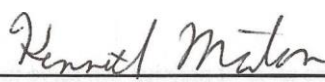


APPROVAL SHEET

Title of Dissertation: The Relationship between School Climate, School Valuing, and Academic Achievement among Middle School Students

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ABSTRACT

Title of Document: THE RELATIONSHIP BETWEEN SCHOOL CLIMATE, SCHOOL VALUING, AND ACADEMIC ACHIEVEMENT AMONG MIDDLE SCHOOL STUDENTS

Surbhi Godsay Lipkin-Moore, Ph.D., 2020

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For adolescents, middle school can be a turbulent and stormy experience. During this stage, young people go through significant developmental changes, seek autonomy from their parents, and desire a sense of belonging with others outside of their families. For this reason, the school environment plays an important role in shaping young people's interests - including the value they place in their academics. School climate is defined by the quality and character of the school environment, including students' sense of safety, interpersonal relationships, experiences in their classes, and the overall aesthetic and quality of resources in the school. While there is an extensive body of research on school climate, including the relationship between school climate and academic achievement, less is known about the pathways through which school climate may influence academic achievement. To address that gap, the current study seeks to investigate the relationship between school climate dimensions, school valuing, and academic achievement.

To assess these relationships, the current study utilized surveys from 650 middle school students, as well as grade and attendance data from a large school district in Pennsylvania. Structural equation modeling (SEM) was used to examine the relationships between school climate dimensions (T1), school valuing (T1), and academic achievement (T2). Furthermore, tests of indirect effects were used to examine whether each school climate dimension was indirectly related to GPA via school valuing. Lastly, multigroup SEM was conducted to assess whether gender or race moderated significant indirect effects. Results indicate that the institutional environment domain was positively and significantly related to school valuing, after controlling for other school climate dimensions and covariates. However, all four school climate dimensions were not significantly related to GPA, after controlling for other school climate dimensions and covariates. Moreover, two school climate dimensions – interpersonal relationships and safety – were positively and significantly related to GPA via school valuing. However, these relationships did not hold when other school climate dimensions were controlled for. Race and gender did not moderate any significant relationships, and no significant findings were found for the exploratory outcome, attendance. Recommendations for school practice and school climate research are discussed.

THE RELATIONSHIP BETWEEN SCHOOL CLIMATE, SCHOOL VALUING,
AND ACADEMIC ACHIEVEMENT AMONG MIDDLE SCHOOL STUDENTS

By

Surbhi Godsay Lipkin-Moore

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, Baltimore County, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2020

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Dedication

To the memory of Jayme, Pushpa, and Sunita, who always believed in using your abilities to promote positive change in the world.

Acknowledgements

This research would not have been possible without the efforts and support of many important people. First, I am so appreciative to my dissertation Co-Chairs, Dr. Kenneth Maton and Dr. Shuyan Sun, without whom this dissertation would not be possible. Thank you for your encouragement and guidance throughout this process. I have learned so much from both of you. Thank you to my committee members, Dr. Jack Tebes, Dr. Bronwyn Hunter and Dr. Susan Sonnenschein whose questions helped me to think critically about this work.

There are several other colleagues with whom I want to thank. Thank you to my mentor and colleague Dr. Kei Kawashima-Ginsberg who introduced me to the field of community psychology. I also want to thank Sam, Tasha, Lindsay, Lamont, and Dr. Nkiru Nnwulezi for being great friends and researchers. Thank you to all the colleagues at Yale University and The Scattergood Foundation for their work, guidance, and support throughout the project.

Finally, this dissertation would be not be possible without my friends and family whose positivity helped me to persevere in this long and difficult journey. Special thanks to my husband Zach for his unwavering encouragement and love - you had faith in my ability to accomplish this goal even when I didn't. Thank you to Tejas, whose presence brings a constant source of goodness, joy, and laughter in our home. To my mom and dad, grandfather, in-laws, and extended family, I am grateful for your positive energy, support, and patience throughout this experience.

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SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

The Relationship between School Climate, School Valuing, and Academic Achievement among Middle School Students

For decades, researchers and practitioners have been interested in how school factors impact the psychosocial and academic development of youth. Schools, and their members can have a tremendous impact on young people, because most youth spend more waking hours in school than anywhere else. While schools are influential at each stage, the middle school experience may be especially formative because of significant developmental changes youth experience during this time.

In addition to hormonal, neurologic, and physical changes, adolescents in middle school are seeking ways to become more independent from their family members. At this stage, students begin to take more risks and place more importance on social relationships with other students and adults in their schools than with their parents (Hurd, Hussain, & Bradshaw, 2018). Belonging in school becomes a priority for students during this time. Indeed, a growing body of research shows how students' perceptions of their transition to middle school is marked by difficult social experiences, especially challenges to "fit in" (Akos & Galassi, 2004; Day, Hamm, Lambert, & Farmer, 2014). As Roeser, Eccles, & Sameroff (2000) explain, students' existing friendships may be disrupted in middle school when they have less time with their central peer groups and are exposed to new peer groups.

With their increased focus on social relationships, middle school students, on average, experience declines in their interest in school and school valuing (Juvonen, 2007). Scholars suggest that decreased engagement in academics leads to higher rates of school dropout among students in middle school, especially among youth from

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subordinate demographic groups such as ethnic and racial minority youth, youth from lower socioeconomic backgrounds, and immigrant youth (Eccles & Roser, 2011; Rumberger & Lim, 2008). However, even students that do well academically experience difficulties with peer relationships during middle school (Akos, 2002; Day et al., 2014). In general, however, research shows that students that have supportive and stable relationships with their peers are more likely to participate in school activities and feel positive about their experience in school (Juvonen, 2007).

In addition to the challenges associated with fitting in, other factors impact the extent to which students feel seen, heard, and cared for in their middle schools. Unlike elementary school, students in middle or junior high schools typically rotate teachers based on academic subjects. As a result, students spend less time with a single teacher, which can make it more difficult to build close-knit relationships with teachers (Eccles & Roser, 2011). Moreover, most middle schools are larger than elementary schools. This can make students feel like a “small fish in a big pond” and means that students may not receive as much individual attention from school staff compared to their elementary school. Moreover, the increase in school size and fewer staff to monitor teasing or bullying in hallways may also make students feel less safe in school (Ferrás & Selman). For some students, academics may become more challenging and competitive which can negatively influence self-esteem or feelings about their academic competency (Martin & Steinbeck, 2017).

As highlighted above, multiple aspects of the middle school context coupled with developmental changes affect if and how youth navigate their middle school years. A number of these factors, including the quality of relationships with peers and

teachers, how valued students feel in the classroom, and the overall classroom and school environment are viewed by scholars as aspects of *school climate*.

School Climate

School climate has been widely studied since its emergence as a key school-level factor in the 1960's. At that time, teachers, administrators, and researchers began to take a close look at the impact of the school environment on student learning and development. School climate has been studied in many subfields in psychology such as community, developmental, educational, and social psychology. Community psychology, which utilizes an ecological perspective to understand human problems, draws attention to the fact that schools are contexts with existing strengths and assets that can be built upon to improve the well-being of its members, and that a lack of "fit" between members' needs and environmental context can result in negative psychosocial and behavioral outcomes (Bronfenbrenner, 1977; Moos, 1976; Rappaport, 1977). It also underscores the importance of attending to issues related to equity, diversity, and collaboration within and outside of school contexts.

One of the earliest descriptions of school climate in empirical work conceptualized schools as having "personalities" falling on a continuum from "open" to "closed" (Halpin & Croft, 1963). Since then, the term has evolved, and it is now generally viewed as a multi-dimensional and multi-level construct that comprises interdependent dimensions of the school environment. Still, there is no consensus on the definition and parameters of school climate nor is there a universally agreed upon

set of dimensions that represent school climate (Bradshaw, Waasdorp, Debnam, & Johnson, 2014; Wang & Degol, 2016).

For the purposes of this research, school climate is defined as “the quality and character of school life...based on patterns of students', parents' and school personnel's experience of school life” (The National School Climate Center, n.d).

Reviews of the school climate literature have identified four dimensions of school climate: 1) safety, 2) interpersonal relationships, 3) teaching and learning, and the 4) institutional environment (Aldridge & McChesney, 2018; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013; National School Climate Center, n.d.; Wang & Degol, 2016). Recently, an additional dimension has been identified: the school improvement process (Cohen & Geier, 2010; Cohen, McCabe, Michelli, & Pickeral, 2009; Thapa et al., 2013). All five dimensions are detailed in the following sections.

Safety

The term *safety* refers to the physical and psychological security provided by the school environment and school members (Thapa et al., 2013; Wang & Degol, 2016). School safety is important for teachers and staff to be able to effectively do their jobs and to foster an environment conducive to learning for students. However, there is growing evidence that both students and educators feel unsafe in schools (Cohen, 2006; Novotney, 2009). Three overlapping components define safety: 1) physical safety, 2) emotional safety, and 3) order and discipline.

First, *physical safety* involves the extent to which the school is free from violence and whether school mechanisms are in place to ensure the safety of all its members. A safe school is one in which all members are not only safe from violence

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(e.g. fighting, assault), but also a school that has clear and consistent policies regarding school safety and a preventative crisis plan that is adequately communicated to school members. Safety also encompasses school attitudes towards bullying and violent behavior, and perceptions about whether school staff can handle disciplinary issues effectively when they arise (Wang & Degol, 2016).

Emotional safety refers to an environment where school members feel cared for, supported, and feel open to express their feelings and thoughts. A school that is emotionally safe is one that has caring and supportive students, teachers, and staff, has an absence of bullying (both in person and online) or harassment, and has services in place for students who may be struggling with mental health issues. In fact, school bullying is now being described as a major public health problem, stemming from discriminatory beliefs about racial, cultural, gender, sexual, socioeconomic, and ability statuses (Rivara & Menestrel, 2016).

Order and discipline refers to the extent to which students believe in school rules, and their perceptions as to whether the rules are implemented fairly across students. This dimension also involves aspects of classroom management and how schools handle disciplinary problems (punitive measures such as suspension or expulsion versus restorative justice techniques such as peer mediation). Taken together, schools that provide an optimal foundation for social, emotional, and academic needs are places where members feel physically and emotionally safe and where consistent policies and procedures are in place to assure this safety (Devine & Cohen, 2007; Goodenow & Grady, 1993).

Interpersonal Relationships

In school, students are not only exposed to new academic subjects, but they also engage in social learning as they build relationships with students and teachers. Quality *interpersonal relationships* are defined by: 1) how connected members of the school feel towards one another, 2) respect for diversity and 3) school collaboration (Cohen et al., 2009; Thapa et al., 2013). Within schools, there are varying types of relationships including student-teacher relationships, student-student relationships, as well as relationships among school staff. Positive interpersonal relationships are characterized by mutual trust, support, and caring (Wang, Brinkworth, & Eccles, 2012; Wang & Degol, 2016). Like any relational process, the nature of these connections can change over time. However, establishing and maintaining consistent positive relationships is important for the academic, social, and psychological well-being of members of the school.

Interpersonal relationships that are *connected* involve students feeling positively engaged with one or more adults, where members of the school have positive feelings towards their school community, and where teachers, staff, and students are engaged in their work. How connected school members feel may relate to how much respect they have for each other and their individual cultural backgrounds. *Respect for diversity* refers to the appreciation, respect, awareness, and presence of all social and cultural groups. Schools and classrooms that demonstrate respect for diversity treat all students equitably, and value the experiences, beliefs, and backgrounds of all members (Cohen et al., 2009; Wang & Degol, 2016).

Lastly, *school collaboration* refers to on-going communication and support among school and community members. Partnership and mutual support between schools and parents are exemplified by consistent communication, parent participation in decision-making and events, and shared norms about learning and behavior. Community members and organizations can also play a fundamental role in the success of young people, by serving as mentors or providing other after-school supports. According to Sheldon and Epstein (2005) mentoring programs, partnerships with businesses, and community safety patrols can have a positive effect on achievement.

Teaching and Learning

The fundamental mission of school is the academic, intellectual, and cultural development of youth. It is not surprising, then, that *teaching and learning* represents one of the most significant dimensions of school climate (Cohen et al., 2009). Teaching and learning is typically defined by: 1) the quality of instruction, 2) professional development, and 3) leadership.

Quality of instruction refers to a teacher's ability to employ varied pedagogical techniques for students with different learning styles, setting high expectations, giving students the opportunity to participate and engage in their learning, and valuing the different skills students bring to the classroom (Wang & Degol, 2016). Furthermore, there is growing emphasis on the need for social-emotional learning in addition to academic learning (Cohen et al., 2009). It is also important for students to be given feedback and the opportunity to improve. For example, teachers may use formative assessments to provide continual constructive

feedback to students, and to determine how to adapt instructional strategies so they better address the learning styles of their students (Boston, 2002).

Relatedly, *professional development* involves on-going opportunities provided to school staff to support their learning and refers to having systems in place for schools to collect and use data to make instructional decisions. To be high quality, professional development needs to be aligned with the goals of the school and state standards and be relevant and helpful to teachers (Cohen et al., 2009). A school ethos that promotes growth and learning among all members, including staff, contributes to a more positive climate. Ultimately, providing high quality opportunities for teachers or shifting the school culture requires *leadership* that prioritizes or advocates for professional development and related school change. Effective school leaders (principals and administrators) can play a fundamental role in shaping and executing a school's mission through clear and frequent communication with staff, providing guidance when needed, promoting collaboration, and by making decisions that benefit all members of the school (Wang & Degol 2013).

Institutional Environment

The aesthetic and quality of the school structure and surrounding neighborhood - the *institutional environment* - is the fourth dimension of school climate. Institutional environment refers to aspects of the school environment, such as whether the school and surrounding neighborhood are clean and inviting, whether there is adequate space and materials for teachers and students, the student to teacher ratio, the grade configuration, and the size of the school (Cohen et al., 2009). Most research that examines the institutional environment has focused on the relation

between school size and student safety. While studies have found positive associations between smaller middle schools, student achievement, and perceived safety (Roberts, 2002; Stevenson, 2006), more research is needed to inform whether school size per se is the key causal factor impacting student outcomes.

Importantly, a quality institutional environment is inextricably linked to the local economic conditions. In fact, over the past decade, under-resourced schools have been affected the most by state budget cuts and state and federal policies, partly due to the fact that public education is primarily funded through local property taxes (Ramey, 2013). The link between housing and education at the local level has led to disparities across both class and race lines. Discriminatory federal housing loan policies favoring White community members and redlining policies dating back to Jim Crow segregation (residential segregation ordinances, official committees on segregation, and denying Black¹ residents mortgages) have dictated where low-income families of color could live (Lipsitz, 2011; Pietila, 2010; Ramey, 2013; Warren, 2014). These redlining policies undermined local housing markets, which lowered property values, in turn impacting local property taxes. Since property taxes are linked to local school budgets, lowered property taxes resulted in less investment in local schools.

Investment in schools is vital to maintaining a quality institutional environment, because schools need economic resources for quality materials, school

¹ In this document, the terms “Black” and “African American” are used interchangeably to reference individuals of African descent throughout the diaspora in the United States.

upkeep, to pay staff, as well as other expenses. Indeed, Stevenson (2006) reviewed eight studies that examined school size and its relation to student outcomes and concluded that school size may not have emerged as a significant predictor if poverty were fully controlled for. For those studies that included poverty or SES as a variable, it was the greatest predictor of how students performed academically. On the other hand, a large-scale setting-level study found that the link between school climate and students' academic and psychosocial adjustment was not solely the product of differential levels of SES (Brand, Felner, Seitsinger, & Dumas, 2003). Thus, multiple institutional factors, including but not limited to neighborhood SES and school size likely contribute in complex ways to student outcomes.

