24					.761
SY 2016:					
X1	.811				
X2	.802				
X3	.922				
X4	.924				
X5		.840			
X6		.758			
X7		.653			

X8		.879			
X9		.849			
X10			.716		
X11			.759		
X12			.750		
X13			.834		
X14			.806		
X15			.814		
X16			.867		
X17			.856		
X18				.699	
X19				.734	
X20				.821	
X21					.606
X22					.885
X23					.583
X24					.770
SY 2017:					
X1	.804				
X2	.812				
X3	.912				
X4	.912				
X5		.832			
X6		.781			
X7		.684			
X8		.875			
X9		.855			
X10			.703		
X11			.739		
X12			.740		
X13			.821		
X14			.793		
X15			.816		
X16			.858		
X17			.845		
X18				.681	
X19				.720	
X20				.814	
X21					.586
X22					.863
X23					.570
X24					.746

Personnel Survey. The hypothesized model for personnel was the last model tested for fit. The model tested loaded twelve items onto the latent factor of teaching and learning, four items on the latent factor of safety, six items on the latent factor of relationships, three items loaded onto physical environment and three items loaded onto parental involvement. The fit indices of the hypothesized model were as follows: x^2 = 17487.54, df = 1376, p<.001. CFI = .91, RMSEA = .060, (95% CI .059-.061). The standardized factor loadings can be found in Table 16.

Table 16. Personnel Survey Standardized Factor Loadings for the Proposed Model

	Teaching & Learning	Safety	Relationships	Physical Environment	Parental Involvement
SY 2015:					
X1	.737				
X2	.681				
X3	.691				
X4	.669				
X5	.742				
X6	.752				
X7	.703				
X8	.774				
X9	.786				
X10	.771				
X11	.728				
X12	.776				
X13		.873			
X14		.469			
X15		.675			
X16		.794			
X17		.378			
X22			.766		
X23			.899		
X24			.866		
X25			.921		
X26			.834		
X27			.870		
X28			.849		
X18				.631	
X19				.603	
X20				.821	
X21				.836	
X29					.895
X30					.950

X31					.931
SY 2016:					
X1	.710				
X2	.651				
X3	.652				
X4	.652				
X5	.713				
X6	.736				
X7	.675				
X8	.731				
X9	.752				
X10	.729				
X11	.679				
X12	.721				
X13		.855			
X14		.462			
X15		.699			
X16		.784			
X17		.376			
X22			.748		
X23			.887		
X24			.855		
X25			.911		
X26			.823		
X27			.864		
X28			.829		
X18				.605	
X19				.615	
X20				.801	
X21				.833	
X29					.896
X30					.950
X31					.935
SY 2017:					
X1	.699				
X2	.664				
X3	.651				
X4	.662				
X5	.726				
X6	.744				
X7	.678				
X8	.747				
X9	.745				
X10	.743				
X11	.696				
X12	.746				

X13	.850			
X14	.411			
X15	.650			
X16	.774			
X17	.336			
X22		.743		
X23		.877		
X24		.846		
X25		.897		
X26		.818		
X27		.859		
X28		.826		
X18			.641	
X19			.646	
X20			.801	
X21			.822	
X29				.886
X30				.937
X31				.929

The model was re-specified after examining the modification indices and theory to include with statements of item six, “I feel connected to the teacher at my school” with item five, “I feel like I fit in among other staff members at my school”. Item twenty-six, “Students at my school treat each other with respect regardless of race, ethnicity or culture” was correlated with item twenty-seven, “Students at my school show respect to other students regardless of academic ability”. Fit indices for the re-specified model showed improvement of fit, x^2 = 14292.02, df = 1370, p<.001. CFI = .93, RMSEA = .054 (95% CI .053-.055). The factors correlations were similar across years and can be found in Table 17. Standardized factor loadings of the re-specified model are in Table 18.

Table 17. Factor Correlations of Personnel Survey SY2017

	Teaching & Learning	Relationships	Safety	Physical Environment	Parental Involvement
Teaching & Learning					
Relationships	.57				
Safety	.57	.68			

Physical Environment	.64	.62	.60		
Parental Involvement	.35	.67	.52	.46	

Table 18. Personnel Survey Standardized Factor Loadings for Best Fitting Model

	Teaching & Learning	Safety	Relationships	Physical Environment	Parental Involvement
SY 2015:					
X1	.714				
X2	.662				
X3	.663				
X4	.645				
X5	.692				
X6	.703				
X7	.719				
X8	.799				
X9	.810				
X10	.790				
X11	.747				
X12	.801				
X13		.873			
X14		.469			
X15		.675			
X16		.794			
X17		.378			
X22			.766		
X23			.904		
X24			.868		
X25			.924		
X26			.814		
X27			.854		
X28			.852		
X18				.630	
X19				.602	
X20				.821	
X21				.836	
X29					.895
X30					.950
X31					.931
SY 2016:					
X1	.683				
X2	.628				
X3	.622				
X4	.627				

X5	.660				
X6	.685				
X7	.692				
X8	.758				
X9	.779				
X10	.750				
X11	.699				
X12	.750				
X13		.855			
X14		.463			
X15		.699			
X16		.784			
X17		.376			
X22			.748		
X23			.892		
X24			.859		
X25			.912		
X26			.799		
X27			.846		
X28			.833		
X18				.604	
X19				.615	
X20				.802	
X21				.834	
X29					.896
X30					.950
X31					.934
SY 2017:					
X1	.672				
X2	.640				
X3	.620				
X4	.634				
X5	.670				
X6	.691				
X7	.690				
X8	.769				
X9	.768				
X10	.759				
X11	.712				
X12	.769				
X13		.850			
X14		.412			
X15		.650			
X16		.774			
X17		.336			
X22			.744		

X23			.884		
X24			.850		
X25			.900		
X26			.796		
X27			.841		
X28			.830		
X18				.640	
X19				.646	
X20				.801	
X21				.822	
X29					.886
X30					.937
X31					.928

The next models included the higher-order factor of school climate and were tested separately by year. For 2015, the model with the higher-order factor of school climate showed good fit, x^2 = 5208.30, df = 427, p<.001. CFI = .93, RMSEA = .060 (95% CI .059-.062). The 2016 model also showed good fit, x^2 = 5188.17, df = 427, p<.001. CFI = .92, RMSEA = .058 (95% CI .057-.060). Lastly, the 2017 model showed good fit, x^2 = 4671.19, df = 427, p<.001. CFI = .92, RMSEA = .054 (95% CI .053-.055). The models loaded similarly across years and the standardized factor loadings for the models can be found in Table 19.

Table 19. Personnel Survey Standardized Factor Loadings with Higher-Order Factor

	Teaching & Learning	Safety	Relationships	Physical Environment	Parental Involvement
SY 2015:					
X1	.696				
X2	.656				
X3	.645				
X4	.640				
X5	.680				
X6	.692				
X7	.720				
X8	.815				
X9	.817				
X10	.788				
X11	.754				
X12	.804				
X13		.862			

X14		.460			
X15		.685			
X16		.795			
X17		.451			
X22			.761		
X23			.903		
X24			.874		
X25			.923		
X26			.824		
X27			.856		
X28			.845		
X18				.637	
X19				.614	
X20				.819	
X21				.832	
X29					.893
X30					.951
X31					.930
Climate:	.686	.796	.856	.723	.701
SY 2016:					
X1	.685				
X2	.612				
X3	.611				
X4	.615				
X5	.643				
X6	.678				
X7	.700				
X8	.759				
X9	.784				
X10	.758				
X11	.702				
X12	.755				
X13		.862			
X14		.465			
X15		.673			
X16		.793			
X17		.350			
X22			.748		
X23			.892		
X24			.857		
X25			.913		
X26			.801		
X27			.846		
X28			.835		
X18				.601	
X19				.590	

X20				.806	
X21				.841	
X29					.895
X30					.950
X31					.936
Climate:	.613	.764	.858	.676	.719
SY 2017:					
X1	.691				
X2	.665				
X3	.653				
X4	.651				
X5	.700				
X6	.710				
X7	.683				
X8	.752				
X9	.754				
X10	.750				
X11	.693				
X12	.759				
X13		.850			
X14		.427			
X15		.672			
X16		.765			
X17		.295			
X22			.750		
X23			.884		
X24			.848		
X25			.900		
X26			.789		
X27			.841		
X28			.830		
X18				.636	
X19				.639	
X20				.807	
X21				.824	
X29					.888
X30					.935
X31					.929
Climate:	.676	.786	.878	.741	.686

To test for measurement invariance of the personnel survey, the model without the higher-order factor was used similar to the parent survey. Fit indices confirmed configural, metric and scalar invariance (Table 20). The standardized factor loadings for the scalar model are

shown in Table 21. Because the models loaded similarly across years and fit indices did not differ across years, strong measurement invariance was found and composite scores of average personnel climate by year and school were created for subsequent analyses.