School Improvement Process

As briefly noted previously, schools with a positive climate have processes in place to reflect on, strengthen, and improve school climate. For this reason, the school improvement process has been identified as a fifth dimension of school climate (Thapa et al., 2013). The school improvement process refers to community-wide (leadership, teachers, students, parents) efforts to improve the other dimensions of school climate (safety, teaching and learning, interpersonal relationships, institutional environment) and student outcomes. These efforts typically include assessments or evaluations, as well as implementation of evidence-based programs (Cohen et al., 2009; Thapa et al., 2013).

Over the last two decades, studies from a range of fields such as prevention, psychology, social work, education, and aligned disciplines, have examined the implementation and effectiveness of programs to improve school outcomes. These

efforts have resulted in a range of best practices and guidelines to create and maintain schools that are responsive, caring, and safe. These programs come in various forms, such as emotional intelligence, violence prevention, civic education, service learning, and school-family-community partnerships, but all seek to address school-based and adolescent problems and/or promote positive youth development (Greenberg et al., 2003). Two types of school improvement efforts are relevant to the current study: *social-emotional learning* and *building a trauma-informed school*. As detailed in a following section, a SEL learning curriculum has been implemented for students in the middle school in which this study takes place, and concurrently, an intervention to develop a trauma-informed community is being implemented.

Social-emotional learning and trauma-informed school improvement programs. The term social emotional learning (SEL) was first introduced in a meeting hosted by the Fetzer Institute in 1994, and has since gained popularity among researchers and practitioners in fields such as education, psychology, and public health (Jennings & Greenberg, 2009). SEL is defined as “the process of acquiring a set of social and emotional skills—self-awareness, self-management, social awareness, relationship skills, and responsible decision-making within the context of a safe, supportive environment” (Cherniss, Extein, Goleman, & Weissberg, 2006, p. 243). The SEL framework, like other aligned approaches such as positive youth development (PYD), positive psychology (Ppsy), and social competence (SC) all seek to increase skills, assets, and knowledge to promote social and academic success among youth and prevent problematic behavior or trajectories (Tolan, Ross, Arkin, Godine, & Clark, 2016).

Universal school-based SEL interventions are theorized to change factors at multiple levels, including improving school policies, school and classroom climate, leadership and administrator buy-in, teacher pedagogy, instructional quality, and student and teacher SEL-related skills, knowledge, and attitudes (Greenberg, Domitrovich, Weissberg, & Durlak, 2017). In 2015, the Collaborative for Academic, Social, and Emotional Learning (CASEL) published a guide to effective SEL programs. Based on the research evidence, they identified six universal SEL programs that met the criteria of being 1) well-designed, 2) provided high quality training and implementation support to schools, and 3) have evidence of effectiveness (at least one pre-post test study with a comparison group). The findings on SEL program impact will be discussed later in the section on the effectiveness of school-based programs.

Programs and interventions to build trauma-informed schools have also gained traction in the past decade. It is well documented that trauma and toxic stress in childhood can negatively impact functioning across the lifespan (Chapman, Dube, & Anda, 2007). For example, traumatic experiences in childhood have been linked to academic deficits (Black, Woodworth, Tremblay, & Carpenter, 2012), less school engagement (Shonk & Cicchetti, 2001), and lower test scores and grades (Wolpow, Johnson, Hertel, & Kincaid, 2009). Furthermore, trauma affected children are often mislabeled or misdiagnosed with attention deficit disorder, conduct disorder, or other diagnoses. When children are mislabeled, it can prevent them from receiving interventions that address trauma as the root cause (Walkey & Cox, 2013). A trauma-informed school community is one that works to understand and educate its members

on how trauma affects child development, and engages in best practices to help children heal from their trauma.

Programs that seek to build a trauma-informed school may intervene at multiple levels. For example, school social workers and other staff can be trained to engage in trauma-informed practices. Examples of these practices include being emotionally present and having patience when students act out, and recognizing problematic behaviors as a response to trauma (Crosby, 2015). Trauma-informed practices may also include school staff demonstrating how to have positive interactions and relationships with other people in the school community. At the setting-level, schools can use a trauma lens when developing student policies and procedures, especially around suspensions and expulsions. For example, schools may use intervention strategies such as crisis teams and de-escalation tactics, rather than punitive policies that rely on immediate suspension or expulsion (Crosby, 2015; Champine, Matlin, Strambler, & Tebes, 2018). Collectively, a trauma-informed approach has potential to influence all dimensions of school climate.

School Climate: Empirical Findings

To date, researchers have studied school climate using a range of measurement and methodological approaches (Voight & Hanson, 2012). The lack of consistency in how school climate is measured makes it difficult to reach a consensus about how school climate is associated with or impacts student and school outcomes. For example, in some cases school climate is examined as a single construct without attention to whether and how specific dimensions of school climate are distinctly related to student and school outcomes. Even in cases where the dimensions of school

climate are parsed out, there is variability in how these dimensions are defined and assessed. Also, most studies use reports from a single group (students, teachers, administrators, parents) (Berkowitz, Moore, Astor, & Benbenishty, Wang & Degol, 2016).

School climate may be thought of as an individual's perception of their school (individual-level), or alternatively as a characteristic of an entire school (setting-level). The current school climate literature is dominated by individual-level studies of perceived school climate, rather than setting-level studies. For purposes of ease in the current study, the terms "perceived school climate" and "school climate" will be used interchangeably to denote individual-level studies of school climate. "Setting-level" or "school-level" studies of school climate will be specified when applicable.

There are unique advantages and disadvantages to studying school climate at either level. For example, variation in student perceptions of school climate in a given school may predict within-school variation in student psychological functioning and academic outcomes. Conversely, aggregated data allows examination of whether school climate is related, across schools, to student psychological functioning and academic outcomes. It may also help to determine how schools compare with one another (between school variance), and how school climate may change at the setting-level, within a given school, or across schools over time. It may also allow greater confidence in drawing inferences of causality - for example, that higher levels of school climate lead to more positive student outcomes, rather than the opposite possibility that students who are better adjusted simply perceive a more positive school climate. Still, while setting-level data have important utility, it may mask

variability within schools. Indeed, there are several examples of school climate research at the setting-level where there is more variability in perceptions within schools than between schools (Brand, et al., 2003; Hung, Luebbe, & Flaspohler, 2015; Malone, Cornell, & Shukla, 2017). Hung et al. (2015) posit that these within school differences may be indicative of variations at smaller units within schools, such as classrooms, grades, or subgroups of youth.

The school climate literature is vast. In general, systematic reviews find that school climate is associated with positive academic and psychosocial outcomes, including academic achievement and motivation, pro-social behaviors, risk-taking behaviors, and mental health (Aldridge & McChesney, 2018; Cohen et al., 2013). However, drawing causal inferences is problematic since the majority of school climate research included in these reviews is at the individual level of analysis, and is cross-sectional and non-experimental (Voight & Hanson, 2017). The majority of research to date is focused on climate within elementary school settings; however, middle and high school settings have received more attention in the past decade. The research findings presented below are selected from a larger review of 50 relevant studies that were: in English, focused on middle or junior high school as the primary sample (unless it was a large-scale study with a nationally representative sample across all grades), and focused on school climate, including the relation between school climate and student outcomes or school climate perceptions among different subgroups. None of the 50 reviewed studies to date has empirically examined the school improvement process as a *dimension* of school climate. In some studies, the school climate data were collected as part of a longer-term school, district, or

citywide strategy to intervene and evaluate on issues related to school climate.

However, for the purposes of this review, only four of the five dimensions will be discussed (safety, teaching and learning, interpersonal relationships, institutional environment).

The individual studies described in the current review were selected because they were determined to have the most robust research designs and were most aligned (in measurement and method) with the current study. The first section of the review includes a summary of the empirical work that utilized global composite and global non-composite measures of school climate, without attention to the differential impact of school climate dimensions on student outcomes. In the current review, *global studies* are defined as those in which the school climate instrument used was composed of items that reflect more than one dimension of school climate, but where dimensions/subscales were not examined separately in relation to student outcomes. Global studies appeared to come in two forms. In some cases, the author *explicitly* and/or *systematically* incorporated items from each school climate dimension; these studies will be considered as *global composite* studies for the purposes of the current review. On the other hand, some authors did not explicitly or systematically devise a measure that covers multiple dimensions of school climate. In these cases, items from one dimension may be over-represented in the school climate measure. These studies will be referred to as *global non-composite* studies.

Following this, studies that examined school climate dimensions (*dimensional studies*) in relation to student outcomes will be summarized. The school climate dimensions that were examined in these studies did not always correspond the four

dimensions that are now considered central to the school climate concept (safety, teaching and learning, interpersonal relationships, institutional environment).

However, information about how they may be aligned with the four dimensions of interest will be discussed. When applicable, descriptive information about whether the focus was within-school or between-school variation is included. At the end of the school climate section, findings specific to demographic differences (gender, race and ethnicity) are described.

School climate: global studies. Among the studies that examined school climate in relation to student outcomes, about 40% (12) utilized only global measures of school climate, and another 3 studies examined both global school climate and two or more individual dimensions. Global studies were most likely to include items aligned with the interpersonal relationships dimension (14 studies), teaching and learning dimension (10 studies), and safety dimension (10 studies). They were less likely to include items from institutional environment dimension (3 studies). Among the 15 total studies, 7 were global composite studies and 8 were global non-composite studies. Among these 15 studies, 6 were individual-level cross-sectional, 4 were individual-level longitudinal, 1 was setting-level cross-sectional, 1 was setting-level longitudinal, and 3 were both individual/setting-level cross-sectional studies. However, two of the five longitudinal studies had short time intervals (less than a year). Studies examined either academic (3 studies) or psychosocial (10 studies) outcomes, and a few examined both (2 studies). The relations of global measures of school climate to academic and psychosocial outcomes are separately reviewed below.

Academic achievement as outcome. School climate has gained nationwide attention because of its theorized potential to close the achievement gap and positively impact students' academic outcomes. Of the 5 global studies that examined academic outcomes, 3 found a consistent positive relation between school climate and one or more academic achievement outcomes (i.e. standardized test scores, GPA, grades). These three studies include a setting-level cross-sectional study (1), a setting-level longitudinal study (1), and an individual-level cross-sectional study (1). The fourth study included both individual and setting-level analyses and found positive relation only at the individual-level, but not at the setting-level, and the fifth study did not find a positive relation.

Maxwell (2016) investigated the relations between school climate, student attendance, and academic achievement. The setting-level cross-sectional study included a sample of 236 middle schools across all five boroughs of New York City (N= 144,000 students). School climate was examined at one time point using a composite measure from subscales representing safety ($\alpha = .97$), teaching and learning (academic expectations; $\alpha = .95$), and interpersonal relationships (communication, respect; $\alpha = .90$, $\alpha = .97$, respectively) dimensions. No information was included about the validity of the measure. The findings showed that higher ratings of setting-level school climate predicted lower absenteeism, which in turn, predicted higher standardized test scores.

In the setting-level longitudinal study, Voight & Hanson (2017) examined the relation between school-level school climate and academic performance using 7th grade student data from nearly 1,000 California middle schools. The goal of the study

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was twofold: 1) to examine whether California middle schools with a more positive school climate at the school-level had greater levels of academic achievement, and 2) to determine how academic performance improved as school climate improved. The school climate measure was developed using an exploratory factor analyses to identify six first-order factors (safety and connectedness, caring relationships with adults, meaningful student participation, substance use at school, bullying and discrimination, and student delinquency). The authors stated that these subscales had adequate school-level reliability and predictive validity. A confirmatory factor analysis was then used to assess the appropriateness of a global composite climate measure that was a function of the six first-order factors. The global measure of school climate with items from the aforementioned subscales reflected safety, teaching and learning, and interpersonal relationships dimensions. The authors found evidence that schools with a more positive climate had higher average academic performance, and that school-level changes in school climate were related to concurrent changes in academic performance across one year, in two different academic years (2004-2005 and 2010-2011).

In contrast, Hopson, Schiller, & Lawson (2014) reported mixed findings in their cross-sectional individual and setting-level study that examined the effects of school climate on grades. The data came from the School Success Profile (SSP) study (Bowen, Rose, Bowen, 2005) that included 37,354 middle and high school students from 318 schools in seven states. Hopson and colleagues (2014) only included middle school students in their analysis, which resulted in 13,068 students representing 43 schools in four states. Their global non-composite measure of school climate included

items aligned with the interpersonal relationships and safety dimensions, and scores were calculated at both the individual and school-levels. SSP scales have demonstrated strong reliability and validity (Bowen et al., 2005), however, no information on reliability and validity specific to the middle school sample used in this analysis was presented. At the individual-level, students who perceived a more positive school climate earned higher grades. However, this pattern did not hold true at the school-level.

Summary. Together, these global studies suggest that a more positive school climate is associated with better academic outcomes at the individual and school-levels, both at a single time point as well as over time. However, it is unclear based on these study findings whether these findings would apply universally across subgroups of students (by gender or race). In addition to academic outcomes, studies have investigated the relation between school climate and psychosocial and behavioral outcomes, potentially important contributors to academic outcomes, as well as important aspects of the student experience in their own right.

Psychosocial and behavioral adjustment as outcomes. Schools can play a large role in promoting mental health and well-being. Of the 12 global studies reviewed that examined such outcomes, all 12 found a positive relation between school climate and one or more psychosocial or behavioral adjustment outcomes. Five of the twelve were individual-level cross-sectional studies, 4 were individual-level longitudinal studies, and the other 3 were cross-sectional studies that included both individual and setting-level analyses, Of the latter 3 studies, 2 found positive

relation only at the individual-level, but not at the setting-level, and the third found a positive relations at both the individual and setting-levels.

In one of the individual and setting-level cross-sectional studies, Van Eck, Johnson, & Bettencourt (2017) examined the relation between school climate and chronic absence. The full sample included students (89% African American) from 121 schools from grades 6 through 12 in a large public school system in an urban area. Although the sample included middle and high school students, the authors factored in the grade range (middle versus high school) into the analysis. The total middle school sample included 70 middle schools, and the number of students in each school ranged from 77 to 1199 students. The school climate measure was a composite measure made up of several subscales (perceptions of safety, value placed on academics, school connectedness, learning environment, school resources, parental involvement, and physical environment), which reflect the safety, teaching and learning, interpersonal relationships, and institutional environment dimensions. Internal consistency of the subscales ranged from $\alpha = .61$ to $\alpha = .88$). The authors conducted a multilevel latent profile analysis (MLPA) to identify school climate profiles at the individual and school-levels. At the student level, three climate profiles emerged (positive, moderate, negative), which displayed two distinct climate groups at the school-level (marginal and challenged). The authors found that students in schools with a “positive” climate attended schools with lower chronic absence rates compared to “moderate” and “negative” climate schools. This pattern held at the school-level, where “climate challenged” schools had significantly higher chronic absence than “marginal climate” schools.

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In one of the individual-level cross-sectional studies, Kuperminc, Leadbeater, Emmons & Blatt (1997) examined the relation between students' perceptions of school climate, student behavioral problems (externalizing problems), and emotional distress (internalizing problems) in one middle school, and how these relations may differ by gender and race (African American, Hispanic). The data were from 499 6th and 7th grade students from a large middle school in a metropolitan school district in New York State. Perceived school climate was measured using a well-validated and reliable scale ($\alpha = .92$) developed by Haynes and colleagues (1993). The global scale used to measure school climate included items representing safety, interpersonal relationships, and teaching and learning, but not institutional environment or the school improvement process. A series of multiple regressions were run separately for boys and girls. Among boys, there was an overall inverse relation between school climate perceptions and externalizing problems, internalizing problems, and discipline referrals, such that, more positive school climate perceptions were related to fewer externalizing and internalizing problems, and fewer referrals. Among girls, there was an overall inverse relation between school climate perceptions and externalizing problems, but not for internalizing problems and discipline referrals. Most notably, the authors found that perceptions of school climate accounted for 16% of externalizing problems among boys, but only accounted for 2% for girls. However, school climate only accounted for 2% of internalizing problems among boys, and was not significant for girls. Moreover, the authors found that when African American boys had more positive perceptions of school climate, they had fewer discipline

referrals. This pattern did not hold true for African American girls, or Hispanic boys and girls.