Table 20. Fit Indices for Invariance Tests for Personnel Survey without Higher- Order

Model	x^2	*df*	*CFI*	Δ*CFI*	*RMSEA*	*Decision*
Model 1: Configural	14026.01	1266	.93	--	.056	*Accept*
Model 2: Metric	14088.84	1318	.93	.00	.055	*Accept*
Model 3: Scalar	14292.02	1370	.93	.00	.054	*Accept*

Table 21. Personnel Survey Standardized Factor Loadings for Scalar Model

	Teaching & Learning	Safety	Relationships	Physical Environment	Parental Involvement
SY 2015:					
X1	.714				
X2	.662				
X3	.663				
X4	.645				
X5	.692				
X6	.703				
X7	.719				
X8	.799				
X9	.810				
X10	.790				
X11	.747				
X12	.801				
X13		.873			
X14		.469			
X15		.675			
X16		.794			
X17		.378			
X22			.766		
X23			.904		
X24			.868		
X25			.924		
X26			.814		
X27			.854		
X28			.852		
X18				.630	
X19				.602	
X20				.821	
X21				.836	
X29					.895
X30					.950

X31					.931
SY 2016:					
X1	.683				
X2	.628				
X3	.622				
X4	.627				
X5	.660				
X6	.685				
X7	.692				
X8	.758				
X9	.779				
X10	.750				
X11	.699				
X12	.750				
X13		.855			
X14		.463			
X15		.699			
X16		.784			
X17		.376			
X22			.748		
X23			.892		
X24			.859		
X25			.912		
X26			.799		
X27			.846		
X28			.833		
X18				.604	
X19				.615	
X20				.802	
X21				.834	
X29					.896
X30					.950
X31					.934
SY 2017:					
X1	.672				
X2	.640				
X3	.620				
X4	.634				
X5	.670				
X6	.691				
X7	.690				
X8	.769				
X9	.768				
X10	.759				
X11	.712				
X12	.769				

X13	.850				
X14	.412				
X15	.650				
X16	.774				
X17	.336				
X22		.744			
X23		.884			
X24		.850			
X25		.900			
X26		.796			
X27		.841			
X28		.830			
X18			.640		
X19			.646		
X20			.801		
X21			.822		
X29				.886	
X30				.937	
X31				.928	

Research Question 1b: How does school climate change over time? Confirmatory Factor Analyses showed strong measurement invariance over time. The latent growth curve models used a composite score of school climate reported by students, parents and personnel. The composite scores reflected the average response of all items by school. Descriptive statistics for the composite variables can be found in Table 22.

Table 22. Descriptive Statistics for Climate Variables

Variable	Mean	Std. Dev	Min	Max	N
Student Climate 2015	3.21	.120	2.97	3.61	60
Student Climate 2016	3.24	.157	2.77	3.91	60
Student Climate 2017	3.21	.110	3.02	3.60	59
Parent Climate 2015	3.52	.269	2.33	4	61
Parent Climate 2016	3.56	.194	2.77	3.97	60
Parent Climate 2017	3.62	.162	3.17	4	57
Personnel Climate 2015	3.32	.281	2.54	3.85	61
Personnel Climate 2016	3.37	.241	2.80	3.84	60
Personnel Climate 2017	3.44	.218	2.89	3.80	57

The composite score for each survey was found to be internally consistent as reflected by cronbach’s alphas. The cronbach’s alpha for the student survey was .80 for across all years and

the alpha for the parent and personnel surveys were both .95 across all years. Thus, the composite score of school climate by respondent was found to be reliable. The parent survey had an ICC of .07, the personnel survey had an ICC of .22 and the student survey had an ICC of .03. Correlations across years can be found in Table 23, across years, surveys showed varying correlations.

Table 23. Correlations Across Year and Survey

	Staff 2015	Staff 2016	Staff 2017	Student '15	Student '16	Student '17	Parent 2015	Parent 2016	Parent 2017
Staff 2015									
Staff 2016	0.82								
Staff 2017	0.77	0.77							
Student '15	0.38	0.30	0.24						
Student '16	0.52	0.54	0.38	0.59					
Student '17	0.35	0.31	0.33	0.49	0.57				
Parent 2015	0.01	0.27	-0.04	0.05	0.35	0.13			
Parent 2016	0.13	0.17	0.26	0.25	0.25	0.16	0.15		
Parent 2017	-0.12	-0.07	0.09	0.24	0.21	0.04	0.00	0.58	

When using the average school climate score by year, the linear growth curve showed moderate fit for the student survey, x^2 = 2.80, df = 1, p = .09 . CFI = .85, RMSEA = .17 (95% CI .00-.41). The parent survey showed excellent fit, x^2 = .09, df = 1, p = .77, CFI = 1.0, RMSEA = 0.0 (95% CI .00- .22) as did the personnel survey, x^2 = .23, df = 1, p = .63, CFI = 1.0, RMSEA = 0.0(95% CI .00- .26). The means and variance estimates of the slope and intercepts can be found in Table 24. An intercept only model was also analyzed for the student survey but showed lowered fit than the slopes and intercepts model and thus suggests that although there is some change, it is likely not linear.

Table 24. Slopes & Intercepts Estimates of Growth Curve

		Means	Variance
Student Survey			
	I	3.21* (.02)	.02*(.01)
	S	-0.00 (.01)	.00 (.00)

Parent Survey			
	I	3.52* (.03)	.03*(.01)
	S	.05* (.02)	.01 (.01)
Personnel Survey			
	I	3.30* (.04)	.06* (.01)
	S	.06* (.01)	-.00 (.01)

An analysis of the mean intercepts shows significance across all three surveys and thus the average scores are greater than zero. However, an analysis of the mean slopes shows small, significant effects for the parent and personnel survey. These results suggest a very small amount of linear change across all schools for the parent and personnel survey and no change in the student survey. Further, an analysis of the variance showed that there was little to no variability in the rate of change between schools for each survey. Based on these results and the high correlations between surveys across years, the three-year averages of student, personnel and parent climate ratings were used in the final models. Once the three-year average climate ratings were created, the survey showed moderate to small correlations (Table 25).

Table 25. Correlations between Aggregated School Climate Variables

	Student Survey	Parent Survey	Personnel Survey	School Risk
Student Survey				
Parent Survey	.38*			
Personnel Survey	.48*	.36*		
School Risk	-.52*	.11*	-.63*	

Research Question 2: Does school-level climate act as a protective factor in the relationship between individual risk and academic achievement for elementary students?

To test if school-level climate buffered the relationship between risk and decreased academic achievement for elementary students, hierarchical linear modeling was used. Before testing any of the models, correlations were run between variables in the models (Table 26). Following the correlations, the decision was made to include a second compensatory and

protective model in which student reported climate was included only to understand if student reported climate had a stronger effect alone than with other reporters on student outcomes. Thus, for each outcome, four models were tested. The first two models tested the compensatory model of resilience and the second two models tested the protective model of resilience.