Longitudinal studies (individual level) have also provided insight into the relations between school climate and psychosocial and behavioral adjustment. Kuperminc, Leadbeater, & Blatt (2001) examined whether baseline perceptions of school climate were related to psychosocial problems among middle school students one year later. Participants were 460 6th and 7th grade students attending a large public middle school in New York State, who completed a baseline survey and a follow-up survey one year later. The perceived school climate measure was the same as described in the study above by Kuperminc et al. (1997). The authors found that when students had positive perceptions of their school (defined as being clean and orderly, where students are treated fairly, and relationships are positive), they did not show the same increases in internalizing and externalizing problems over the course of the year as students who perceived a negative school climate.

There is little research on the association between school climate and pro-social behaviors. However, one longitudinal study investigated how school climate and school connectedness relate to civic engagement behaviors among middle school youth of color (Guillaume, Jagers & Rivas-Drake, 2015). The sample consisted of 232 students from middle schools in the Midwest who self-identified as African American, Multiracial or Mixed, Latinx, Asian American or Pacific Islander, Other, or Native American. There was no information on how many schools the students were sampled from. The authors used a global 6-item measure of school climate with items primarily within the interpersonal relationships and teaching and learning dimensions.

The measure was reliable ($\alpha = .92$), but there was no information on the validity of the measure. The authors found support for their mediation model, such that, a positive school climate at time 1 was associated with greater levels of school connectedness (at time 1), which in turn was associated with civic engagement behaviors (at time 2, which was six months after time 1).

Multiple studies have examined whether school climate moderates the relation between victimization and psychosocial and behavioral student outcomes (Birkett, Espelage, & Koenig, 2009; Dumas, Midgett, & Johnston, 2017; Yang, Sharkey, Chen & Dowdy 2018). A multiple-level cross-sectional study by Yang and colleagues (2018) explored individual and school-level moderating effects of school climate in the association between bullying victimization and student emotional, cognitive, and behavioral engagement in school. The study was from a larger study where the full sample consisted of 25,896 students (4th to 12th grade) from 114 public schools in the state of Delaware. The middle school sample included 26 schools, representing 9,535 students. Although the full study included more than middle school students, the authors provided separate findings for each grade level (elementary, middle, and high school). The findings presented below were for middle schools. School climate was assessed using a modified version of the 2014 Delaware School Climate Survey-Student (DSCS-S; Bear et al., 2011, 2014). The overall school climate score was generated using six lower-order factors (teacher-student relationships, student-student relationships, fairness of rules, clarity of expectations, school safety, and respect for diversity), which represent the safety, teaching and learning, and interpersonal relationships dimensions from the current study. For middle school students, the

school climate scale was found to be reliable ($\alpha = .92$). As predicted, the authors found that students in schools with higher ratings of school climate had greater levels of student engagement. At the school-level, however, authors unexpectedly found that students' emotional and cognitive-behavioral engagement was inversely related to victimization in schools to a greater extent in schools with a more positive school climate compared to those with more negative school climates. In other words, at the school-level, a positive school climate did not have a protective effect in the relation between victimization and student engagement. As the authors explained, it may be that students in schools perceived as supportive are more negatively impacted by bullying, because victimization in these contexts is unexpected.

Students who identify as LGBTQ are particularly vulnerable because of the high levels of bullying and victimization they experience in school. In an individual-level, cross-sectional study Birkett et al. (2009) examined the relation between school climate and negative outcomes (drug use, depression, suicidality) among LGB and questioning middle school students. The sample included 7,376 7th and 8th grade students from a large Midwestern county. The global, non-composite measure was an eight-item scale with items that represented the teaching and learning and interpersonal relationships dimensions. The scale had an acceptable alpha ($\alpha = .78$). The authors found evidence that school climate moderated the relation between homophobic victimization and substance use among LGB and questioning students. Another study by Dumas, Midgett, & Johnston (2017) replicated these findings in a student sample not specific to LGB and questioning students. Participants (N= 256 middle school students) were from selected schools in a district in the Northwest. The

school climate measure was a global non-composite measure with 10 items primarily within the safety and interpersonal relationships dimensions. The internal consistency of the scale was adequate ($\alpha = .77$). The study found that victimization was a risk factor for substance use, but the impact of victimization on substance use was buffered by a positive school climate.

Summary. Despite the variability in research design and how school climate is measured, these data provide initial evidence that a positive school climate, utilizing a global measure of school climate, is associated with a range of psychosocial and behavioral adjustment outcomes, in addition to academic outcomes. The majority of these studies did not include analyses by subgroup (by gender or race), however, the limited evidence suggests that school climate perceptions may play a greater role for the psychosocial outcomes of boys than girls (Kuperminc et al., 1997) However, given the multidimensional nature of the school climate construct, questions remain about what aspects of school climate are most strongly associated with student outcomes. As such, studies that examined the relation between individual school climate dimensions and student outcomes are discussed next.

School climate: studies by dimension. Based on literature reviews, scholars agree that school climate is a multi-dimensional and multi-level construct that contributes to student outcomes. In addition to studying school climate globally, the relation between specific school climate dimensions and student outcomes has been of interest because it provides guidance on the specific aspects of the school environment that could be the focus of interventions to improve student outcomes.

Among the research reviewed, 30 studies examined the relation between one or more individual school climate dimensions and student outcomes (three of these studies also examined school climate globally). An additional 8 studies explored perceptions of school climate dimensions in relation to other factors such as grade configuration (Kim, Schwartz, Cappella, & Seidman, 2014; Malone, Cornell, & Shukla, 2017), school transitions (Madjar & Cohen-Malayev, 2016), cultural differences (Bear & Chen, 2018) alignment between student and teacher experiences (Conderman, Walker, Neto, & Kackar-Cam, 2013; Rinehart & Espelage, 2015) and whether there are school-level patterns of school climate (De Pedro, Gilreath, & Berkowitz, 2016). Among the 30 studies that examined school climate dimensions in relation to academic and psychosocial student outcomes, 12 were individual-level cross-sectional, 12 were individual-level longitudinal, 1 setting-level cross-sectional, 3 setting-level longitudinal, and 2 were individual/setting-level cross-sectional. These 30 studies examined either academic (4 studies) or psychosocial (22 studies) outcomes, and a few examined both (4 studies).

While recent reviews (Thapa, et al., 2013; Wang & Degol, 2016) suggest that school climate comprises five dimensions (safety, teaching and learning, interpersonal relationships, institutional environment, the school improvement process), the dimensions identified in previous literature vary between studies. However, as detailed below, many of the school climate factors or dimensions in the reviewed studies are aligned with the dimensions investigated for the current study. The 30 dimensional studies were more likely to include scales that aligned with the interpersonal relationships dimension (29 studies), safety dimension (21 studies), and

teaching and learning dimension (17 studies). They were less likely to include scales aligned with the institutional environment dimension (3 studies). The relations of dimensions of school climate to academic and psychosocial outcomes are separately reviewed below.

Academic achievement as outcome. Overall, the literature suggests that factors within the *interpersonal relationships, teaching and learning, and safety* dimensions are most strongly associated with academic achievement. Of the 7 studies reviewed that examined interpersonal relationships and academic achievement, 6 found a positive relation, whereas only 1 did not. Similarly, all 5 of the studies that examined teaching and learning and its relation to academic achievement found a positive relation. Finally, of the 6 studies that examined safety and its relation to academic outcomes, 4 found a positive relation, and 2 studies had mixed results.

Brand and colleagues (2003) longitudinally examined the relations between school-level climate dimensions (teacher support, consistency and clarity of rules and expectations, student commitment and achievement orientation, negative peer interactions, positive peer interactions, disciplinary harshness, student input in decision-making, instructional innovation/relevance, support for cultural pluralism, and safety problems) and a range of academic, psychosocial, and behavioral outcomes. These dimensions reflect the safety, teaching and learning, and interpersonal relationships dimensions in the current study. The subscales relevant to these dimensions had acceptable to good levels of internal consistency (ranging from $\alpha = .70$ to $\alpha = .81$). The study included 105,000 students in 188 schools located in two states. There were a number of school dimensions that were consistently,

longitudinally, related to students' academic adjustment. Specifically, commitment to academic achievement, teacher support, structure, instructional innovation (within the teaching and learning dimension), and positive peer interactions (within the interpersonal relationships dimension), and to a lesser extent student participation in decision making, support for cultural pluralism, and less use of disciplinary harshness, were associated with better grades and more positive levels of academic aspirations and efficacy. The most powerful predictor of school-level differences in students' academic achievement in all three years was student commitment to academic achievement (teaching and learning). Two other teaching and learning factors (instructional innovation and teacher support) were the second and third strongest predictors. In contrast, positive peer interactions had less of an effect in all three years of the study compared to these teaching and learning factors, and safety was only a significant predictor in year 3 of the study.

In another school-level longitudinal study Brand and colleagues (2008) examined the extent to which school-level teacher ratings of six school climate dimensions (peer sensitivity, disruptiveness, teacher-pupil interactions, achievement orientation, support for cultural pluralism, and safety) relate to students' later academic achievement. The longitudinal study involved three cohorts with 114 middle schools in the Year 1 cohort, 240 middle schools in the Year 2 cohort, and 243 middle schools in the Year 3 cohort from two states. The Inventory of School Climate-Student (ISC-S; Brand et al., 2003) was used to assess school climate, and each subscale has been found to have high levels of reliability and to correlate with indexes of student adjustment. The subscales showed moderate to high levels of

internal consistency (peer sensitivity, $\alpha=.84$; disruptiveness; $\alpha=.86$; teacher–pupil interactions; $\alpha=.76$; achievement orientation; $\alpha=.84$), support for cultural pluralism; $\alpha=.78$; and safety problems, $\alpha=.57$). The three climate dimensions that were significantly related with academic achievement were achievement orientation (teaching and learning), peer sensitivity (interpersonal relationships), and safety. However, achievement orientation was most consistently and robustly related to student achievement on several measures of academic adjustment, compared to the other two dimensions. For example, school-level effect sizes of academic orientation on GPA were higher across all three years of the study compared to peer sensitivity. Safety was only significantly related to grades in Year 2 of the study.

In a school-level cross-sectional study of 132 public elementary, middle, and high schools in the State of Delaware, Bear, Yang, Pell, & Gaskins (2014) examined the association of seven school climate subscales with academic achievement. The study included teacher reports for grades K-12, however, analyses for elementary, middle, and high schools were conducted separately, and only middle school results are presented below. The middle school sample included 1,230 6th through 8th grade teachers. There was satisfactory internal consistency for each of the subscales (teacher-student relations, student-student relations, teacher-home communication, school safety, clarity of expectations, fairness of rules, and support for diversity) in the middle school sample, which ranged from .80 to .90 (median $\alpha=.90$). Further, there was evidence of concurrent validity for the seven subscales. School-level scores on each subscale were positively and significantly correlated with student academic achievement in middle school ($r=0.35\text{--}0.75$) and negatively and significantly

correlated with school suspensions and expulsions in middle school ($r = -0.47$ to -0.72). The findings showed that when students are in schools where students support and care for one another, then students have higher levels of academic achievement. Student relations factor (interpersonal relationships) was the most highly correlated with English language arts (ELA) and Math scores ($r = 0.73$ and $r = 0.75$, respectively). However school safety (ELA, $r = 0.67$; Math, $r = 0.70$) and teacher clarity of expectations (ELA, $r = 0.50$, Math, $r = 0.52$) aligned with the teaching and learning dimension, were also positively correlated with academic outcomes.

In an individual-level cross-sectional study, Jia and colleagues (2009) explored American and Chinese 7th grade students' perceptions of three dimensions of school climate from five public middle schools in New York City ($N=709$). The school climate measure was a revised 25-item version of two school climate measures, which have good reliability and validity (Brand et al., 2003; Emmons, Haynes, & Corner, 2002). The measure assessed three dimensions of school climate, including teacher support, student-student support, and opportunities for autonomy in the classroom. These dimensions reflect the teaching and learning and interpersonal relationships dimensions as described in the current study. In Jia et al's (2009) middle school sample, each subscale demonstrated acceptable reliability (teacher support, $\alpha = .84$; student-student support, $\alpha = .82$; opportunities for autonomy in the classroom, $\alpha = .70$). Findings indicated that teacher and peer support (interpersonal relations dimension of school climate), were of equal magnitude in their relation to student GPA. On the other hand, opportunities for autonomy (which may be a factor within the teaching and learning dimension) had a negative association with GPA. According

to the authors, it may be that this particular factor within the teaching and learning dimension is negatively related with GPA, because more student autonomy in the classroom may reduce the time necessary for traditional teacher instruction in the classroom, which could negatively impact grades.

In another individual-level cross-sectional study, Hung, Elkund, & Cornell (2017) investigated how three school climate factors, student support (aligned with the interpersonal relationships dimension), disciplinary structure and academic expectations (aligned with teaching and learning dimensions) are associated with academic achievement (self-reported grades). The data were from a sample of 56,508 middle school students from 415 public schools in Virginia. The school climate measure had three subscales, all of which had acceptable to good levels of internal consistency (student support, $\alpha = .85$; disciplinary structure; $\alpha = .76$; academic expectations, $\alpha = .70$). The authors found that all school climate factors were independently associated with student reported GPA, with academic expectations ($B = .04$) having slightly more of an effect than student support ($B = .02$), when controlling for all other variables in the model.

Summary. The findings suggest that teaching and learning, interpersonal relationships, and safety dimensions of school climate are positive related to academic achievement. However, it appears as though teaching and learning and interpersonal relationships may be more influential for academic adjustment compared to the safety dimension. The next section summarizes findings of the patterns of relation between school climate dimensions and psychosocial and behavioral adjustment indicators.

Psychosocial and behavioral adjustment as outcomes. Like the findings for academic achievement, the research points to the *interpersonal relationships, teaching and learning, and safety* school climate dimensions as being associated with psychosocial and behavioral outcomes. Specifically, 23 of 26 (88.5%) of the studies reviewed examined the interpersonal relationships dimension, 9 of 11 (81.8%) of studies examined the teaching and learning dimension, and 11 of 17 (64.7%) of the studies investigated the safety dimension support this relation.

Across studies, the psychosocial and behavioral outcomes examined with respect to school climate dimensions vary greatly, including psychopathology and mental health (Hendron & Kearney, 2016; Lester & Cross, 2016; Loukas & Murphy, 2007; Way, Reddy, & Rhodes, 2007), school satisfaction (Samdal, Nutbeam, Wold, & Kannas, 1998; Zullig, Huebner, & Patton, 2011), problem behaviors and relational aggression (Batanova & Loukas, 2016; Hung, et al., 2015; Wang, 2009; Wang & Dishion, 2012;), life satisfaction (Suldo, Thalji-Raitano, Hasemeyer, Gelley, & Hoy, 2013), bullying victimization (Gage, Prykanowski, & Larson, 2014), and pro-social behaviors such as community engagement (Pérez-Gualdrón & Helms, 2017) and bystander responses to bullying (Ferrás & Selman, 2014; Syvertsen, Flanagan & Stout, 2009).

In addition to academic achievement (reviewed above), Brand et al.'s (2003) study longitudinally examined the relation between school climate dimensions and psychosocial and behavioral adjustment outcomes. As detailed above, the school climate dimensions measured reflect the safety, teaching and learning, and interpersonal relationships dimensions in the current study. In terms of psychosocial

and behavioral adjustment outcomes, instructional innovation, teacher support, and student commitment to achievement (which fall under the teaching and learning dimension), peer interactions (which aligns with the interpersonal relationships dimension), and safety were consistently, longitudinally related to self-esteem, depression, smoking, drinking, and drug use. Specifically, lower levels of depression were found in schools in which students reported higher levels of support from their teacher, positive peer interactions, and lower levels of safety problems. The most consistent predictor of students' behavioral adjustment (smoking, drinking, and drug use) across schools was negative peer interactions. This is consistent with the fact that in middle school, students may face bullying or challenges fitting in and they may also initiate risky behaviors such as drinking or drug use (Hurd et al., 2018).

Way and colleagues' (2007) individual-level longitudinal study explored how students' perceptions of four dimensions of school climate (teacher support, peer support, opportunities for autonomy in the classroom, and consistency of school rules and regulations) were associated with changes in psychological and behavioral adjustment. The dimensions are aligned with the interpersonal relationships and teaching and learning dimensions in the current study. The individual-level longitudinal study, which included 1,451 middle school students from 22 schools located in the Midwest, examined the directionality of effect between each dimension and self-esteem, depressive symptoms, and behavioral problems. All variables were measured across three consecutive years (from the start to the end of middle school). Perceived school climate was measured using The Perceived School Climate Scale, which has been found to be a valid and reliable measure of school climate (Brand et

al., 2003). Way et al. found that each subscale at each of the three time points had acceptable to good levels of internal consistency, except one time point for clarity and consistency in school rules (teacher support, ranged from $\alpha = .74$ to $\alpha = .79$; peer support, ranged from $\alpha = .70$ to $\alpha = .82$; opportunities for student autonomy ranged from $\alpha = .70$ to $\alpha = .75$; clarity and consistency in school rules ranged from $\alpha = .65$ to $\alpha = .82$). The authors found that the influence of teacher and peer support on depressive symptoms, and the influence of peer support and student autonomy on self-esteem were unidirectional. In other words, it was students' perceptions of their interpersonal relationships with peers that predicted students' subsequent adjustment, rather than adjustment predicting their perception of interpersonal relationships with peers. Similarly, as students perceived declines in their opportunities for autonomy in the classroom, they reported decreases in self-esteem.

An individual-level longitudinal study by Wang and Dishion (2012) examined whether student perceptions of four dimensions of school climate were associated with changes in adolescents' problem behavior. Students from eight middle schools in one school district in the Northwest United States were followed for three years, from 6th through 8th grade. A total of 937 students completed all three waves of data collection. School climate perceptions were assessed using items from Dishion and Stormshak's (2002) School Climate Measure. It included four subscales including academic support, school behavior management, teacher social support, and peer social support (reflecting teaching and learning and interpersonal relationships dimensions). Previous research has found adequate levels of internal consistency and convergent and discriminant validity for the measure among middle school students

(Wang, Selman, Dishion, & Stormshak, 2010). The authors found that adolescents who perceived declines in all four school climate factors engaged in increased problem behaviors over the course of the three years. The findings suggest that perceptions of factors within the teaching and learning and interpersonal relationships dimensions change over time, and that these changes are associated with behavioral outcomes. However, it is unclear from the findings presented about which of the school climate dimensions contributed more or less to change in problem behaviors.

Lester and Cross' (2015) individual-level longitudinal study examined the relation between school climate dimensions and students' mental and emotional well-being. The sample included 1,800 students from 11 middle schools in Western Australia, and data were collected in four waves (from 2005 to 2007). The social climate measure was developed and adapted from previous measures that examined four different school climate dimensions, including teacher connectedness (teacher connectedness scale, Resnick et al., 1997), connectedness to school (school connectedness scale, Resnick et al., 1997), peer support (perceptions of peer social support scale, Ladd, Kochenderfer, & Coleman, 1996) and safety (peer relations questionnaire, Rigby & Slee, 1998). A single item was used to represent the safety dimension, but the other subscales had good internal consistency (teacher connectedness, $\alpha = .81$; connectedness to school, $\alpha = .80$; peer support, $\alpha = .88$). These dimensions were examined during the transition from elementary school through their first two years of middle school. These dimensions are aligned with the teaching and learning, interpersonal relationships, and safety dimensions described for the current study. Consistent with what was hypothesized, peer support, school

connectedness, and safety were significant predictors of mental and emotional well-being after the first year of middle school. However, compared to the teaching and learning factor, interpersonal relationships (a sense of connectedness at school) and safety (feeling safe at school) were the most protective factors of mental and emotional well-being.

Hung et al. (2015) tested the relations between three school climate factors (authoritative structure, student order, and student support) and emotional problems, conduct problems, and peer victimization at one time point. The study included 2,212 middle school students enrolled at ten schools located in a Midwestern metropolitan area. School climate perceptions were measured using 36 items from a measure from the Collaborative for Academic, Social, and Emotional Learning (CASEL) toolkit. CASEL originally developed the measure from adapting items from other existing measures. Hung and colleagues (2015) conducted an EFA to explore the underlying factor structure of perceived school climate items, which resulted in three factors: authoritative structure ($\alpha = .86$), student order ($\alpha = .68$) and, and student support ($\alpha = .65$). When included in the same regression model, the three school climate factors explained 7% of the variance of emotional problems, 13% of conduct problems and 7% of victimization. Interestingly, and slightly in contrast to previous findings, student support (the interpersonal dimension of school climate) did not uniquely predict subsequent adjustment, whereas the authoritative structure and student order factors (the teaching and learning dimension) uniquely predicted emotional and conduct problems, as well as victimization.

Student school and life satisfaction represent additional psychological outcomes of interest to researchers and practitioners. Zullig, Huebner, and Patton (2011) explored the relations between school climate dimensions and school satisfaction. Their individual-level cross-sectional study included a total of 2,049 6th through 12th grade students from three school districts in one Midwestern state. Although the sample included more than middle school students, the authors controlled for age in their analysis. Their school climate measure included 8 subscales (positive student–teacher relationships, school connectedness, academic support, order and discipline, school physical environment, school social environment, perceived exclusion/privilege, and academic satisfaction), and reliability ranged from $\alpha = .65$ to $\alpha = .91$ for the scales. Together, all school climate variables accounted for 34% of the variance in school satisfaction. After controlling for age and GPA, five of the eight school climate factors were related to school satisfaction. The teaching and learning factor, academic support accounted for the most variance in school satisfaction, followed by order and discipline (safety dimension), and school connectedness (interpersonal relationships). This was one of the few studies that included the school's physical environment (institutional environment dimension), however, it did not make a unique significant contribution to school satisfaction after accounting for the other school climate factors.

Finally, Suldo and colleagues (2013) study explored to what extent students' perceptions of school climate were associated with adolescents' life satisfaction at one time point. Participants were from one suburban middle school in the Southeastern United States (N = 461 students). School climate perceptions were measured using

the School Climate Survey-Revised, Middle School Version (SCS-MS; Haynes, Emmons, Ben-Avie, Joyner, & Comer, 2001). In previous research, the SCS-MS has demonstrated internal consistency and has been correlated with student outcomes in the expected direction among middle school students. There are a total of six dimensions in the measure: fairness, order and discipline, parent involvement, sharing of resources, student interpersonal relations, and student-teacher relations. In Suldo et al.'s (2013) study, internal consistency for each factor ranged from as low as $\alpha = .65$ for the order and discipline subscale to $\alpha = .88$ for the student-teacher relations subscale. All school climate subscales together accounted for 14% of the variance in students' life satisfaction. Student interpersonal relations and order and discipline (safety dimension) both emerged as uniquely associated with greater life satisfaction. However, student interpersonal relations was a stronger predictor of life satisfaction compared to order and discipline.

Summary. The evidence to date suggests that factors within the interpersonal relationships, teaching and learning, and safety dimensions of school climate relate to student outcomes. Together, the findings suggest that the teaching and learning and interpersonal relationships dimensions may be most strongly associated with academic, psychosocial, and behavioral outcomes; however, factors within the safety dimension also appear to be an important contributor. Overall, the findings regarding which dimensions contribute most to psychosocial outcomes are mixed. Some studies point to the interpersonal relationships dimensions as the best predictor of these outcomes, whereas others find that the teaching and learning dimension is more predictive of psychosocial outcomes. It appears that the safety dimension may also

predict students' psychosocial adjustment, but not to the extent that the interpersonal relationships and teaching and learning dimensions do. Very little is known about the relative contribution of the institutional environment dimension on these outcomes. More research is needed on how these individual dimensions relate to academic and psychological, and behavioral adjustment to better understand their unique contributions. Furthermore, additional research is needed to understand the pathways through which school climate dimensions influence both academic and psychological outcomes. The current study addressed these gaps in the literature.

Race, Ethnicity, and Gender Findings

Race, ethnicity, and gender are complex social constructs that are important to consider when exploring student perceptions of school climate and academic achievement. Race involves the classification of individuals or groups based on physical characteristics and ethnicity involves a state of belonging to a social group based on nationality or cultural tradition. Gender refers to a range of characteristics that pertain to masculinity or femininity, which may be defined by factors within the social context and biological sex (male, female, intersex). At all ecological levels, race, ethnicity, and gender – individually or in combination - can play a role in how systems in society operate. This can directly or indirectly influence settings, as well as individuals' lived experience. The current study included individual race, ethnicity, and gender as moderators as a first step in exploring how these factors may relate to school climate, school valuing, and academic achievement. However, the inclusion of these variables cannot alone capture the historical, multi-level, interrelated, and

dynamic nature of these constructs and their influence on youth of varying race, ethnicity and gender.

The studies presented in this review thus far, with a few exceptions, have been inclusive of students from a range of backgrounds and geographic locations, without specific attention to the role of demographic factors (gender, race, ethnicity, socioeconomic status) as they relate to school climate and academic and adjustment outcomes. Across the 50 studies reviewed, 8 examined gender as a moderator of school climate effects on student outcomes, with 6 studies exploring the role of racial differences in the relation between school climate and student outcomes. An additional 2 studies compared the experiences of American and Chinese students (Bear & Chen, 2018; Jia, et al., 2009), and 3 studies included samples that were fully or mostly comprised of youth of color (Guillaume, et al., 2015; Pérez-Gualdrón & Helms, 2017; Van Eck et al., 2017). The limited research on how race and ethnicity and gender function with respect to the relation between school climate and student outcomes is explored next.

Race and ethnicity. Most studies that examine school climate and student outcomes to date have not examined the way race and ethnicity relate to school valuing and academic achievement. However, it is important to examine this because students from diverse racial and ethnic backgrounds may have different experiences in school, which can influence their perception of school climate, motivation and school valuing, and subsequent academic achievement. For example, Voight, Hanson, O'Malley, & Adekanye (2015) investigated whether there were any racial gaps in perceptions of school climate dimensions (safety and connectedness, adult-student

relationships, and opportunities for meaningful participation). The authors found that Black and Hispanic middle school students had less favorable ratings of all three dimensions compared to White students. One explanation for this may be the differential treatment youth of color receive from teachers and administrators. Indeed, there has been increased attention to disproportionate punitive treatment among Black and Latinx students within the classroom. This phenomenon is known as the “school to prison pipeline,” where minor student infractions have led a disproportionate amount of students of color into the criminal justice system. For example, in Kuperminc et al’s (1997) study, African American boys were more likely to be perceived as disruptive compared to White boys and girls, and African American girls had higher discipline referrals relative to White boys and girls. Moreover, because of deep-rooted biases and stereotypes, students’ bad behavior may be perceived differently based on race. For example, Black boys may be more likely to be perceived as a “classroom terror,” “malevolent,” or “unsalvageable” whereas White boys may only be viewed as “naughty” (Dancy, 2014; Ferguson, 2000). Moreover, students of color may experience explicit or implicit forms of racism, such as microaggressions, which could influence their school experience or sense of belonging.

In Brand et al.’s (2003) setting-level longitudinal study that examined whether contributions of each school climate dimension on students’ outcomes differed between White and racial minority students, the most notable finding was that schools that were rated as having high levels of support for cultural pluralism (within the interpersonal relationships dimension) were schools in which students also exhibited

higher levels of academic, psychosocial, and behavioral adjustment across the three time points. This relation was true even after the effect of student SES was taken into account. Across all student outcomes, the relations between the support for cultural pluralism and indicators of academic, psychosocial, and behavioral adjustment were weaker for White students. The support for cultural pluralism school climate factor was the only subscale that exhibited this differential relation between minority and Whites students across all cohorts. Significant differences between White and racial minority students in the other school climate subscales did not hold across all three cohorts. The findings suggest that it is particularly impactful for students of color when teachers and students value the diverse background of members of their school community.

Relatedly, Camacho, Medina, Rivas-Drake, and Jagers (2018) examined the longitudinal and reciprocal relation between school climate dimensions (support for cultural pluralism and teacher supportiveness) and ethnic-racial identity (ERI) development. Among both White students and students of color, exploration and resolution of racial identity has been linked with several positive outcomes, such as greater academic engagement and self-esteem (Miller-Cotto & Byrnes, 2016; Rivas-Drake et al., 2014). The study sample included 491 self-identified Black, Latinx, and White youth in one middle school in the Midwest. The authors found that perceived support for cultural pluralism and teacher supportiveness predicted greater exploration and resolution of racial identity for White, Black, and Latinx students.

Previous research has shown that the perception of dimensions of school climate, such as positive interpersonal relationships or perceived fairness in treatment

by teachers, may relate to the differential levels of school valuing, self-efficacy, motivation, and academic performance among youth of color. Specifically, research shows that youth of color who perceive a lack of support in school (from teachers or peers) due to their racial background are at greater risk for lower academic adjustment than their White peers (Brittian & Gray, 2014; Mattison & Aber, 2007; Roeser, Eccles, & Sameroff, 2000). One prominent idea that explains why youth of color are particularly impacted by negative experiences in school is *academic disidentification*, which refers to a phenomenon in which a student's academic performance does not impact one's academic self-concept (Cokley, 2002). As such, academic disidentification has been studied as one possible explanation for the achievement gap, which refers to the disparity in academic performance between students of color and White students in the United States. Indeed, research shows that Black students, particularly African American male students, are vulnerable to academic disidentification (Cokley, 2002; Cokley, McClain, Jones, & Johnson, 2011). Scholars have posited several possible explanations for why Black students are at greater risk for academic disidentification, including stereotype threat. Stereotype threat is defined as a situation where individuals feel at risk of conforming to stereotypes about their social group (Steele, 1997). As it relates to academic disidentification, Black students may devalue their academics because they perceive that other members of the school, such as teachers or their peers, believe their racial group fares poorly in school (Crocker & Major, 1989; Major & Schmader, 1998). Indeed, Steele (1997) found that among Black students, academic disidentification is utilized as a coping strategy to protect against stereotype threat in school. However,

chronic academic disidentification can lead to devaluing academics, which has been linked to lower grades and school dropout (Osborne, 1999; Steele, 1997).

In general, there is clear evidence that students from different racial and ethnic backgrounds may experience school differently. However, aside from support for cultural pluralism (within the interpersonal relations dimension), there is a paucity of research on whether and how the differential experience of school climate dimensions, by race and ethnicity, is associated with student outcomes. The current study addresses this question by including race/ethnicity as a moderator in the relation between school climate and academic achievement.

Gender. The findings regarding gender differences in the relation of school climate to student outcomes are mixed. On one hand, a few studies find that there were no gender differences in the association between school climate and academic and psychological outcomes (Jia et al., 2009; Zullig et al., 2011). A third study (Wang & Dishion, 2012) examined whether changes in student perceptions of school climate were associated with problem behavior and found that most of the significant associations between school climate dimensions and problem behavior were consistent across gender. The only exception to this was related to peer social support; across both genders, adolescents who experienced decreased peer social support had increased problem behaviors, but this effect was stronger for girls than boys.