Table 26. Correlations of Student-Level Variables

	Race	Gender	Mobility	Student Risk	2015 Average Grade	2015 ELA	2015 Math	2017 Average Grade	2017 ELA	2017 Math
Race										
Gender	-.01									
Mobility	.30*	-.00								
Student Risk	.49*	.07*	.26*							
2015 Average Grade	-.07*	.01	.03	-.08*						
2015 ELA	-.27*	-.10*	-.07*	-.32*	.29*					
2015 Math	-.19*	-.01	-.01	-.25*	.32*	.86*				
2017 Average Grade	-.06*	-.03	.16*	-.08*	.38*	.05*	.04			
2017 ELA	-.47*	-.12*	-.25*	-.53*	.04*	.52*	.36*	.07*		
2017 Math	-.48*	-.01	-.26*	-.54*	.02*	.46*	.40*	.07*	.80*	

Average Grade in Core Subjects. Hierarchical linear modeling was used to analyze the data where students (level 1) were nested within schools (level 2). The first model tested the hypothesis that school-level climate by respondent (level 2) would have a direct effect on individual grades in core subjects (level 1). To test the hypothesis that school-level climate by respondent (level 2) would moderate the relationship of individual risk (level 1 predictor) and school risk (level 2 predictor) on individual grades in core subjects (outcome). Model testing took place in 4 stages, main effects model, a second main effects model with just student

reported climate, a slopes as outcomes model and a final slopes as outcomes model with just student reported climate. Further, exploratory models in which school risk was removed were tested to verify that mutlicolinearity of climate and school risk was not influencing results but there was no change in results so they have been excluded. Average core subject grade was found to have an ICC of .12 indicating that 88% of the variability in average core grade is between students within schools rather than between schools and thus finding effects at the school-level will be more difficult.

At the student level, the model included race, gender, student risk from the student's 2nd grade school year, previous grades from the 3rd grade school year and student risk from the students 2nd grade school year. At the school-level, the model included school risk from the 2nd grade year, student climate, personnel climate and parent climate averaged from 3 years. There were a total of 2,566 students included in the sample at 50 schools. The results showed that male students had significantly decreased grades, b = -1.65, SE = 0.50, p < .001. African American students also had significantly decreased grades, b = -1.64, SE = 0.36, p <.001. The regression coefficient for previous grades was positive and significant, b = .39, SE = 0.04, p <.001. Student risk was also negatively related to student core subject grades, b = -1.94, SE = 0.29, p < .001. Thus, students at higher risk have relative decreases in core subject grades. On the second level, school risk was negatively related to student core subject grades b = -.86, SE= 0.44, p < .05 and schools with higher risk have students with relative decreased core subject grades than schools at less risk. Climate as reported by students, personnel and parents had no significant effect on core subject grades. Estimates for all variables can be found in Table 27.

A second main effect model was tested in which only student reported climate was included. Results were similar to those of the first model for the student level factors. Climate

had no significant effect on core subject grades. Estimates for all variables can be found in Table 27.

Next, the slopes-as-outcomes model was tested to test for interactions between the school-level variables and student level risk on core subject grades. There were a total of 2,566 students included in the sample at 50 schools. The cross-level interactions between student climate, personnel climate and parent climate and core subject grade were not statistically significant (*b* = -.71, SE= 4.74, *p* = .882, *b* = -3.55, SE = 2.55, *p* = .36, *b* = -1.12, SE = 1.66, *p* = .15); which means that school climate as reported by students, personnel and parents did not buffer the relationship between student risk and lowered core subject grades (Table 27).

The third model tested was also a slopes-as-outcomes model in which all predictor variables were included to test for interactions between just student climate and student level risk on core subject grades. There were 2,783 students at 55 schools for this model. This final model was included to assess if more of an effect can be found if students are the only reported. The cross-level interaction between student climate and core subject grade was not statistically significant (*b* = -.3.84, SE= 4.71, *p* = .42). All estimates for the third model can be found in Table 27. Thus, school climate as reported by students had no effect on the strength of the relationship between student risk and core subject grades.

Table 27. Hierarchical Linear Model Estimates for Average Grade in Core Subjects

Parameters	Model 1	Model 2	Model 3	Model 4
Intercept	53.60** (3.91)	53.29** (3.83)	53.60** (3.91)	53.15** (3.79)
Level 1 (Student)				
Race	-1.64** (0.50)	-1.64** (0.50)	-1.59** (0.52)	-1.61** (0.52)
Gender	-1.65** (0.36)	-1.61** (0.34)	-1.75** (0.35)	-1.69** (0.34)
Mobility	-0.56 (0.34)	-0.58 (0.33)	-0.68* (0.35)	-0.68* (0.33)
Student Risk	-1.94** (0.29)	-1.87** (0.28)	--	--
Previous Average Grade	0.39** (0.04)	0.39**(0.04)	0.39** (0.04)	0.39** (0.04)
Level 2 (School)				

School Risk	-0.86* (0.44)	-0.58 (0.42)	-0.70* (0.32)	-0.68 (0.35)
Student Climate	0.13 (7.50)	4.26 (6.05)	-0.84 (6.28)	7.21 (4.58)
Personnel Climate	1.11 (3.47)	--	2.62 (2.83)	--
Parent Climate	2.55 (3.26)	--	4.55 (3.14)	--
		Random Effects		
Intercept			-1.97** (0.28)	-1.85** (0.29)
Level 2 (School)				
School Risk	--	--	-0.14 (0.36)	0.14 (0.28)
Student Climate	--	--	-0.71 (4.74)	-3.84 (4.71)
Personnel Climate	--	--	-3.55 (2.50)	--
Parent Climate	--	--	-1.12 (1.66)	--

*** p <.01, * p <.05*
Note. Standard Errors are in parentheses. Model 1 is main effect model, Model 2 is a main effect model, Model 3 is slopes as outcome model with all climate variables & Model 4 is slopes as outcomes model with just school climate.

Scale Scores on ELA State Exam. Hierarchical linear modeling was used to test the hypothesis that school-level climate by respondent (level 2) would have a direct effect on ELA scale scores from a state assessment (level 1) and that school-level climate by respondent (level 2) would moderate the relationship of individual risk (level 1 predictor) and school risk (level 2 predictor) on ELA scale scores from a state assessment (outcome). Main effects models and slopes as outcomes models were tested. Further, exploratory models in which school risk was removed were tested but there was no change in results so they have been excluded. The outcome of ELA scale scores had an ICC of .02 indicating that 98% of the variability in ELA is between students within schools and not between schools.

The main effect model included race, gender, and student risk from the students 2nd grade year and 3rd grade ELA scale scores. At the school-level, the model included school risk from the 2nd grade year and student climate, personnel climate and parent climate aggregated across grades three to five. The sample included 2,776 students across 52 schools. The results showed that male students had significantly decreased ELA scores, *b* = -3.98, SE= 1.06, *p*< .001. African American students also had significantly decreased ELA scores, *b* = -6.28, SE= 1.85, *p* <.001.

The regression coefficient for 3rd grade ELA scale scores was positive and significant, b = .66, SE = 0.01, p <.001. Student risk was also negatively related to ELA scale scores, b = -5.38, SE= 1.10, p <.001. Thus, students at higher levels of risk had decreased ELA scores compared to their counterparts who are at lower risk. Climate as reported by students and personnel had no significant effect on ELA scores but parent reported climate had a significant negative relation to ELA scores (b = -14.33, SE= 5.35, p <.01). A second main effect model in which just student reported climate was also tested and similar results were found (Table 28).

Next, the slopes-as-outcomes model was tested with all predictor variables to test for interactions between the school-level variables and student risk on ELA scale scores. The sample consisted of 2,776 students across 52 schools. The cross-level interactions between student climate, personnel climate and parent climate and ELA scale scores were not statistically significant (b = -11.42, SE=8.97, p = .20; b = -4.15, SE=4.66, p = .37; b = -0.47, SE=6.33, p = .94); which means the strength of the relationship between student risk and ELA scale scores were not conditional on school climate as reported by students, personnel and parents. However, school climate as reported by students had a positive, direct effect on ELA scale scores which was not found in the first model (b = 30.03, SE=13.86, p < .05).

The last model tested was also a slopes-as-outcomes model in which all predictor variables were included to test for interactions between just student climate and student risk on ELA scale scores. This model was run to assess if student reported school climate would have an effect as the only report of climate in the model. There were 2,899 students clustered at 55 schools. School risk was found to be marginally significant in predicting ELA scale scores, b = -2.53, SE= 1.28, p = .05. The cross-level interaction between student climate and ELA scale scores was not statistically significant (b = -10.69, SE= 7.97, p = .17). Thus, the strength of the relationship

between student risk and ELA scale scores was not conditional on student reported school climate.