Among studies that did find gender differences in the relation between school climate and student outcomes, findings are not consistent. As detailed in the review above, Kuperminc and colleagues (1997) found that the effect of school climate perceptions on internalizing problems, externalizing problems, and discipline referrals

was stronger for boys than for girls. Similarly, Hendron and Kearney's (2016) study model linking school climate to internalizing and externalizing problems applied better to boy students compared to girl students. In contrast, Loukas and Murphy (2007) examined four aspects of school climate (friction, cohesion, competition among students, and satisfaction with classes) and subsequent conduct problems. The authors found that perceived satisfaction in classes (teaching and learning dimension) acted as a protective factor for subsequent conduct problems only among girl students.

The mixed findings regarding gender differences are replicated in the literature focused on Black students' perception of school climate and academic adjustment. While most studies show that Black boys may be at higher risk of academic disengagement and academic devaluing because of negative school experiences, Oyserman and colleagues (2001) argue that in fact Black girls academics may suffer more when they have negative experiences in school, because they are more concerned with relationships than boys. Together, these findings suggest that there may be gender differences in the relation between school climate and student outcomes. However, more research is needed to better understand the patterns in these relations.

Summary. As demonstrated by this review of available research, there is a well-established relation between school climate factors and student outcomes. There is mixed evidence about whether these relation function differently by race and gender. In addition to the academic and psychosocial outcomes explored above, school climate may also relate to students' valuing of school. In the current study,

academic achievement will be the student outcome of focus, and school valuing will be examined as the mediating variable between school climate and academic achievement. The next section describes school valuing and its association with school climate dimensions and academic achievement, respectively.

School Valuing: Empirical Findings

For decades, scholars have been interested in why some students engage in school, while others do not. Student engagement has been theorized to encompass three components: behavioral engagement (school attendance and student conduct), cognitive engagement (student effort in learning tasks), and emotional engagement (enjoyment, interest, and valuing of school). One aspect of the emotional engagement component of student engagement is *school valuing*. School valuing refers to the degree to which students are interested in and value education and school tasks. It is described as a motivation-related factor that is important to students' academic success (Niehaus, Irvin, & Rogelberg, 2016). Indeed, if students value school, they may be more likely to invest their time and energy into it. On the other hand, if students do not value school work or do not identify how it applies to their lives or future, they may disengage from their academics and school. In the scholarly literature, school valuing has been termed "valuing of schooling," "valuing of school work," and "academic valuing."

Although the "student engagement" literature is vast, the empirical work on school valuing is limited. Previous reliable and valid measures of school valuing assess students' interest in school and belief that school is important and valuable in their lives and future. For example, Wang, Willett, and Eccles (2011) conducted a

confirmatory factor analyses on student engagement items from the Maryland Adolescent Development in Context Study (MADICS), which resulted in a 5-item factor structure for the school valuing construct. Example items include “I often learn a lot from my schoolwork,” “Schooling is not so important for kids like me,” and “I have to do well in school if I want to be a success in life.” Voelkl (1996) developed the Identification with School (ISQ) scale which assesses students’ emotional engagement in school. The scale measured student belonging and school valuing. School valuing was assessed using a 7-item measure, which included items such as “school is more important than most people think,” “most of the things we learn in class are useless,” and “I can get a good job even if my grades are bad.” Martin (2009) developed the Motivation and Engagement scale (MES) to assess student engagement based on cognitive dimensions (including *school valuing*), behavioral dimensions, maladaptive cognitive dimensions, and maladaptive behavioral dimensions. One of the items on the 4-item valuing school subscale is “learning at school is important.” Wigfield and Eccles (2000) expectancy-value model of achievement provides one framework to understand the relationship between school valuing and academic achievement. The model proposes that students’ academic related choices, and thus their academic achievement, is determined by two primary factors: expectancies for success (efficacy) and subjective task values (the importance, utility, or usefulness ascribed to a certain task). Subjective task value includes an individual’s intrinsic values and utility values. Utility value refers to extrinsic reasons for doing a specific task, such as how useful a task will be for a future goal. One type of utility value examined in the literature is school valuing.

Using the expectancy-value model as a guiding framework, Wigfield and colleagues (2000) hypothesize that these factors may both directly influence achievement decisions and indirectly influence achievement by influencing student effort or persistence. Further, these factors may be influenced by contextual variables such as school climate, or cognitive variables such as individual perception of previous experiences. Consistent with the model, school valuing has been associated with future educational aspirations (Irvin, Meece, Byun, Yong, Farmer, & Hutchins, 2011; Litalien, Morin, & McInerney, 2017) and classroom behavioral engagement (Niehaus, et al., 2016). The relation between school climate and school valuing, and school climate and academic achievement are elucidated in the next section. Since there is a paucity of research about school valuing, the findings below are not limited to middle school students.

School Climate and School Valuing

As described previously, perceptions of school climate appear to influence students' academic and psychological adjustment. However, less is known about the mechanisms through which school climate impacts these outcomes. One promising mediating variable of the relation between school climate and student academic and psychological adjustment is school valuing. The research to date on the relation between school climate and school valuing examines two dimension of school climate (primarily interpersonal relationships or teaching and learning). No studies were found that specifically investigated the relations between safety or institutional environment and school valuing.

Wang and Eccles' (2013) longitudinal study examined the relations between middle school students' perceptions of the school environment (structure support, provision of choice, teaching for relevance, teacher and peer emotional support, which reflect the *teaching and learning* and *interpersonal relations* dimensions of school climate), school valuing in 7th grade, and school engagement at the end of 8th grade. Previous research had established that the four subscales of school environment had good levels of internal consistency and displayed predictive and criterion validity. The sample included 1039 middle school students, who were surveyed in early 7th grade and again at the end of their 8th grade year. The authors hypothesized that student perceptions of school climate would directly and indirectly predict the level of school engagement through school valuing. The authors found support for this hypothesis and concluded that a school environment that facilitates positive relationships and where teachers provide meaningful opportunities to learn and support students' personal goals and interests (teaching and learning) promotes student engagement through its influence on students' school valuing.

The relation between positive interpersonal relationships and school valuing is supported by other studies (Eccles & Midgely, 1989; Ganotice & King, 2014; Hamm, Lambert, Agger, & Farmer, 2013). Ganotice and King (2014) examined how positive peer influence and teacher support predicted students' school valuing (as well as other indicators of academic engagement and achievement). The sample included 1,694 high school students from four schools in the Philippines. Positive peer influence was positively related to school valuing, and negative peer influence was negatively correlated with school valuing. Although teacher support was also positively related

to school valuing, peer effects were more strongly associated with school valuing. Hamm and colleagues' (2013) study provide additional insight into the relation between positive peer relationships and school valuing by investigating whether a sustained network of peers that favor effort and achievement in middle school influences school valuing over the course of a year. The study included 103 predominantly African American boys from three schools in a rural community in the southern region of the United States. The authors found that boys who maintained an affiliation with a group of peers that favored effort and achievement maintained a greater sense of school valuing than their peers who did not sustain this affiliation over the course of one school year. In summary, studies suggest that positive interpersonal relationships in school are important to students' sense of school valuing, and specifically, being a part of a peer group that values effort and achievement appears important to school valuing.

In addition to interpersonal relationships, the relation between the teaching and learning dimension of school climate and school valuing has been explored in the literature (Strambler & Weinstein, 2010; Ulmanen, Soini, Pietarinen, & Pyhältö, 2016; Wentzel, Muenks, McNeish, & Russell, 2017). Strambler and Weinstein (2010) examined the relations between negative feedback from teachers and academic valuing and devaluing. The authors hypothesized that after controlling for prior academic achievement differences, students that report greater negative feedback would be less likely to value academics. The sample consisted of 111 predominantly African American and Latinx K-5 students. Consistent with their hypothesis, the authors found that higher perceived negative teacher feedback was associated with

higher devaluing of academics. Wentzel and colleagues (2017) explored whether student consensus concerning teacher support in the classroom predicted school valuing after controlling for individual perceptions of support, sex, and grade level. The sample consisted of 169 middle school and 71 high school students from the mid-Atlantic region. The findings showed that at the classroom level, teacher emotional support and teacher values positively predicted individual-level school valuing.

Summary

Overall, the findings suggest that a more positive school climate predicts students' school valuing. Evidence points to the interpersonal relationships and teaching and learning dimensions as particularly influential to school valuing. Ultimately, school valuing is of interest to scholars because it is a factor related to students' motivation and identity that is theorized to be influential for students' academic achievement. The next section summarizes the scholarship on the relation between school valuing and academic achievement.

School Valuing and Academic Achievement

The relation between school valuing and academic achievement has been established in the literature (Brickman, Mcinerney, & Martin, 2009; Hardre & Hennessey, 2010; Martin & Steinbeck, 2017). When students perceive school as useful and important, it can increase their engagement and effort in school (Wigfield & Eccles, 2000). Martin and Steinbeck (2017) explored whether motivation at baseline (comprised of self-efficacy and school valuing subscales) predicted subsequent academic achievement (self and parent reported grades) a year later. The sample consisted of 342 students (ages 10 to 15 years old) from two cities in New

South Wales, Australia. Consistent with their hypothesis, the authors found that valuing of school at baseline positively predicted academic achievement a year later. Relatedly, Brickman and colleagues (2009) were interested in whether school valuing related to GPA among a subgroup of American Indian (i.e., Native American, Indigenous) students. The authors investigated whether school valuing was a predictor of GPA. The sample included 108 8th to 12th grade students at a K-12 boarding school within a Tribal National in the Midwest United States. The findings supported the authors' hypothesis that school valuing predicted GPA.

Summary. Previous studies have established the relation between school valuing and academic achievement. Likewise, there is a large body of work that supports the relation between positive school climate and academic achievement. However, a question remains about whether school climate influences academic outcomes *through* school valuing. Although no work to date examines the meditational role of school valuing in the relation between all four dimensions of school climate (safety, interpersonal relationships, teaching and learning, and institutional environment) and academic achievement, a few studies have examined the mediating role of concepts aligned with school valuing in the relation between school climate and academic outcomes.

The Relation between School Climate, School Valuing, and Academic Achievement

Although it has not been extensively studied, previous work has examined the relation between school climate, school valuing, and academic outcomes (Faircloth & Hamm, 2005; Fan & Dempsey, 2017; Goodenow, 1993a; Wentzel et al., 2017). The

Wang and Eccles (2013) study cited above examined the mediational role of school valuing in the relation between school climate and student engagement. However, there was no study found that investigated the mediational role of school valuing in the relation between school climate and academic outcomes. Fan and Dempsey's (2017) study explored the mediating role of school motivation (self-efficacy and intrinsic motivation) in linking perceived school climate and academic achievement. Although the authors did not measure school valuing as a subscale, it has been conceptualized as an aspect of academic motivation in other studies (Brickman et al., 2009; Martin & Steinbeck, 2013; Wang & Eccles, 2013; Wentzel et al., 2017). Thus, although the study does not examine school valuing as a mediator, it helps to elucidate the relation between an aligned school motivation factor, school climate, and academic achievement (math and reading scores). The sample was gathered from the Educational Longitudinal Study (ELS, 2002) and consisted of 14,639 10th graders. School climate was measured by assessing students' perceptions of 1) order/safety/discipline, 2) fairness/clarity of school rules, and 3) teacher-student relationships, which reflect the safety and interpersonal relations dimensions of school climate. Each school climate subscale yielded adequate to good reliability ($\alpha = .67$ to $\alpha = .73$). The authors found that both school motivation variables (self-efficacy and intrinsic motivation) mediated the relation between teacher student relationships and math and reading achievement, as well as the relation between perceived fairness and clarity of school rules and math and reading achievement. Intrinsic motivation (but not self-efficacy) mediated the relation between safety and math and reading achievement. The authors concluded that these findings suggest that

strategies seeking to improve school climate without considering students' motivations, beliefs, and interests may be incomplete. Consistent with this study, the current study will explore whether school valuing helps to explain the pathway that links school climate dimensions to academic achievement.

Directionality of relationships. Consistent with the expectancy value theory of achievement (Wigfield et al, 2000), the current study examined whether school climate influenced academic achievement via the student engagement construct, school valuing. The idea behind this theory, and others like it, suggest that if changes are made in a student's environment, then their attitudes and behaviors would change as a result, ultimately influencing students' learning and achievement. However, questions remain about the directionality of these relationships, and the interplay between student's perceptions of their school environment and student engagement. It may be argued, for example, that students who inherently value and engage in school may perceive school more positively, and that increasing school valuing will influence more positive perceptions of school climate.

While the majority of research has examined the ways in which the environment influences student outcomes, a few studies examined the bi-directional or reciprocal relationships between aspects of school climate and student engagement (Patall et al., 2018; Ruzek & Schenke, 2019; Skinner & Belmont, 1993). For example, Patall and colleagues (2018) examined the relations between student perceptions of high school science teacher practices that support student autonomy and student motivation and engagement through a 6-week classroom-based diary study. The study included 208 high school students in 41 classes across eight public

high schools in the Southwest United States. Consistent with their hypotheses, the authors found that teacher daily support of autonomy in various forms (choice provision, consideration for student preferences and interests, rationale for the importance of tasks, and question opportunities) predicted changes in daily student motivation and engagement. The authors were also interested in the reciprocal effects of student beliefs about teacher practices and student motivation and engagement. However, given the lack of research examining the effects of student motivation and engagement on perception of teacher strategies, the authors made no hypotheses about how these constructs may interact. Ultimately, the authors did find evidence for reciprocal effects. Student motivation and engagement did predict changes in student perceptions of their teachers supportive strategies. This finding was consistent with other studies (Skinner & Belmont, 1993), that suggest when students are motivated and engaged, teachers are perceived to respond in positive ways, such as using supportive practices, and that the use of these supportive practices then reciprocally influences student engagement and motivation.

Similarly, previous research has found that there are dynamic and reciprocal relationships between peer relationships and school engagement (including school valuing) over time. Wang and colleagues (2018) examined to what extent peer influence and selection processes play a role in school engagement in a sample of 1419 adolescents across two study waves (10th and 11 grade). The authors found that students who are less likely to value school may seek out peers with negative feelings towards school, which in turn, decreased school valuing.

In summary, theory (Bronfenbrenner, 1974, 1977) and empirical work suggest that the relationship between school climate and school valuing is likely bidirectional. However, there is little empirical work that examines the influence of student school valuing on school climate. While the current study restricted focus to examining school valuing, school climate, and academic achievement, it is recognized that school climate itself may be affected by other observed and unobserved variables (such as school valuing). As discussed later, future longitudinal work with more than two waves of data should consider examining these reciprocal effects.

Summary. Taken together, studies suggest that school climate, school climate, and achievement are related. Yet, more evidence is needed to understand whether school valuing is, in fact, a mechanism of change between school climate dimensions and student achievement, and if is the case for some demographic subgroups more than others. Moreover, there is very little research on the relations between safety and institutional environment, school valuing, and academic achievement. The current research will move beyond looking at interpersonal relations and teaching and learning dimensions to investigate the range of dimensions that may influence academic achievement.

Changing school climate as a mechanism to improve student outcomes is widely viewed as a worthy goal. Consequently, scholars and practitioners have developed a range of strategies, programs, and interventions to improve aspects of school climate with the goal of subsequent improvements in student outcomes. The next section briefly summarizes the research and evaluation evidence on effective practices and programs to improve student outcomes by improving aspects of school

climate. The review focuses on social-emotional learning programs and interventions to build a trauma-informed community, given their relevance to the current research context. As described further below, the school in which this study is taking place - and the community in which the school is situated - are undergoing concurrent SEL and trauma-informed interventions. Although the current study will not be focused on evaluating the effectiveness of these interventions, understanding the ways in which these programs relate to school climate provides important context for the current study.

Practices and Programs to Improve School Climate

Transforming school climate requires a comprehensive approach, because school climate is multidimensional, multi-level, and involves a large group of diverse stakeholders with varying interests and needs. Given that each school is unique, there is no single standardized practice, program, or intervention that has been developed to improve school climate. Rather, government and national educational organizations have endorsed broad strategies for schools to consider when addressing negative school climate issues. Some examples of these strategies include: convening a school climate team led by school administrators, collecting school climate data to obtain a detailed understanding of what the school needs are in terms of school climate, engaging students and parents in the process of improving school climate, reviewing and revising discipline policies, and planning and selecting interventions to address student needs within a specific school context (American Federation of Teachers, n.d.; Youth.gov, 2018).

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

Interventions to address school climate may target the whole school (students, teachers, administrators) and/or specific groups (students with more specialized needs, teachers). The Positive Behavioral Interventions and Supports (PBIS) is one program that has a multi-tiered strategy that includes universal (whole school) and selected (specific to individual students or groups) components to improve school climate. The school-wide intervention involves the school articulating positive behavioral expectations and providing incentives to students who meet those expectations. It also involves an on-going data collection process to monitor the school improvement process at the teacher and administrator levels. One 5-year group-randomized control trial examined the effect of PBIS on schools' climate in Maryland elementary schools (Bradshaw, Koth, Thornton, & Leaf, 2009). Twenty-one (21) schools were randomized to the intervention condition, and 16 were assigned to the comparison condition. School climate was measured using a validated and reliable measure of elementary school organizational health (The Organizational Health Inventory for Elementary Schools (OHI, Hoy & Feldman, 1987) and reflected the interpersonal relationships and teaching and learning dimensions of school climate. Data were collected from school staff from the intervention and control conditions (N=2,596) over the five years. The analyses revealed significant effects of PBIS on the overall school climate of intervention schools compared to the control schools after three years. Notably, schools that had a more negative school climate at baseline appeared to benefit most from the model.

Programs may also focus on outcomes that reflect one or more dimensions of school climate. For example, interventions to address violence prevention or school

bullying may address the dimension of school safety but not school climate as a whole. Indeed, Jiménez-Barbero and colleagues (2016) conducted a meta-analysis of 14 anti-bullying programs (N = 30,934 adolescents) to assess the efficacy of these interventions on bullying or school violence frequency, school victimization frequency, and school climate. The results showed moderate effect sizes for bullying frequency and school victimization frequency, but no significant improvement was observed for school climate. However, only 3 of the 14 studies included in the meta-analysis included school climate as an outcome. The results suggest that anti-bullying may target aspects of the school safety dimension, but may not impact school climate as a whole.

Other models to change school climate utilize a promotion, rather than prevention approach. Student voice programs that engage youth in the process of school improvement may be one such example. A case study by Voight (2015) describes a student voice initiative that aimed to change school climate through youth organizing and strengthening collaboration between teachers and students. Moreover, the author predicted that students would become more socially and emotionally competent as a result of this engagement. The study took place in one middle school in the Southeastern United States. Three teams of between six to eight students were involved in the student voice initiative, which took place across one academic year (2010 - 2011). Multiple types of data were collected as part of the single case design study, including participant observation, interviews with students and staff, program documentation, and surveys that asked about student perceptions of school climate. The research design did not allow for causal explanations, but based on the data

gathered, there is initial evidence to suggest that there were school climate improvements during the implementation of the student voice initiative.

SEL and trauma-informed programs are two other types of interventions that have been implemented to improve aspects of school climate. Although universal school-based SEL interventions are theorized to change factors at multiple levels, studies have largely examined the impact of these programs on individual student behavior change and skills rather than the impact on school climate (Durlak, Weissberg, Dymnicki, & Schellinger, 2011). However, two studies have explored whether school climate moderates, or mediates, the relation between SEL program involvement and student outcomes (McCormick, O'Connor, Cappella, & McClowry, 2015; Stalker, Wu, Evans, & Smokowski, 2018).

McCormick and colleagues (2015) examined whether three dimensions of school climate moderated the impacts of the INSIGHTS SEL program on students' psychosocial and academic outcomes among elementary school students. The program involves students participating in classroom curricula aimed at enhancing empathy, and training parents and teachers to implement temperament-based behavioral management strategies. The randomized trial of the program took place in 22 public elementary schools in New York City, with 120 teacher and 435 student participants. The school climate dimensions used as moderators in the study were leadership, accountability, and safety/respect (aligned with teaching and learning and safety dimensions of the current study). Reliability for the three subscales ranged from $\alpha = .90$ to $\alpha = .94$. The authors found that the three dimensions of school climate did moderate the relation between the program and student math and reading

achievement. Program impacts were larger for schools with lower baseline scores in the three climate dimensions, suggesting that the program may be more beneficial for schools that have a more negative school climate to begin with.

Another longitudinal study used structural equation modeling to examine whether an SEL program for middle and high school students called Positive Action (PA) was associated with psychosocial outcomes (alcohol use, aggression, depression, and anxiety) and explored whether school climate was the mechanism of change (Stalker et al., 2018). The PA program intervenes at the student-level, with students receiving a curriculum focused on displaying positive behavior. The study sample included 8,333 students from 38 public middle- and high-schools in two counties in North Carolina. Students in one county received the program, while students in the other county did not. Findings from the indirect effects analyses revealed that increased participation in PA was indirectly associated with decreased alcohol use, aggression, depression, and anxiety through school climate, suggesting that school climate was the mechanism of change between the program and student outcomes.

The other interventions relevant to the current study are programs to build a trauma-informed school and community. Interventions to build trauma sensitive communities involve a range of practices and may include building awareness among all members of the school to recognize and respond to trauma, and providing high quality therapeutic services to students with trauma symptoms. To date, there does not appear to be any empirical studies that examine the impact of a trauma-informed program on school climate or student outcomes. However, there are examples of models for trauma-informed approaches in schools in the published literature

(Anderson, Blitz, & Saastamoinen, 2015; Blitz & Lee, 2015). These approaches typically involve professional development workshops for school staff and administration. These efforts seek to help staff recognize how trauma can manifest as negative student behaviors and how the responses of adult staff in school can trigger trauma responses among students. For example, a teacher's authoritative voice may trigger a "fight, flight, or freeze" response if a student associates the tone with violent experiences. A needs assessment by Anderson and colleagues (2015) found that student trauma not only affects the student exposed to traumatic experiences, but it may also negatively effect other students, school staff, and school climate (from the perspective of teachers).

At the student level, an SEL intervention may be used as a lever to build a trauma-informed community. Students who experience trauma may not have the vocabulary or skills to express their experiences, and as a result, may be more likely to internalize or externalize fear, anger, and aggression. SEL seeks to help students better identify and connect their experiences with their thoughts, feelings, sensations, and reactions, so they are able to better cope when they are triggered. As such, the delivery of an SEL intervention combined with building a trauma-informed community seeks to provide a safe space for students who experience trauma, while also increasing students' knowledge and ability to cope within and outside of the school context.

Summary

Although the empirical evidence is limited, a few studies have shown the impact of school-based programs on improving school climate. The findings suggest

that school SEL interventions may influence student outcomes through changing school climate. However, less is known about how trauma-informed approaches impact school climate or student outcomes. SEL and trauma-informed approaches suggest that improvements can be made to environments, such as schools, to enhance well-being. This notion is consistent with theoretical frameworks within the field of community psychology, which help to explain the mechanisms through which environments can influence wellness.

Community Psychology Theoretical Frameworks for School Climate

Since its origin as a field, community psychology has been concerned with addressing social problems through theory development, research, and practice. In community psychology, a several prominent theories or frameworks provide guidance for understanding the mechanisms through which a positive school climate can impact student well-being: Ecological Systems Theory (Bronfenbrenner, 1974, 1977), Person-Environment Fit Theory (Rappaport, 1977), and the School Climate Framework (Moos, 1976). In line with the current study, the assumption underlying these theories is that social environments can exercise significant influence over their members.

Ecological Systems Theory

Urie Bronfenbrenner's ecological systems theory (1974, 1977) is an important framework in the field of community psychology, as it calls attention to the fact that individuals exist in and are influenced by multi-level contexts. The theory suggests that environmental factors impact developmental processes and outcomes, and as such, contextual factors may be intervened upon to improve individual wellness.

Bronfenbrenner first introduced the theory to explain differential child development outcomes, and it has subsequently been used as a framework for several school studies. In the current study, the ecological frame places focus on how microsystems (i.e. students direct contact with peers, teachers), mesosystem (i.e. interaction between teachers and parents), exosystem (i.e. teacher or staff perceptions of school climate, teacher professional development, school violence), and macrosystem (i.e. discipline policies, education related legislation), relate to student adjustment. The theory also emphasizes how social processes within each of these levels (student-teacher relationships, student-student relationships, classroom processes) are important to student academic and psychological outcomes. Consistent with ecological theory, the current study will examine how school factors at multiple levels, including social processes such as interpersonal relationships, relate to middle school student outcomes. As described below, although the school climate interventions were not the focus of the current study, the SEL and trauma-informed programs being implemented at the study site are interventions seeking to improve school and community climate by influencing factors at multiple levels.

Person-Environment Fit

Person-Environment fit theory, also known as P-E fit, is a foundational theory in community psychology. The theory, which traces its' origins to the field of industrial/ organizational psychology, proposes that if there is a lack of congruence between an individual's needs and their environment, then it may result in negative psychological and behavioral outcomes (Beasley, Jason, & Miller, 2011; Rappaport, 1977). This theory has been applied to examine a range of settings and individual

outcomes, including schools and their members. For example, according to P-E theory, if students feel unsupported in their needs to belong and have autonomy, it may influence their psychological and behavioral adjustment, including their motivation to attend and engage in school.

Moreover, as Eccles and colleagues (1993) emphasize, it is important to use P-E theory within a developmental framework when exploring the relation between school climate and student adjustment. They argue a developmental approach is important because it provides a framework to better define and understand student needs. As such, when determining what student needs are within the school context, teachers and administrators should view these needs (such as belonging or autonomy) within a developmental continuum. This means that rather than viewing student needs as static, student needs are best understood as dynamic and changeable.

Social Climate Framework

Based on Person-Environment Fit theory, Moos (1976) developed the social climate framework to understand how the ‘personality’ of an environment relates to an individual’s social-psychological adjustment. In numerous studies, Moos and colleagues (Moos & Moos, 1978, Moos & Trickett, 1973) assessed the psychological characteristics of a range of environments, such as workplaces, treatment centers, and classrooms. Moos’ framework is centered on three dimensions of the climate: 1) relationships, the cohesiveness and support students receive within the classroom, 2) personal development, the degree to which students can experience a sense of autonomy and growth in the classroom, and 3) the systems’ ability to maintain and change, which involves the structure of the classroom including organization and

clarity (Moos, 1976, Moos & Trickett, 1973). Numerous studies utilizing this framework have shown that student grades and absenteeism are related to classroom climate (Moos & Moos, 1978, Fraser, 1989).

Site of Study

Data for this study will be gathered from students at Pottstown Middle School, which is the only middle school in the Pottstown School District in Pennsylvania. The middle school is a 5th to 8th grade school, with approximately 900 students and 70 teachers. Details regarding student demographics are discussed below. The data collected for this study are part of a larger longitudinal mixed method evaluation of a K-12 social and emotional learning (SEL) program implemented in the larger school district conducted by The Consultation Center at Yale University and the Scattergood Foundation. The program is part of a multi-year initiative called the Pottstown Early Action for Kindergarten Readiness (PEAK), which seeks to enhance youth development and success. SEL implementation began in 2017 and is aligned with a larger community-wide intervention known as the Pottstown Trauma-Informed Community Connection (PTICC).

Pottstown Trauma-Informed Community Connection

PTICC is a coalition of teachers and school administrators, social, civic, and community service providers, law enforcement, healthcare organizations, and religious organizations who are collaborating to build a trauma-informed community in Pottstown, Pennsylvania. Roughly 22,000 reside in Pottstown. Most community members are working class.

The larger intervention (coalition development and implementation of the social-emotional learning curriculum in the schools) and evaluation originated in 2017 in response to community concerns that children were not prepared for school as a result of adverse childhood experiences (ACEs). Members of the community were interested in addressing these issues and reached out to the Scattergood Foundation to support their work to build a trauma-informed community. The objectives of the coalition – which included primarily representatives within the education and social service sectors - included: 1) to share knowledge and experiences related to trauma and trauma-informed care, 2) train members of the community to be trauma-informed, and 3) create a network of trauma-informed service providers.

In addition to the support of the Scattergood Foundation, the Kellogg Foundation supported 10 members of the Coalition to learn about social emotional learning, and it was discovered that the goals of social-emotional learning (SEL) at the student level aligned well with the larger objectives of the coalition, because the SEL curricula is designed to address the results or consequences of trauma at the student level. As a result, the coalition chose to adopt and implement an SEL curriculum as a universal prevention program within the schools (4 elementary schools, 1 middle school, 1 high school).

The Current Study: Aims and Hypotheses

The primary research aim of the study sought to answer the following research questions: 1) does school climate predict academic achievement? and 2) are school climate dimensions and academic achievement related via school valuing? The

secondary research aim addressed whether there was gender, racial, and ethnic differences in the relations between school climate, school valuing, and academic achievement. The hypotheses included for the primary and secondary research aims are discussed next.

Primary Research Aim

There were two research aims for this study, with four related hypotheses and four related exploratory analyses. The primary aim was to examine whether 1) school climate dimensions (assessed at time 1) were related to academic achievement (assessed at time 2) via school valuing (assessed at time 1). There were four hypotheses and two exploratory analyses related to the primary aim. The four hypotheses included:

H1: Each of the four dimensions of school climate (safety, interpersonal relationships, teaching and learning, and institutional environment) will be positively related to academic achievement among middle school students.

H2: Two of the four school climate dimensions (interpersonal relationships and teaching and learning) will be positively related to school valuing among middle school students.

H3: School valuing will be positively related to academic achievement.

H4: Two of the school climate dimensions (interpersonal relations and teaching and learning) will be positively and indirectly related to academic achievement via school valuing.

The study hypotheses are depicted visually in the following figure (Figure 1)

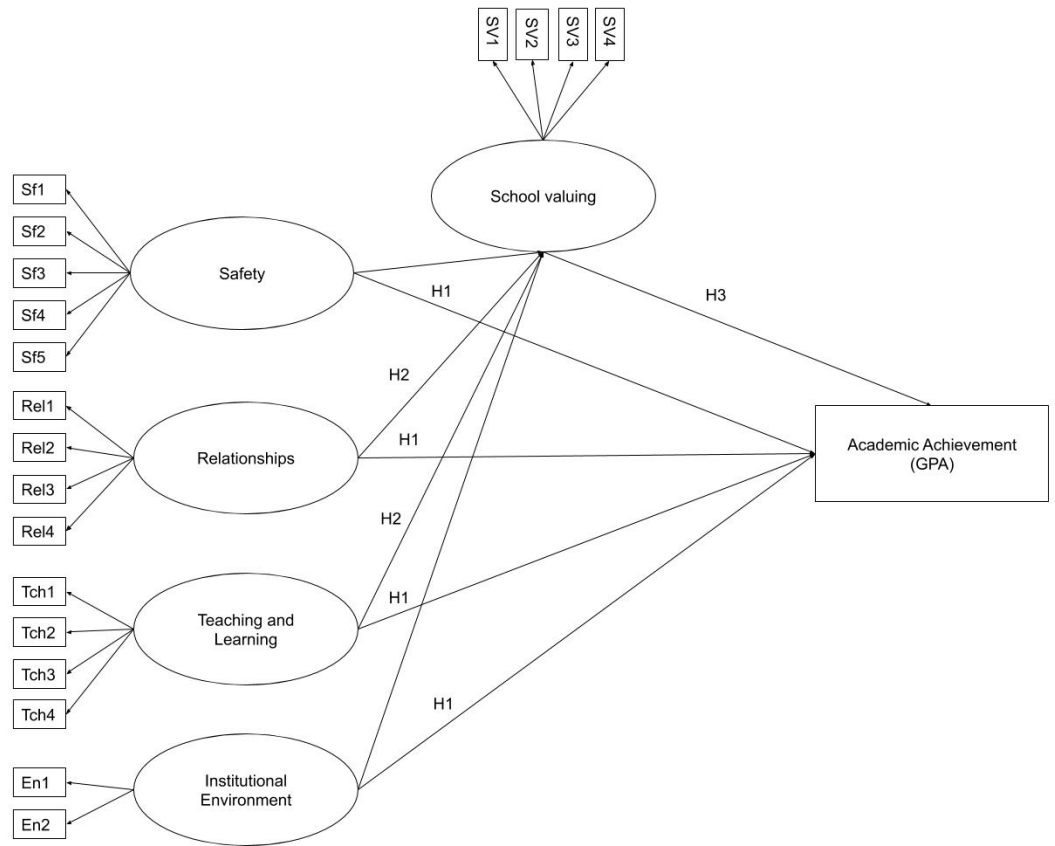


Figure 1. Hypothesized structural equation model (H4) model - School valuing as a mediating variable of the relations between school climate dimensions and academic achievement, after controlling for race and gender.