Table 28. Hierarchical Linear Model Estimates for ELA Scale Scores

Parameter	Model 1	Model 2	Model 3	Model 4
		Fixed Effects		
Intercept	191.69** (6.67)	193.02** (6.60)	192.22** (6.63)	191.32** (6.53)
Level 1 (Student)				
Race	-6.28** (1.85)	-6.45** (1.97)	-5.13** (1.90)	-5.24** (1.90)
Gender	-3.98** (1.06)	-4.18** (1.02)	-4.22** (1.07)	-4.30** (1.03)
Mobility	-2.45 (1.37)	-2.51 (1.32)	-2.34* (1.35)	-2.38 (1.30)
Student Risk	-5.38** (1.10)	-5.80** (1.07)	--	--
Previous ELA Scale scores	0.66** (0.01)	.65** (0.01)	0.65** (0.01)	0.65** (0.01)
Level 2 (School)				
School Risk	0.43 (1.39)	-0.50 (1.22)	-1.13 (1.49)	-2.53* (1.28)
Student Climate	21.22 (12.12)	17.36 (12.17)	30.03* (13.86)	27.85* (13.59)
Personnel Climate	10.38 (7.72)	--	16.20 (11.17)	--
Parent Climate	-14.33** (5.35)	--	-12.73 (9.64)	--
		Random Effects		
Intercept			-5.26** (1.00)	-5.57** (0.98)
Level 2 (School)				
School Risk	--	--	1.66 (0.89)	2.06* (0.76)
Student Climate	--	--	-11.42 (8.97)	-10.69 (7.97)
Personnel Climate	--	--	-4.15 (4.66)	--
Parent Climate	--	--	-0.47 (6.33)	--

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

Note. Standard errors are in parentheses. Model 1 is main effect model, Model 2 is a main effect model, Model 3 is slopes as outcome model with all climate variables & Model 4 is slopes as outcomes model with just school climate.

Scale Scores on Math State Exam. Hierarchical linear modeling was also used to test the hypothesis that school-level climate by respondent (level 2) would have a direct effect on math scale scores on a state assessment (level 1) and that school-level climate (level 2) would moderate the relationship of individual risk (level 1 predictor) and school risk (level 2 predictor) on math scale scores from a state assessment (outcome). Model testing took place in 4 stages, first a main effects model was tested, then a second main effects model with just student reported climate then a slopes as outcomes model and lastly a final slopes as outcomes model with just

student reported climate. Further, exploratory models in which school risk was removed were tested but there was no change in results so they have been excluded. The outcome of math scale scores had an ICC of .03 indicating that 97% of the variance in school climate can be found between students rather than between schools.

The first model tested a direct effect of climate on math achievement. At the student level, the model included race, gender, student risk from the students 2nd grade and 3rd grade math scale scores. At the school-level, the model included school risk from the students 2nd grade year and student climate, personnel climate and parent climate aggregated from grades three to five. This model included 2,777 students in 52 schools. The standardized results showed that male students had significantly decreased math scores, b = -7.14, SE= 1.55, p< .001. The regression coefficient for 3rd grade math scale scores was positive and significant, b = .86, SE= 0.03, p <.001. Student risk was also negatively related to math scale scores, b = -7.37, SE=1.01, p <.001. Thus, students at higher risk had decreased math scores when compared to their counterparts who are less at risk. Climate as reported by students, personnel and parents had no significant effect on math scores (Table 29). A second main effect model was also tested in which just student reported climate was included. Effects were similar to the main effect model with all three climate measures (Table 29).

Next, the slopes-as-outcomes model was used to test for interactions between the school-level variables and individual level variables on math scale scores (Table 29). The model also included 2,777 students within 52 schools. The cross-level interactions between student climate, personnel climate and parent climate and math scale scores were not statistically significant (b = -18.56, SE=10.40, p = .07, b = -1.65, SE= 4.87, p = .73, b = -2.99, SE= 5.36, p = .58); which

means the relationship between student risk and math scale scores is not conditional on school climate as reported by students, personnel and parents.

The last model tested was also a slopes-as-outcomes model to test for interactions between just student climate and student risk on math scale scores. The final model included 2,900 students clustered within 55 schools. School risk was found to be significant in predicting math scale scores, *b* = -2.95, SE=1.37, $p < .05$; where schools with higher risk had students with lower math scale scores. The cross-level interaction between student climate and student risk on math scale scores was statistically significant (*b* = - 21.65, SE= 9.92, $p < .05$). Thus, the relationship between student risk and math scale scores was conditional on the level of school climate.

Table 29. Hierarchical Linear Model Estimates for Math Scale Scores

Parameters	Model 1	Model 2	Model 3	Model 4
Intercept	83.49** (13.44)	84.37**(13.30)	89.04** (13.20)	86.32** (13.01)
Level 1 (Student)				
Race	-7.14** (1.55)	-7.14** (1.57)	-6.77** (1.57)	-6.58** (1.58)
Gender	-1.48 (1.10)	-1.62 (1.09)	-1.60 (1.10)	-1.73 (1.11)
Mobility	-2.08 (1.77)	-2.80 (1.74)	-2.09 (1.76)	-2.77 (1.73)
Student Risk	-7.37** (1.01)	-7.09** (1.01)	--	--
Previous Math Score	0.86** (0.03)	0.86** (.03)	0.85** (0.03)	0.85** (0.03)
Level 2 (School)				
School Risk	-1.79 (1.59)	-2.01 (1.29)	-2.64 (1.77)	-2.95* (1.37)
Student Climate	18.17 (15.25)	17.23 (13.95)	32.88 (18.37)	36.95* (15.67)
Personnel Climate	4.40 (7.47)	--	7.10 (10.16)	--
Parent Climate	-9.46 (8.72)	--	-5.23 (11.47)	--
		Random Effects		
Intercept			-7.49** (0.94)	-7.10** (0.91)
Level 2 (School)				
School Risk	--	--	0.86 (0.93)	0.96 (0.83)
Student Climate	--	--	-18.56 (10.40)	-21.65* (9.92)
Personnel Climate	--	--	-1.65 (4.87)	--
Parent Climate	--	--	-2.99 (5.36)	--

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

Note. Standard errors shown in parentheses

The cross-level interaction between student reported school climate and student risk was probed to understand how climate moderated the relationship between student risk and math

scale scores. To probe the interaction, the school climate variable was re-centered. The effect of student risk on math scale scores was probed at low (-1 SD), average, and high (+1 SD) levels of student climate. As shown in Table 30, the negative effect of student risk on math scores was found to be more pronounced in schools with relatively high school climate. Thus, the hypothesis that school climate would act as a buffer of student risk on math test scores was not supported.

Table 30. Moderating Effects of Student Reported School Climate on Student Risk Predicting Math Exam Scores

School Climate	Estimate	SE	*p*
High Climate (+ 1 SD)	-9.45	1.44	< .01
Average Climate	-7.10	0.91	<.01
Low Climate (- 1 SD)	-5.05	1.25	< .01

5. Discussion

The overall goal of this dissertation was to test the effects school climate as a resilience resource. This study was the first to assess school climate as a buffer in the protective model of resilience for elementary students at higher levels of risk and academic achievement. First, the dimensionality of school climate as reported by students, personnel and parents was assessed using confirmatory factor analysis. Second, how school climate changes overtime was measured to better understand if climate is consistent or changes in a linear fashion across three years. Last, hierarchical linear modeling was used to assess if the relationship between student risk and academic achievement was moderated by school climate.

5.1 Summary of Findings and Theoretical Implications

School climate research has suggested that positive school climate promotes academic achievement, healthy development and school satisfaction (Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013). School climate has been defined as an environment that promotes youth development and learning where individuals are respected (National School Climate Council, 2007). Research on school climate has defined school climate as a unified construct, and also as having different domains which fit under the unified construct. The main domains of focus within school climate are typically teaching and learning, safety, relationships and physical environment (Thapa et al., 2013; Zullig et al., 2010). However, these domains are often unified under the larger umbrella of school climate (Zullig et al., 2010). The first step in the analyses was to test the dimensionality of school climate, examining whether it is composed of different domains which in turn can fit under the larger construct of school climate. Results of the confirmatory factor analyses indicated that that for elementary students, climate was one unified construct. However, for parents and school personnel, items were found to load onto latent

factors representing distinct, although intercorrelated domains of teaching and learning, safety, relationships, physical environment and parental involvement. Additionally, these domains also fit under a higher-order factor of school climate. Thus, school climate is both dimensional and one construct. The results for the student survey reflect the results found by La Salle, Zabek, and Meyers (2016) in which school climate is one construct for the same survey. However, the results for the parent and personnel surveys reflect the domains defined by Zullig and colleagues (2010) as well as the unified construct of school climate as both models fit similarly. This suggests that there may be a developmental difference for youth and adults in how they operationalize climate. However, this may also be due to the different versions of the survey assessing different questions. Thus, it may be beneficial for researchers focused on children to understand how their perceptions of school climate may differ from those of adults.

Research has suggested that sustained school climate is beneficial for youth (Cohen et al., 2009; National School Climate Council, 2007; Tharpa et al., 2013) but studies have historically not assessed if or how school climate changes over time. Because the current study used a longitudinal approach, it was possible to assess how school climate changed by school across three years. Using a growth model, it was found that school climate was largely consistent across three-years with little systematic differences between schools. Thus, levels of school climate are consistent in this school district. Because school climate showed minimal change across three years, the final model included the school three-year average by students, parents and personnel. Part of the reason why there was no systematic variation across years may be because the current surveys are used for accountability purposes by the state and across all three respondents on average, results are positive.

The main goal of this research was to test compensatory and protective models of resilience for academic achievement and student risk. As described in the introduction, the compensatory model is a main effect model in which the protective factor acts directly on the outcome and the protective model is a moderation model in which the relationship between the risk and the outcome are buffered by the protective factor. Three different outcome variables were included in the model as measures of academic achievement: average core subject grade, and ELA and math scale scores on a state assessment. Results differed based on the academic outcome.

There were mixed results from the main effects models testing the compensatory model. In the current study, a direct negative relationship was found between student risk and all three academic outcomes. However, a direct positive relationship was found for student reported climate and ELA and math scale scores. For the outcome of average core subject grade, climate had no effect on core grades. Parent reported school climate was related to decreased ELA scale scores, which is the opposite direction has hypothesized. It could be theorized that this may be due to parents assuming that since the school is having such a positive effect there is less need for them to read with their children at home. Further studies would be necessary to understand if parent and student reading time is conditional on how a parent views their child's school. However, school climate as reported by students was related to increased ELA scale scores, which is consistent with the compensatory model of resilience. Climate was not directly related to change in math scale scores. In the math model, when the interaction of student reported climate is included, student reported climate has a direct effect on math scores. Thus, the compensatory model was confirmed for math scores and student reported climate but only when climate is also included as an interaction with student risk.

To assess the protective model, cross-level moderation models were run for each outcome. In the protective model of resilience, a protective factor moderates the relationship between risk and an outcome. Of all the interactions tested, only one was statistically significant: When only student reported climate was included in the model, the effect of student risk on math scale scores was found to be conditional on school climate. However, probing the interactions showed that the effect was opposite of the hypothesized buffering model.

However, the effect of the interaction was very small and may be explained by an overall positive rating of climate across the sample. An analysis of the means shows that for all three years, the average climate rating by students was above a three. On the survey, responses of a three or higher reflect positive climate and thus, for all three years, the average climate was above average. Thus, the results of the moderation model may not provide a clear picture of high and low climate because all responses were generally high. Further, when interpreting the results of the probing, part of the explanation on why the result was found may be because at high levels of climate, there were fewer students with low test scores. Thus, students who are at risk in these environments may feel more disconnected to their peers and marginalized but their responses are not reflected in the average school climate. However, their test scores may be so low that the more negative effect of climate is found for the entire school. In comparison, at schools where most students have high levels of risk and lowered test scores, below average climate that is still moderately positive has less of a negative effect because more students are at risk and less students feel marginalized from the general population of the school. However, the effect found for student reported climate as a buffer is very small and more studies are needed to clarify this relationship

Results raise questions about how school climate can fit into resilience research and more specifically, how it can be used for youth who are placed at risk. When considering theory, positive school climate could fit as a protective factor in the compensatory and protective models of resilience to protect youth placed at risk from lowered academic achievement by providing a safe and supportive environment. However, the current study only found support for the compensatory factor for student reported climate and ELA scale scores. Further, for math scale scores, the protective model was not found. Although students who were placed at risk did have lower average core subject grades and ELA scale scores, this relationship was not conditional on school climate regardless of respondent. Across the nation, achievement gaps have been found in a variety of subjects and populations but the current study did not find that this achievement gap may be lessened by the school environment. These results require follow up to understand what factors could act in the protective model of resilience to help close the achievement gap for students placed at risk. It also requires follow up in a district with more variability in test scores and grades as the current sample lacked variability.

For math scale scores, the relationship between risk and math achievement was conditional on student reported climate but the effect was more negative at high climate schools. Thus, at schools with high climates, risk is negatively related to math achievement and this relationship is more negative than at low climate schools. To investigate this result, a similar study could be conducted that included the interaction between student risk, school risk and climate. This interaction would provide clarity around climate and school risk with student risk that could not be tested in this study due to the small sample of schools. Further, if student-level data were used for climate, it may become clear if there is an effect if a student is an outlier of risk in their school or if they are similar to all other students in the school. Similarly, this would

help to clarify any relationship between a school with more variability in risk or one that has a homogenous school population.

For other variables in the models such as race, gender, mobility, school risk and student risk, most results replicate previous findings. Black students had decreased average core subject grade, ELA scale scores and math scale scores in comparison to their counterparts. Males also had decreased average core subject grade and ELA scale scores. No gender differences were found for math scale scores. For average core subject grades, students at schools with higher risk, had lowered average grades.

In conclusion, the definition of school climate is nuanced and may be dependent on developmental stages. Elementary school-aged youth may see climate as one unified construct where adults view climate as multiple domains that work together to create school climate. A secondary explanation of why differences are found in how climate is operationalized for students and parents and personnel may also be that the surveys were constructed differently with the parent and personnel survey being much longer. The compensatory model of resilience was supported for half of the outcomes for elementary students. However, this dissertation did not detect any of the hypothesized buffering effects derived from the protective model of resilience.

5.2 Limitations and Future Directions

This dissertation has several limitations. First, the sample consisted of third to fifth graders in one urban school district. To find effects and make the study generalizable to other populations, the study would need to be replicated with a larger population and with different demographics. The study also utilized elementary school students who had previously not been studied in depth with school climate, it would be beneficial to replicate the study in other grade

bands to see if results differ in middle of high school students. Given that results suggest that climate is defined differently for elementary students then for adults, it would be important to assess where in development this change is made from one construct to numerous constructs under the larger umbrella of climate.

Second, it would also be beneficial to add more items to the risk index that provide information about the student's social ecology or home environment such as parental education, parental income, number of siblings and various other contextual factors. Because the current study had to rely on a limited number of factors and when creating a risk index, more items is beneficial to account for the snowball effects of risk (Sameroff, 2006). It would also be beneficial to include a measure of community risk to better understand how communities, parents and schools are all influencing youth development. By adding more factors, a student's social ecology could be assessed and provide the whole picture of what lowers achievement for student placed at risk. Research has found that an individual's environment may increase their vulnerability to risk and thus, including more factors from the student's environment or community would be beneficial (Arrington & Wilson, 2000).

The results also bring into question if school climate is better operationalized as an organizational measure of the school environment or whether it is a student-level construct. By measuring climate on a student's level rather than the school level, researchers could examine individual differences in students' perceptions of climate. Because the current study had to use the anonymous survey data available, results cannot be tied directly to students, parents or personnel. Thus, the only way to link results was back to the school and not to individuals. It would be beneficial to be able to tie results from perceptions of school climate to specific individuals to assess if student level results are similar to those at the school-level or if

perceptions of school climate have a stronger effect at an individual level. Brookmeyer, Fanti and Henrich (2006), found that on both the student level and school-level school climate act as a protective factor for violent behavior. Using a model similar to theirs, would be beneficial with the outcome of academic achievement. It would also be beneficial to be able to associate the different respondent responses together based on the student to assess if parents and their students are responding in the same manner or differently. In the best case, student responses could also be associated with their parents responses and the teacher of the classroom they are in to provide a way to triangulate the data.

The current study used the three-year average of school climate, but it may be beneficial to consider the separate domains of school climate. By including the domains in future studies, it will be possible to understand which domains are most important to protect youth and provide the most information about the overall school environment. Because the current study found that the student level domains were highly correlated, this was not done. It may be that while an overall measure of climate does not protect youth, specific domains such as increased safety and positive relationships do.

In the same vein, the average response for each school regardless of respondent reflected overall positive responses on the surveys. Thus, there was little variability in the sample at the school-level. This brings into question if all students, parents and personnel had positive feelings about their school or if results differ more at the individual level. The overarching question which arises is if school climate is a school-level variable or if it would be better as a student level variable in future studies.