While the relation between the interpersonal relations and the teaching and learning dimensions of school climate and school valuing are well established in the literature, less is known about whether the school climate dimensions safety and institutional environment are significantly related to school valuing. Thus, hypotheses 2 and 4 only include the two school climate dimensions with a well-established

literature. Exploratory analyses for the other two school climate dimensions included examining whether:

EA1: Two school climate dimensions (safety and institutional environment) will be related to school valuing among middle school students.

EA2: Two of the school climate dimensions (safety and institutional environment) will be indirectly related to academic achievement via school valuing.

Secondary Research Aim

The literature suggests that the relations among school climate, school valuing, and academic achievement may not be uniform across gender and race/ethnicity. However, if significant relationships are found among any or all the school climate dimensions (safety, interpersonal relations, teaching and learning, and institutional environment), it is expected that these effects may differ based on students' demographic background. Consequently, a secondary research aim of the current study is to explore whether race/ethnicity and gender moderates the relations among school climate dimensions (assessed at time 1), school valuing (assessed at time 1), and academic achievement (assessed at time 2). There were two main exploratory analyses related to this second aim, including examining whether:

EA3: race/ethnicity will moderate any significant indirect effects (from H4 or EA2) found from the first aim (i.e. examine whether any indirect effects obtained are conditional on race/ethnicity).

EA4: gender will moderate any significant indirect effects (from H4 or EA2) found from the first aim (i.e. examine whether any indirect effects obtained are conditional on gender).

Direct relations between race/ethnicity and gender and each of the primary study variables will be examined. Secondly, all analyses presented above will be repeated for a secondary outcome measure, student attendance.

Method

Participants

In Spring 2018 (T1), school climate and school valuing data were collected as part of a larger evaluation study designed to examine the effectiveness of a Social and Emotional Learning (SEL) curriculum implemented in the Pottstown School District. The total number of fifth through eighth grade students that were on school rosters, and who were expected to be surveyed on the day of data collection (June 3, 2018) was 917 students. Among the 917 students on the rosters, 149 students were absent from school the day the surveys were administered, 18 students did not consent, and 5 students were not matched with a student identification number. This process yielded a total of 745 student surveys at T1. Among the 745 students who had T1 data, 650 were enrolled in the Pottstown School District by Spring 2019 (T2). Attrition was due to students transferring to another local education agency (LEA) in Pennsylvania ($n = 76$), students leaving the Pennsylvania public school system ($n = 12$) or transferring schools during the summer session ($n = 7$). Chi-square and t-tests revealed no significant differences in relevant T1 study variables (school climate, school valuing, grade, gender, and race and ethnicity) among the students who were no longer

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enrolled at T2 ($n = 95$) and students who were enrolled at T2 ($n = 650$).

The 650 students who were enrolled in T1 and T2 were retained as the sample for the analysis (Table 1). The sample was balanced in terms of gender (49.7% female, 50.3% male). In terms of race and ethnicity, participants were 35.1% Black/African American, 34.3% White, 16.5% Hispanic, 12.9% Multiracial, 0.9% Asian, 0.2% Native Hawaiian or Pacific Islander, and 0.2% American Indian/Alaskan Native. The grade distribution was even, with 24.0% in 5th grade, 25.7% in 6th grade, 26.3% in 7th grade, and 24.0% in 8th grade at T1. Nearly all (99.6%) of Pottstown Middle School students are eligible for free or reduced school lunch (NCES, 2016).

Table 1

Participants by Grade, Gender, Race and Ethnicity

	Frequency	Percent
Grade		
5	156	24.0%
6	167	25.7%
7	171	26.3%
8	156	24.0%
TOTAL	650	100.0%
Gender		
Male	323	50.3%
Female	327	49.7%
TOTAL	650	100.0%
Race/ethnicity		
Black/African American	228	34.3%
White	223	35.1%
Hispanic (any race)	107	16.5%
Multiracial/Other	92	14.2%
TOTAL	650	100%

Procedure

The current study utilized data from the Pottstown Trauma-informed

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Community Connection (PTICC) evaluation project. The larger intervention project is an effort by the Pottstown School District and has been supported by consultants from The Scattergood Foundation and The Consultation Center at Yale University.

Although SEL implementation began in 2017, student level school climate and school valuing data were first collected in May 2018.

Prior to the child's participation in the study, parental informed consent was obtained according to procedures set forth by the Yale University Institutional Review Board (IRB). Parents and guardians of Pottstown Middle school students were sent a passive consent letter in the mail. The letter informed them that their child would be receiving an annual survey in school as part of the district-wide effort to implement a social-emotional learning curriculum. Instructions and an enclosed statement were affixed to the letter, which allowed a parent or guardians to opt their child out of the study if desired. Contact information for the study PI from the Consultation Center at Yale University was also included in the letter (see Appendix A).

The Pottstown School District SEL survey was distributed via hardcopy survey in Pottstown Middle School students in a single school day (see Appendix B and C). Students in grade 5 received a slightly different survey than those in grades 6-8 (the item not included in the grade 5 survey is noted in Table 1). Members of the PTICC evaluation team from Scattergood Foundation and the Consultation Center at Yale were trained to administer the surveys in classrooms. Surveys were administered in every homeroom in middle school so that all students (in attendance that day) were included in the study. Trained members of the evaluation team were divided between homerooms and instructed on how to manage survey administration and coordinate

with the teacher to manage classroom dynamics. Each team member was provided a list of frequently asked questions that may be asked by students.

Upon the arrival to each classroom, members of the PTICC evaluation team read a standardized script aloud to introduce the survey. Students were informed that they could decline participation in the study at any time, and that there would be no penalties or negative consequences for declining participation in the study. They could choose to decline by marking an “X” on their survey where it asked “If you do NOT want to do the survey, check here and stop.” If they declined, they were asked to work quietly at their desk while other students completed the survey. When surveys were distributed, students were guided in how to answer two practice questions not relevant for the current study (e.g., “I like ice cream” (strongly agree to strongly disagree)), which were designed to assure students’ understanding of the survey design. If students had questions while they took the survey, they were instructed to raise their hands so that the survey administrator could answer their questions. After students completed the surveys, PTICC team members collected the completed surveys and proceeded to the next assigned classroom.

Variables

School climate and school valuing were assessed using measures included in the Panorama Student Survey (PSS, Panorama Education, 2015) in Spring 2018 (T1). The PSS is a free and open source survey developed by a team at the Harvard Graduate School of Education, directed by Dr. Hunter Gehlbach. The survey includes scales that can be used to assess the strengths and challenges of educational organizations. The PSS was developed through a six-step process (Gehlbach &

Brinkworth, 2011) which involved 1) conducting a literature review, 2) conducting interviews and focus groups which intended populations, 3) item creation, 4) expert review, 5) cognitive pre-testing, and 6) interviewing. Following this, large-scale pilot tests were conducted to assess the reliability and validity of the scales (Gehlbach & Brinkworth, 2011; Panorama Education, 2015). The large-scale pilot tests revealed that all the PSS scales were reliable and valid.

School climate. The PSS includes four separate subscales, one a global school climate measure, and other three assessing various aspects of school climate (school emotional climate, student teacher trust, and peer relationships). The global school climate subscale includes five items that correspond to multiple dimensions of school climate. In addition to this subscale, the PSS includes subscales assessing the specific dimensions of school emotional climate, student teacher trust, and peer relationships. All items are on a Likert scale ranging from 1-4 or 1-5, with different anchors for each item. Large-scale studies have shown that these PSS subscales are reliable and valid (Panorama Education, n.d.). The items in the four PSS subscales (school climate, school emotional climate, student teacher trust, and peer relationships) appear to reflect the various dimensions of school climate outlined in the literature (safety, interpersonal relationships, teaching and learning, and institutional environment, Table 2). However, because the subscales are constructed differently than the school climate dimensions in the literature, additional preliminary analysis was required to explore whether these items map on to the four school climate dimensions of interest: safety, interpersonal relationships, teaching and learning, and institutional environment.

Table 2

School Climate Items in PSS and Current Study

Variable Label	Item	PSS Subscale	Current Study Subscale
Safety1*	How much do the adults in your school care about how you feel?	Student-teacher relationships	Safety
Safety2*	How much do the adults in your school ask you about how you feel?	Student-teacher relationships	Safety
Safety3*	How often do the adults in your school help you feel better when you're unhappy?	Student-teacher relationships	Safety
Safety4	How much support do the adults at your school give you?	Sense of belonging	Safety
Safety5	I feel safe and comfortable with my teachers at this school.	Student-teacher trust	Safety
Rel1	How well do people at your school understand you as a person?	Sense of belonging	Relationships
Rel2	How much respect do students at your school show you?	Sense of belonging	Relationships
Rel3	Overall, how much do you feel like you belong at your school?	Sense of belonging	Relationships
Rel4	Most students at my school treat each other with respect.	Sense of belonging	Relationships
Teach1	When my teachers tell me not to do something, I know they have a good reason.	Student-teacher trust	Teaching
Teach2	My teachers will always listen to students' ideas.	Student-teacher trust	Teaching
Teach3	My teachers treat me with respect.	Student-teacher trust	Teaching
Teach4	How often do your teachers seem excited to be teaching your classes?	School climate	Teaching
Enviro1	How fair or unfair are the rules for the students at this school?	School climate	Institutional Environment
Enviro2	How positive or negative is the energy of the school?	School climate	Institutional Environment

*These items were aligned with this construct in the panorama student survey, but the item phrasing was slightly different than what is listed in the most current version of the panorama student survey (n.d.)

To address this, the current study utilized a structural equation model (SEM) approach to both test the measurement model and analyze the structural relationships between the latent constructs. The resulting school climate measure included four subscales: safety, interpersonal relationships, teaching and learning, and institutional environment. All school climate subscales except for institutional environment included items with different scale lengths, and as such, items were first standardized in SPSS 26 (IBM, 2018) to produce a standardized alpha coefficient to determine scale reliability. The *safety* subscale included five items, primarily asking about students' sense of emotional safety in the school, such as whether they feel safe and comfortable, whether teachers ask students how they feel, and how much help they receive when they are unhappy. The safety subscale exhibited good consistency (Std $\alpha = .81$). *Interpersonal relationships* consisted of four items which asked students about their sense of belonging in school and whether they are treated with respect. The resulting subscale had acceptable internal consistency (Std $\alpha = .71$). The third subscale, *teaching and learning*, included four items that asked about whether teachers listen to student ideas and whether teachers are excited to teach their classes. The subscale had an acceptable internal consistency (Std $\alpha = .77$). The final subscale, institutional environment, had two items that asked about how positive or negative the energy of the school is, and how fair the rules are at the school. Both items were measured on five-point scales. The resulting subscale demonstrated a poor level of internal consistency (Std $\alpha = .60$). The alpha coefficient may be low because the scale only consists of two items. Because institutional environment is the least measured dimension of school climate (Lewno-Dumdie, Mason, Hajovsky, Villeneuve, 2020;

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Wang & Degol, 2015), information on the reliability and validity of extant measures of this dimension is limited. Other than the institutional environment subscale, the levels of internal consistency for the school climate subscales are consistent with school climate measures (Voight & Hanson, 2012).

School valuing. The PSS includes a 4-item valuing of school subscale, which assesses the extent to which students feel that school is interesting, important, and useful to them. Participants indicate how interesting they find the things learned in class, how often they use ideas from their school in daily life, how much they see themselves as someone who appreciates school, and how useful they think school will be to them in the future. The items are on a Likert scale ranging from 1-4 with different anchors. The school valuing subscale had questionable levels of internal consistency (Std $\alpha = .67$, $\alpha = .67$). Although this alpha is less than .70 (which is considered an acceptable level of reliability), it is consistent with previous studies examining school valuing. According to Fredricks and McColskey (2012), reliability of student engagement measures, including school valuing subscales, range from .54 to .93. Studies utilizing similar measures such as the Identification with School Questionnaire (ISQ, Voelkl, 1996) or the Motivation and Engagement Scale (Martin, 2009) report reliabilities ranging from .54 to .87. Still, findings should be interpreted with caution in light of the fact that this measure has questionable reliability.

Academic achievement. Student level academic achievement was assessed using English language arts (ELA) and math grades from the 2018-2019 school year (T2). Student transcripts were provided to the PTICC evaluation team by the Pottstown School District as part of the larger SEL evaluation. Historically, academic

achievement has been measured through grades from student transcripts (Bowers, 2011; Hoge et al., 1990), standardized test scores (Bear et al., 2014; Hanson & Voight, 2017, Voight et al., 2015), and self-reported grades (Huang et al., 2017). For the purposes of this study, grades from transcripts will be utilized because only 8th grade students will have standardized test scores and transcript grades are more reliable than student-reported grades. Grade point average (GPA) across all subjects is not traditionally used as an outcome measure in middle school because it assumes that grades are comparable across subjects, courses, and instructors. This study spans 5th through 8th grade (T1) and 6th through 9th grade (T2). Consequently, there was expected to be variability in GPA due to the particular set of electives students choose to take. As such, and consistent with prior research, grades for two core subject areas (English and math) were a more appropriate measure of academic achievement than GPA (Lekholm & Cliffordson, 2008).

In previous studies, such as those from the National Center for Education Statistics (NCES, Ingles et al., 2004; Ingles et al., 2007) grades have been recoded to a 1 to 13 scale where 1 = A and 13 = F. In the Pottstown School District, middle and high school students are given a numerical value as their grade in lieu of the traditional course grades (i.e. F through A+). The grading scale for the 2018-2019 school year (T2) is as follows: 59 and below = F, 60-69 = D, 70-79 = C, 80-89 = B, and 90-100 = A. Consistent with traditional grading systems, higher values indicated better grades. Students received a value for each class for 4 different marking periods, with marking periods 1 and 2 in the fall semester, and marking periods 3 and 4 in the spring semester. For each student, a math and English score for each semester was

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generated by averaging the values (if students took more than one math and English course in the semester). Once a fall math score, spring math score, fall English score, and spring English score was calculated, the average of both spring scores (math and English) was utilized as the measure of academic achievement in the spring semester (Hoge et al., 1990)

Attendance. Student attendance was utilized as a secondary, exploratory outcome measure. The Pottstown School District provided attendance data (i.e. total number of days enrolled, total number of days present, total number of excused absences) for students in the sample. For each student, the total number of school days missed was calculated by subtracting the total number of days present from the total number of days enrolled. Then, an absentee percentage was calculated by dividing total number of school days missed by the total number of school days enrolled for that academic year (and multiplying by 100). This yielded a percentage of absenteeism for each student, which was used as the secondary outcome measure.