5.3 Applied Implications

The main implication of the study revolves around how school climate is perceived similarly across years and how it is defined. First, it is important that school administrators understand how students feel about the climate in their schools and that it is measured consistently over time. Although school climate provides an overarching theme it becomes clear the dimensions of climate are also important and if administrators are looking to increase their overall climate, they must focus on all of the dimensions.

Further, given that students who were at higher levels of risk had lower achievement for all three outcomes, the implications for teachers and administrators reflect what most teachers and administrators already believe. Given the findings, it is important that teachers and administrators understand the extra support students who are at risk may require to achieve the same outcomes as their less at risk classmates both within low functioning schools and high functioning schools. The current study found that for students who were defined as at risk in their early elementary years had lower scores in their fifth grade year in comparison to their peers. Thus, teachers and administrators would benefit from knowing student data from previous years as they enter their classroom. As districts across the nation rely more on student data to define students who are at risk of academic failure in advance, a large implication is the use of student data across multiple years. By providing teachers with early warning systems that forecast the risk of school failure or dropout they will be better prepared to intervene with students at need and end the cycle of risk. By creating a longitudinal database of all data available on students, districts would also be able to provide teachers and administrators with a whole student perspective that teachers can use to understand their student needs.

REFERENCES

Akos, P. (2002). Student perceptions of the transition from elementary to middle school. *Professional School Counseling, 5,* 339-345.

Alvidrez, J., & Weinstein, R. S. (1994). The nature of “schooling” in school transitions: A critical re-examination. *Prevention in Human Services*, *10*(2), 7-26.

Anderson, C. S. (1982). The search for school climate: A review of the research. *Review of educational research*, *52*(3), 368-420.

Arrington, E. G., & Wilson, M. N. (2000). A re-examination of risk and resilience during adolescence: Incorporating culture and diversity. *Journal of Child and Family Studies*, *9*(2), 221-230.

Astor, R. A., Guerra, N., & Van Acker, R. (2010). How can we improve school safety research?. *Educational researcher*, *39*(1), 69-78.

Battistich, V., Schaps, E., & Wilson, N. (2004). Effects of an elementary school intervention on students' “connectedness” to school and social adjustment during middle school. *The Journal of Primary Prevention*, *24*(3), 243-262.

Bergman, L. R., Magnusson, D., & El Khouri, B. M. (2003). *Studying individual development in an interindividual context: A person-oriented approach*. Psychology Press.

Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American psychologist*, *57*(2), 111.

Blum, R. W., Libbey, H. P., Bishop, J. H., & Bishop, M. (2004). School connectedness–strengthening health and education outcomes for teenagers. *Journal of School Health*, *74*(7), 231-235.

Borowsky, I. W., Ireland, M., & Resnick, M. D. (2002). Violence risk and protective factors among youth held back in school. *Ambulatory pediatrics*, *2*(6), 475-484.

Brookmeyer, K. A., Fanti, K. A., & Henrich, C. C. (2006). Schools, parents, and youth violence: A multilevel, ecological analysis. *Journal of clinical child and adolescent psychology*, *35*(4), 504-514.

Brooks-Gunn, J., & Duncan, G. J. (1997). The effects of poverty on children. *The future of children*, 55-71.

Brookover, W. B., Schweitzer, J. H., Schneider, J. M., Beady, C. H., Flood, P. K., & Wisenbaker, J. M. (1978). Elementary school social climate and school achievement. *American educational research journal*, *15*(2), 301-318.

Bryk, A. S., Sebring, P. B., Allensworth, E., Easton, J. Q., & Luppescu, S. (2010). *Organizing schools for improvement: Lessons from Chicago*. University of Chicago Press.

Byrne, D. G., & Mazanov, J. (2001). Self‐esteem, stress and cigarette smoking in adolescents. *Stress and Health*, *17*(2), 105-110.

Catalano, R. F., Berglund, M. L., Ryan, J. A., Lonczak, H. S., & Hawkins, J. D. (2002). Positive youth development in the United States: Research findings on evaluations of positive youth development programs. *Prevention & Treatment, 5*(1), 15a.

Catalano, R. F., Berglund, M. L., Ryan, J. A., Lonczak, H. S., & Hawkins, J. D. (2004). Positive youth development in the United States: Research findings on evaluations of positive youth development programs. *The annals of the American academy of political and social science*, *591*(1), 98-124.

Christle, C. A., Jolivette, K., & Nelson, C. M. (2005). Breaking the school to prison pipeline: Identifying school risk and protective factors for youth delinquency. *Exceptionality*,

13(2), 69-88.

Cohen, J., McCabe, L., Michelli, N. M., & Pickeral, T. (2009). School climate: Research, policy, practice, and teacher education. *Teachers college record*, *111*(1), 180-213.

Cohen, J., Pickeral, T., & McCloskey, M. (2009). Assessing school climate. *The Education Digest*, *74*(8), 45.

Compas, B. E., Hinden, B. R., & Gerhardt, C. A. (1995). Adolescent development: Pathways and processes of risk and resilience. *Annual review of psychology*, *46*(1), 265-293.

Constantine, N., Benard, B., & Diaz, M. (1999, June). Measuring protective factors and resilience traits in youth: The healthy kids resilience assessment. In *seventh annual meeting of the Society for Prevention Research, New Orleans, LA.*

Cowan, P. A., Cowan, C. P., & Schulz, M. S. (1996). Thinking about risk and resilience in families. *Stress, coping, and resiliency in children and families*, *1*.

Doll, B., Jones, K., Osborn, A., Dooley, K., & Turner, A. (2011). The promise and the caution of resilience models for schools. *Psychology in the Schools*, *48*(7), 652-659.

Duncan, S. C., Duncan, T. E., & Strycker, L. A. (2000). Risk and protective factors influencing adolescent problem behavior: A multivariate latent growth curve analysis. *Annals of Behavioral Medicine*, *22*(2), 103.

Elias, M. J., Zins, J. E., Graczyk, P. A., & Weissberg, R. P. (2003). Implementation, sustainability, and scaling up of social-emotional and academic innovations in public schools. *School Psychology Review*, *32*(3), 303-319.

Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Annu. Rev. Public Health*, *26*, 399-419.

Fiester, L. (2010). Early Warning! Why Reading by the End of Third Grade Matters. KIDS

COUNT Special Report. *Annie E. Casey Foundation*.

Fleming, C. B., Kim, H., Harachi, T. W., & Catalano, R. F. (2002). Family processes for children in early elementary school as predictors of smoking initiation. *Journal of Adolescent Health*, *30*(3), 184-189.

GADOE. (2017). Validity and reliability for the 2016-2017 Georgia Milestones Assessment System. Retrieved from http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Documents/Milestones

Galassi, J., & Akos, P. (2007). Strengths-based school counseling. Mahweh.

Garmezy, N., Masten, A. S., & Tellegen, A. (1984). The study of stress and competence in children: A building block for developmental psychopathology. *Child development*, 97-111.

Gilligan, R. (2000). Adversity, resilience and young people: The protective value of positive school and spare time experiences. *Children & society*, *14*(1), 37-47.

Griffith, J. (1999). The school leadership/school climate relation: Identification of school configurations associated with change in principals. *Educational Administration Quarterly*, *35*(2), 267-291.

Griffin, K. W., Scheier, L. M., Botvin, G. J., Diaz, T., & Miller, N. (1999). Interpersonal aggression in urban minority youth: Mediators of perceived neighborhood, peer, and parental influences. *Journal of Community Psychology*, *27*(3), 281-298.

Gutman, L. M., & Midgley, C. (2000). The role of protective factors in supporting the academic achievement of poor African American students during the middle school transition. *Journal of youth and adolescence*, *29*(2), 223-249.

Hawkins, J. D., Catalano, R. F., Kosterman, R., Abbott, R., & Hill, K. G. (1999). Preventing

adolescent health-risk behaviors by strengthening protection during childhood. *Archives of pediatrics & adolescent medicine*, *153*(3), 226-234.

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science, 312*(5782), 1900-1902.

Hilarski, C. (2004). How school environments contribute to violent behavior in youth. *Journal of Human Behavior in the Social Environment*, *9*(1-2), 165-178.

Hixson, J., & Tinzmann, M. B. (1990). Who are the “at-risk” students of the 1990s. *NCREL Monograph*.

Hopson, L. M., & Lee, E. (2011). Mitigating the effect of family poverty on academic and behavioral outcomes: The role of school climate in middle and high school. *Children and Youth Services Review*, *33*(11), 2221-2229.

Hopson, L. M., Schiller, K. S., & Lawson, H. A. (2014). Exploring linkages between school climate, behavioral norms, social supports, and academic success. *Social Work Research*, *38*(4), 197-209.

Jessor, R. (1993). Successful adolescent development among youth in high-risk settings. *American psychologist*, *48*(2), 117.

Johnson, B., & Stevens, J. J. (2006). Student achievement and elementary teachers’ perceptions of school climate. *Learning Environments Research*, *9*(2), 111-122.

Kerr, D., Ireland, E., Lopes, J., Craig, R., & Cleaver, E. (2004). Citizenship education longitudinal study:Second annual report: First longitudinal study. Retrieved from https://www.education.gov.uk/publications/eOrderingDownload/RB531.pdf

Khanlou, N., & Wray, R. (2014). A whole community approach toward child and youth resilience promotion: A review of resilience literature. *International journal of mental*

health and addiction, *12*(1), 64-79.

Koth, C. W., Bradshaw, C. P., & Leaf, P. J. (2008). A multilevel study of predictors of student perceptions of school climate: The effect of classroom-level factors. *Journal of educational psychology*, *100*(1), 96.

Kuperminc, G. P., Leadbeater, B. J., & Blatt, S. J. (2001). School social climate and individual differences in vulnerability to psychopathology among middle school students. *Journal of School psychology*, *39*(2), 141-159.

La Salle, T. P., Zabek, F., & Meyers, J. (2016). Elementary student perceptions of school climate and associations with individual and school Factors. In *School Psychology Forum* (Vol. 10, No. 1).

Laursen, B. P., & Hoff, E. (2006). Person-centered and variable-centered approaches to longitudinal data. *Merrill-Palmer Quarterly*, *52*(3), 377-389.

Lesneskie, E., & Block, S. (2017). School violence: the role of parental and community involvement. *Journal of school violence*, *16*(4), 426-444.

Leventhal, T., & Brooks-Gunn, J. (2004). A randomized study of neighborhood effects on low-income children's educational outcomes. *Developmental psychology*, *40*(4), 488.

Lleras, C. (2008). Do skills and behaviors in high school matter? The contribution of noncognitive factors in explaining differences in educational attainment and earnings. *Social Science Research*, *37*(3), 888-902.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child development*, *71*(3), 543-562.

Luthar, S., & Zelazo, B. (2003). Resilience and vulnerability: An integrative review. Resilience and vulnerability: Adaptation in the context of childhood adversity. New York:

Cambridge University Press. Pediatrics, 106(4), 756-761.

Magnusson, D. (2003). The person approach: Concepts, measurement models, and research strategy. *New directions for child and adolescent development*, *2003*(101), 3-23.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American psychologist*, *56*(3), 227.

Masten, A. S. (2014). Global perspectives on resilience in children and youth. *Child development*, *85*(1), 6-20.

Masten, A. S. (2015). *Ordinary magic: Resilience in development*. Guilford Publications.

Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and psychopathology*, *22*(3), 491-495.

Masten, A. S., Powell, J. L., & Luthar, S. S. (2003). A resilience framework for research, policy, and practice. *Resilience and vulnerability: Adaptation in the context of childhood adversities*, 1-25.

Masten, A. S., & Tellegen, A. (2012). Resilience in developmental psychopathology: Contributions of the project competence longitudinal study. *Development and psychopathology*, *24*(2), 345-361.

McNeely, C. A., Nonnemaker, J. M., & Blum, R. W. (2002). Promoting student connectedness to school: Evidence from the national longitudinal study of adolescent health. Journal of School Health, 72, 138–146. doi:10.1111/j.1746-1561.2002.tb06533.x

McCord, J. (Ed.). (1997). *Violence and childhood in the inner city*. Cambridge University Press.

Mutsau, S., & Billiat, E. (2015). Leveraging Schools Systems as a Locus for Disaster Risk Reduction in Zimbabwe. *Journal of Education and Practice*, *6*(29), 163-169.

National School Climate Council. (2007). The School Climate Challenge: Narrowing the gap

between school climate research and school climate policy, practice guidelines and teacher education policy. Retrieved from http://www.schoolclimate.org/climate/advocacy.php

Rai, A. A., Stanton, B., Wu, Y., Li, X., Galbraith, J., Cottrell, L., & Burns, J. (2003). Relative influences of perceived parental monitoring and perceived peer involvement on adolescent risk behaviors: An analysis of six cross-sectional data sets. *Journal of Adolescent Health*, *33*(2), 108-118.

Resnick, G., & Burt, M. R. (1996). Youth at risk: definitions and implications for service delivery. *American Journal of Orthopsychiatry*, *66*(2), 172.

Rutter, M. (1981). Stress, coping and development: Some issues and some questions. *Journal of Child Psychology and Psychiatry*, *22*(4), 323-356.

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American journal of orthopsychiatry*, *57*(3), 316.

Sameroff, A. (2006). Identifying risk and protective factors for healthy child development. *Families count: Effects on child and adolescent development*, 53-76.

Sameroff, A. J., Seifer, R., Barocas, R., Zax, M., & Greenspan, S. (1987). Intelligence quotient scores of 4-year-old children: Social-environmental risk factors. *Pediatrics*, *79*(3), 343-350.

Shumow, L., Vandell, D. L., & Posner, J. (1999). Risk and resilience in the urban neighborhood: Predictors of academic performance among low-income elementary school children. *Merrill-Palmer Quarterly (1982-)*, 309-331.

Silva, E., White, T., & Toch, T. (2015). The Carnegie Unit: A Century-Old Standard in a Changing Education Landscape. *Carnegie Foundation for the Advancement of Teaching*.

Thapa, A., Cohen, J., Guffey, S., & Higgins-D'Alessandro, A. (2013). A review of school climate research. *Review of educational research*, *83*(3), 357-385.

von Eye, A., & Bogat, G. A. (2006). Person-oriented and variable-oriented research: Concepts, results, and development. *Merrill-Palmer Quarterly*, *52*(3), 390-420.

Wang, M. T., & Dishion, T. J. (2012). The trajectories of adolescents' perceptions of school climate, deviant peer affiliation, and behavioral problems during the middle school years. *Journal of Research on Adolescence*, *22*(1), 40-53.

Wigfield, A., & Eccles, J. S. (1994). Children's competence beliefs, achievement values, and general self-esteem: Change across elementary and middle school. *The Journal of Early Adolescence*, *14*(2), 107-138.

Wills, T. A., Yaeger, A. M., & Sandy, J. M. (2003). Buffering effect of religiosity for adolescent substance use. *Psychology of Addictive Behaviors*, *17*(1), 24.

Windle, G. (2011). What is resilience? A review and concept analysis. *Reviews in Clinical Gerontology*, *21*(2), 152-169.

Wu, A. D., Li, Z., & Zumbo, B. D. (2007). Decoding the meaning of factorial invariance and updating the practice of multi-group confirmatory factor analysis: A demonstration with TIMSS data. *Practical Assessment, Research & Evaluation*, *12*(3), 1-26.

Yang, C., Bear, G. G., Chen, F. F., Zhang, W., Blank, J. C., & Huang, X. (2013). Students' perceptions of school climate in the US and China. *School Psychology Quarterly*, *28*(1), 7.

Zimmerman MA & Arunkumar R. 1994. Resiliency research: implications for schools and policy. Soc. Policy Rep. 8:1–17

Zimmerman, M. A., Stoddard, S. A., Eisman, A. B., Caldwell, C. H., Aiyer, S. M., & Miller, A.

(2013). Adolescent resilience: Promotive factors that inform prevention. *Child development perspectives*, *7*(4), 215-220.

Zimmerman, M. A., Bingenheimer, J. B., & Notaro, P. C. (2002). Natural mentors and adolescent resiliency: A study with urban youth. *American journal of community psychology*, *30*(2), 221-243.

Zullig, K. J., Huebner, E. S., & Patton, J. M. (2011). Relationships among school climate domains and school satisfaction. *Psychology in the Schools*, *48*(2), 133-145.

Zullig, K. J., Koopman, T. M., Patton, J. M., & Ubbes, V. A. (2010). School climate: Historical review, instrument development, and school assessment. *Journal of Psychoeducational Assessment*, *28*(2), 139-152.

APPENDICES

Appendix A.

Elementary Student Georgia Climate Survey

Demographic Information	
Gender	○ Female ○ Male
Ethnicity	○ Black or African American ○ Hispanic or Latino ○ White or Caucasian ○ Asian or Pacific Islander ○ Other
Grade	○ 3 ○ 4 ○ 5
1. I like school.	○ Always ○ Often ○ Sometimes ○ Never
2. I feel like I do well in school.	○ Always ○ Often ○ Sometimes ○ Never
3. My school wants me to do well.	○ Always ○ Often ○ Sometimes ○ Never
4. My school has clear rules for behavior.	○ Always ○ Often ○ Sometimes ○ Never

5. I feel safe at school.

- Always
- Often
- Sometimes
- Never

6. Teachers treat me with respect.

- Always
- Often
- Sometimes
- Never

7. Good Behavior is noticed at my school

- Always
- Often
- Sometimes
- Never

8. Students in my class behave so teachers can teach.

- Always
- Often
- Sometimes
- Never

9. I get along well with other students.

- Always
- Often
- Sometimes
- Never

10. Students treat each other well.

- Always
- Often
- Sometimes
- Never

11. There is an adult at my school who will help me if I need it.

- Always
- Often
- Sometimes
- Never

Appendix B

Personnel Climate Survey

Demographic Questions	
Primary Job Classification	o Teacher o Administrator o Certified Staff Member o Classified/Other Staff Member
Primary Grade Taught	
Area(s) Taught	o Science o ELA o Social Studies o Connections (e.g., art, PE, band, music) o Math o Special education o Other, please specify:
School Work Experience	o 0-5 years o 6-10 years o 11-15 years o More than 15 years
Highest Degree	o Bachelor's Degree o Master's Degree o Educational Specialist Degree o Doctoral Degree o Other, please specify:
Gender	o Female o Male
Ethnicity	What is your ethnicity? o Hispanic or Latino o Not Hispanic or Latino
Race/Ethnicity	What is your race? Mark one or more races to indicate your race. o White o Black or African American o Asian o American Indian or Alaskan Native o Native Hawaiian or Other Pacific Islander

GSHS Teacher Survey

Staff Connectedness

1. I feel supported by other teachers at my school.

   a. Strongly Disagree
   b. Somewhat Disagree
   c. Somewhat Agree
   d. Strongly Agree

2. I get along well with other staff members at my school. a. Strongly Disagree b. Somewhat Disagree c. Somewhat Agree d. Strongly Agree
3. I feel like I am an important part of my school. a. Strongly Disagree b. Somewhat Disagree c. Somewhat Agree d. Strongly Agree
4. I enjoy working in teams (e.g. grade level, content) at my school. a. Strongly Disagree b. Somewhat Disagree c. Somewhat Agree d. Strongly Agree
5. I feel like I fit in among other staff members at my school. a. Strongly Disagree b. Somewhat Disagree c. Somewhat Agree d. Strongly Agree
6. I feel connected to the teachers at my school. a. Strongly Disagree b. Somewhat Disagree c. Somewhat Agree d. Strongly Agree
Structure for Learning
7. Teachers at my school frequently recognize students for good behavior. a. Strongly Disagree b. Somewhat Disagree c. Somewhat Agree d. Strongly Agree
8. Teachers at my school have high standards for achievement. a. Strongly Disagree b. Somewhat Disagree c. Somewhat Agree d. Strongly Agree
9. My school promotes academic success for all students. a. Strongly Disagree b. Somewhat Disagree c. Somewhat Agree d. Strongly Agree

10. All students are treated fairly by the adults at my school.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

11. Teachers at my school treat students fairly regardless of race, ethnicity, or culture.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

12. Teachers at my school work hard to make sure that students do well.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

School Safety

13. I feel safe at my school.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

14. I have been concerned about my physical safety at school.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

15. If I report unsafe or dangerous behaviors, I can be sure the problem will be taken care of.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

16. I feel safe when entering and leaving my school building.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

17. Some students carry weapons (e.g., guns or knives) at my school.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

Physical Environment

18. My school building is well maintained.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

19. Instructional materials are up to date and in good condition.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

20. Teachers at my school keep their classrooms clean and organized.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

21. Teachers make an effort to keep the school building and facilities clean.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

Peer and Adult Relations

22. Students at my school would help another student who was being bullied.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

23. Students at my school get along well with one another.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

24. Students at my school get along well with the teachers and other adults.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

25. Students at my school treat each other with respect.
  a. Strongly Disagree
  b. Somewhat Disagree
  c. Somewhat Agree
  d. Strongly Agree

26. Students at my school treat other students fairly regardless of race, ethnicity, or culture.
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Somewhat Agree
    d. Strongly Agree

27. Students at my school show respect to other students regardless of their academic ability.
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Somewhat Agree
    d. Strongly Agree

28. Students at my school demonstrate behaviors that allow teachers to teach, and students to learn.
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Somewhat Agree
    d. Strongly Agree

Parent Involvement

29. Parents at my school attend PTA meetings or parent/teacher conferences.
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Somewhat Agree
    d. Strongly Agree

30. At this school, parents frequently volunteer to help on special projects.
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Somewhat Agree
    d. Strongly Agree

31. Parents at this school frequently attend school activities.
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Somewhat Agree
    d. Strongly Agree

Appendix C

Parent School Climate Survey

Demographic Questions	
Please indicate the grade of your student or students (mark all that apply)	o k o 1 o 2 o 3 o 4 o 5 o 6th o 7th o 8th o 9th o 10th o 11th o 12th
Is your student enrolled in any of these programs? (mark all that apply)	o Special Education Program or has an Individual Education Program (IEP) o Gifted program or Honors/Advanced Placement courses o Not applicable, not sure, or decline to answer
Gender Ethnicity Race/Ethnicity	o Female o Male o Hispanic or Latino o Not Hispanic or Latino o White o Black or African American o Asian o American Indian or Alaskan Native o Native Hawaiian or Other Pacific Islander

Georgia Parent School Climate Survey
Teaching and Learning
1. Teachers at my student's school have high standards for achievement. ! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree

2. Teachers at my student's school frequently recognize students for good behavior.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
3. Teachers at my student's school work hard to make sure that students do well.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
4. Teachers at my student's school promote academic success for all students.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
School Safety	
5. My student's school sets clear rules for behavior.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
6. My student feels safe at school.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
7. My student feels safe going to and from school.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
8. School rules are consistently enforced at my student's school.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
9. School rules and procedures at my student's school are fair.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
Interpersonal Relationships	
10. My student likes school.	

	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
11. My student feels successful at school.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
12. My student is frequently recognized for good behavior.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
13. I feel comfort able talking to teachers at my student's school.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
14. Staff at my student's school communicates well with parents.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
15. I feel welcome at my student's school.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
16. All students are treated fairly at my student's school.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
17. Teachers at my student's school treat all students with respect.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree
InstitutionalEnvironment	
18. My student's school building is well maintained.	! StronglyDisagree ! SomewhatDisagree ! SomewhatAgree ! StronglyAgree

19. My student's textbooks are up to date and in good condition.	❢ StronglyDisagree ❢ SomewhatDisagree ❢ SomewhatAgree ❢ StronglyAgree
20. Teachers at my student's school keep their classrooms clean and organized.	❢ StronglyDisagree ❢ SomewhatDisagree ❢ SomewhatAgree ❢ StronglyAgree
Parent Involvement	
21. I am involved in the decision making process at my student's school.	❢ StronglyDisagree ❢ SomewhatDisagree ❢ SomewhatAgree ❢ StronglyAgree
22. I am actively involved in activities at my student's school.	❢ StronglyDisagree ❢ SomewhatDisagree ❢ SomewhatAgree ❢ StronglyAgree
23. I attend parent/teacher conferences at my student's school.	❢ StronglyDisagree ❢ SomewhatDisagree ❢ SomewhatAgree ❢ StronglyAgree
24. I frequently volunteer to help on special projects at my student's school.	❢ StronglyDisagree ❢ SomewhatDisagree ❢ SomewhatAgree ❢ StronglyAgree