Demographic information. Student level race/ethnicity and gender data was provided to the PTICC evaluation team by the Pottstown School District as part of the larger SEL evaluation. Grade level was available through administrative data and student rosters. The race/ethnicity and gender data were reported at the time of registration by students' parents. Student gender was reported as either male or female. Student race and ethnicity were coded as: White (Non-Hispanic), Black/African American (Non-Hispanic), Hispanic (any race), Asian (Non-Hispanic), Multiracial (Non-Hispanic), American Indian/Alaska Native (Non-Hispanic), and

Native Hawaiian/Pacific Islander (Non-Hispanic). Students represented four grades: 5th, 6th, 7th, and 8th.

Data Analysis

Data analysis was conducted using two statistical programs, SPSS Version 26 (IBM, 2019) and R (R Core Team, 2013). SPSS 26 (IBM Corp, 2018) was utilized for data cleaning and management, missing values analysis, descriptive statistics, and correlational analyses. Lavaan, an R package for structural equation modeling (SEM; Rosseel, 2012), was used to test the hypothesized relationships between school climate dimensions, school valuing, and academic achievement. As detailed below, there were several steps to conducting data analysis.

First, data were investigated for data missingness, to determine whether data were missing completely at random (MCAR), missing at random (MAR), or missing not at random (MNAR). Missing data that are MCAR or MAR is less concerning because it means the missing data are not systematic, whereas MNAR is a systemic loss of data (Cham, Reshetnyak, Rosenfield, & Breitbart, 2017). Second, the data were examined to assess if it meets or violates assumptions of multivariate normality for maximum likelihood (ML) estimation. To do so, the distribution of each observed variable was checked for skewness and kurtosis. Skewness refers to a lack of symmetry in the distribution of data and kurtosis is a measure of “tail-heaviness,” or outliers in a distribution (Morrison, Morrison, & McCutcheon, 2017; Weston & Gore, 2006). Using non-normal data in SEM can be problematic because non-normality of data can affect the statistical tests. Although there is no consensus about cut-offs, guidelines for skewness suggest that absolute values greater than 3 is considered

extreme skewness, whereas absolute values greater than 10 suggest a problem with kurtosis (Morrison et al., 2017; Weston & Gore, 2006). Furthermore, descriptives (means, standard deviations, frequencies) were obtained for all study variables, and relationships between study variables (e.g, bivariate correlations) were examined. In addition, *t*-tests and ANOVAs were run on all study variables to test for any significant differences based on the covariates (gender, race/ethnicity, grade level).

Next, structural equation modeling (SEM) was used to test a series of models to examine the direct and indirect effects between student perspectives of school climate dimensions at T1 (latent variables), school valuing at T1 (latent variable), and two different outcomes, GPA and attendance (manifest variables) at T2. Lavaan, an R package for structural equation modeling (SEM; Rosseel, 2012) was used to test how well the hypothesized models fit the sample data. SEM combines testing of measurement models (confirmatory factor analyses) and testing hypotheses about the relationships between latent variables. There are five key steps involved with testing SEM models: 1) model specification, 2) identification, 3) estimation, 4) evaluation, and 5) modification (Khine, 2013). The first step, model specification, involves the researcher specifying the hypothesized relationships among the variables of interest. Next, in model identification, the researcher determines whether the specified model is just-identified (all the parameters provide sufficient information), overidentified (there is more than enough information, and more than one way of estimating a parameter), or under-identified (parameters cannot be determined because there is not enough information). Third, estimation involves determining the value of parameters in the model. Fourth, evaluation of the model involves assessing how well the data fit

the model. This is done by assessing several model fit indices. Specifically, the models were evaluated against five criteria: the chi-squared statistic (χ^2), the root mean squared error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis Index (TLI), and the standardized root-mean-square residual (SRMR). The chi-squared statistic is sensitive to sample size, and as such, a normed chi-square value (χ^2/df) will be used to identify goodness of fit. According to Bollen (1989), a value of 5.0 or lower indicates reasonable model fit. In addition, good model fit will be indicated by $RMSEA < .06$, $CFI > .95$, $TLI > .95$, and $SRMR < .08$ (Hu & Bentler, 1998). Acceptable model fit will be indicated by $RMSEA < .08$, $CFI > .90$, $TLI > .90$, and $SRMR < .10$ (Bollen, 1989). The fifth and final step, modification (or respecification), involves adjusting and retesting the model to improve the fit.

A series of SEM models were used to examine the hypothesized relationships. First, a full SEM was tested which included the predictor (school climate dimensions), mediating variable (school valuing), and outcome variables (GPA or attendance), as well as three exogenous demographic variables (gender, race and ethnicity, and grade). For the primary outcome, predictive paths were hypothesized from each school climate dimension to GPA and school valuing, as well as school valuing to GPA. These paths were replicated for a secondary exploratory outcome, attendance. Gender was recoded it as a single dummy variable with male recoded “0” and female recoded as “1.” The variable grade (four categories) was entered as a set of three dummy variables. The variable race and ethnicity (with four categories) was replaced by a set of three dummy variables.

Second, a series of five SEM models were tested to assess the hypothesized indirect effect of school valuing on the relationship between each of the four school climate dimensions and the outcome variables. First, four individual models were tested to explore whether school climate dimension and GPA were indirectly related via school valuing, without controlling for the other school climate dimensions. Each model included one of the four school climate dimensions as the predictor, school valuing as the mediating variable, and GPA as the outcome. The fifth model tested included all four school climate dimensions as predictors, school valuing as the mediating variable, and GPA as the outcome, to explore if individual school climate dimensions had an effect when controlling for the other dimensions. The indirect effects models included grade as a covariate, but did not include race and gender since subsequent multigroup SEM models were tested to assess whether race and gender moderated any significant relationships. For the indirect effects analyses, bootstrapping was conducted based on 5,000 samples (Hayes, 2013).

Lastly, a series of multiple group structural equation models were tested to assess whether race and gender moderated indirect effects found in the previous step. For both the indirect effects and moderated indirect effects models, grade was entered as a covariate. For the multigroup analyses with gender used as the group factor, race and ethnicity was also included as a covariate. The race and ethnicity multigroup SEM models included gender as a covariate. For each analysis, a series of recommended steps were taken to first assess for multigroup invariance (Byrne, 2004; Dimitrov, 2010), which is a pre-requisite for assessing group differences in the structural paths. The following steps were taken for each multigroup SEM.

First, the SEM identified by the preceding analysis (with safety and interpersonal relationships as the predictors) were simultaneously fit to all groups allowing all parameters to vary across groups. Second, this model was run again with factor loadings constrained to be equal across groups. Third, the model was run again with both the factor loadings and the intercepts constrained to be equal across groups. To test for metric/weak invariance, a chi-squared test was run to examine whether the first model (with all parameters freely estimated) and the second model (with factor loadings constrained) were significantly different. Next, to test for scalar/strong invariance, a second chi-squared test was run to see if the second model (with factor loadings constrained) and the third model (with factor loadings and intercepts constrained) were significantly different. While a fourth test to assess for strict factorial invariances (equal residuals) is recommended practice, it is suggested that equality of error variances and covariances may be an overly restrictive test (Byrne, 2004). As such, moderation was tested if both weak and partial strong invariance were present. There are different criteria in the literature regarding how many items can be freed for partial invariance. Some guidelines suggest that less than 20% of parameters should be freed for partial invariance (Dimitrov, 2010) while others suggest that more than half of items should be invariant (Steenkamp & Baumgartner, 1998), or that the majority of items on the factor are invariant (Vandenberg and Lance, 2000). For the purposes of the current study, if more than half of the items on a factor are invariant, then it will be considered partially invariant. To explore moderating relationships, invariance of structural paths was tested, such that a model

with constrained structural paths was compared to the final model from measurement invariance testing.

Results

The goals of this investigation were to examine: 1) the relationships between school climate dimensions, school valuing, and academic achievement, 2) whether school climate dimensions were indirectly related to academic outcomes (GPA and attendance) via school valuing and 3) whether significant indirect effects differed by student race and gender.

Academic achievement was measured by taking an average of math and English grades from the Spring 2019 semester (T2). For parsimony, the term “GPA” will be used as a proxy for “academic achievement” in the results. These analyses were repeated for an exploratory outcome: student attendance, which is represented by the percentage of absenteeism. For brevity, the racial category comprised of Multiracial, Asian, Pacific Islander, Native Hawaiian, and Native Alaskan students, will be referred to as the “multiracial/other” group. Descriptive data are presented first, including means, standard deviations, and correlations for all study variables. This is followed by the results for the primary and secondary research aims.

Missing Values Analysis

A missing values analysis was conducted in SPSS 26 (IBM Corp, 2018) to assess data missingness among all variables (independent, dependent, and covariates). School climate and school valuing data were missing due to item-level nonresponse. The percentage of missing values for the predictor variables (school climate and school valuing items) ranged from 0% to 2.3% (see Table 3). Eight percent (8%) of

the outcome variable, GPA, was missing because 52 students did not take English or math classes in the spring semester. There was no missing attendance or demographic data. A missing values analysis revealed that data were missing completely at random (MCAR, $\chi^2(539, N= 650) = 535.42, p = .54$). When data are normal and MCAR, full information maximum likelihood (FIML) method is an unbiased and efficient approach to address missing data (Enders & Bandalos, 2001). As such, FIML estimation, rather than using listwise deletion or imputation approaches, was used in subsequent data analyses.

Descriptive Statistics

Descriptive statistics (means, standard deviations, skewness, and kurtosis) were computed for all study variables including school climate dimensions, school valuing, academic achievement, attendance, and demographic variables (see Table 3). The relation of demographic variables (race, ethnicity, gender, and grade) with all study variables was also examined using a series of bivariate correlations, *t*-tests, or ANOVAs. For descriptive purposes, measures for the school climate variables (safety, interpersonal relationships, teaching and learning, and institutional environment) were first standardized in order to address the fact that items were measured on different scales. Following this, a composite score was created using the standardized items. Higher scores on the school climate and school valuing variables indicate favorable perspectives of the construct. Standardized scale descriptive statistics are shown in Table 4. For the primary and secondary research aims, each item for the latent variables was entered in the original form.

Table 3

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

Unstandardized Item Descriptives

Items	<i>M</i>	<i>SD</i>	Min	Max	Skewness	Kurtosis	% <i>missing</i>
Safety							
Sf1	2.91	0.93	1	4	-0.45	-0.73	0.5%
Sf2	2.12	1.07	1	4	0.47	-1.07	1.1%
Sf3	2.28	0.96	1	4	0.27	-0.86	2.0%
Sf4	3.48	1.02	1	5	-0.26	-0.54	0.3%
Sf5	2.96	0.81	1	4	-0.64	0.14	1.1%
Interpersonal relationships							
RI1	2.87	1.03	1	5	-0.03	-0.33	0.8%
RI2	2.94	1.15	1	5	-0.01	-0.87	0.3%
RI3	3.05	1.25	1	5	-0.18	-0.91	0.9%
RI4	2.08	0.74	1	4	0.26	-0.24	0.0%
Teaching and learning							
Tc1	3.12	0.72	1	4	-0.63	0.46	0.3%
Tc2	2.68	0.85	1	4	-0.12	-0.63	0.8%
Tc3	3.13	0.79	1	4	-0.76	0.34	0.8%
Tc4	3.03	1.28	1	5	-0.15	-1.02	2.5%
Institutional environment							
En1	2.88	1.08	1	5	-0.16	-0.42	2.0%
En2	3.03	1.01	1	5	-0.28	-0.22	2.5%
School valuing							
Valu1T1	2.66	0.85	1	4	-0.25	-0.52	1.8%
Valu2T1	2.38	0.93	1	4	0.10	-0.85	2.2%
Valu3T1	3.70	0.62	1	4	-2.23	4.95	2.2%
Valu4T1	3.03	0.87	1	4	-0.55	-0.48	2.3%
Academic achievement							
GPA	79.47	12.33	1.50	99.75	-1.46	4.79	8.0%
Attendance (original variable)	5.98	6.34	0.00	74.18	4.02	28.65	0.0%
Attendance (transformed variable)	1.67	0.73	0.00	4.32	0.017	0.241	0.0%

Demographics	
Grade	0.0%
Gender	0.0%
Race/ethnicity	0.0%

Table 4

Standardized Scale Descriptives

Items	<i>Std M</i>	<i>Std SD</i>	Min	Max	Skewness	Kurtosis
Safety	-0.02	0.75	-1.87	1.48	0.00	-0.63
Interpersonal relationships	0.02	0.73	-1.63	1.67	-0.30	-0.46
Teaching and learning	0.00	0.76	-2.29	1.34	-0.38	-0.13
Institutional environment	0.00	0.84	-1.86	1.95	-0.24	-0.15
School valuing	0.01	0.70	-2.51	1.23	-0.58	0.50

Normality was assessed by examining skewness and kurtosis values and through visual inspection of histograms to identify asymmetries or deviations from normality. As indicated by skewness and kurtosis values, all study variables except for the exploratory outcome attendance were normally distributed (e.g. all variables had skewness values less than 3, and kurtosis values less than 10). Attendance was skewed right and non-normally distributed, with a skewness of 4.02 ($SE = 0.10$) and a kurtosis of 28.65 ($SE = 0.91$). As a means of correction, a natural log+1 transformation was conducted (“+1” was added because original absentee percentages did include “0” and a natural log transformation cannot be conducted on “0” values, IBM, n.d.). The transformed attendance variable was normally distributed with a skewness of 0.017 ($SE = 0.096$) and a kurtosis value of 0.241 ($SE = 0.191$). The transformed attendance variable was used for all subsequent analyses. Descriptive

statistics for both the original and transformed attendance variable can be found in Table 3.

On average, students responded favorably to the school climate dimensions. Across all students, students had favorable perspectives of the interpersonal relationships (*Std M*=0.02 *Std SD*=0.73), and undecided or indifferent perspective on teaching and learning (*Std M*=0.00 *Std SD*=0.76) and institutional environment (*Std M*=0.00 *Std SD*= 0.84) dimensions. Students responded least favorably to the safety dimension (*Std M*= -0.002, *Std SD*=0.75). On average, students also responded favorably to the school valuing construct (*Std M*= .01 *Std SD*= .70). In terms of academic achievement, students' math and English average score fell within the B-C range ($M = 79.47$, $SD = 12.33$) Students, on average, were absent nearly 6% of the year ($M = 5.98$, $SD = 6.34$). The transformed attendance variable had a mean of 1.67 ($SD = 0.73$).

Next, a *t*-test and series of ANOVAs were conducted to determine if there were any group differences based on gender, race/ethnicity, and grade on all study variables (Tables 5 – 7). Results of the *t*-test indicated that there were significant differences between female and male students on GPA, interpersonal relationships, and institutional environment. Results suggest that female students ($M = 82.11$, $SD = 10.45$) had a higher GPA compared to male students ($M = 76.89$, $SD = 13.46$), a statistically significant difference ($M = 5.23$, 95% CI [3.30, 7.16], $t(566.396) = 5.312$, $p < .001$). Additionally, female students (*Std M* = -0.11, *Std SD* = 0.71) had less favorable perspectives of the interpersonal relationships dimension than male students (*Std M* = 0.14, *Std SD* = 0.72), a statistically significant difference of -0.25 (95% CI, -

0.36 to -0.14), $t(639) = 4.468, p < .001$. Similarly, female students ($M = -0.07, SD = 0.82$) had a less favorable views of the institutional environment dimensions than male students ($M = 0.07, SD = 0.86$), which was a statistically significant difference ($M = -0.14, 95\% \text{ CI } [-0.27, -0.01], t(631) = 2.064, p = .04$).

Table 5

All Study Variable Means for Male and Female Students

	Gender		<i>t</i>	<i>df</i>
	Female	Male		
GPA	82.11 (10.45)	76.89 (13.46)	5.31**	566.396
Attendance (transformed)	1.69 (0.75)	1.65 (0.72)	0.71	648
Safety	-0.05 (0.74)	0.01 (0.76)	-.93	625
Interpersonal relationships	-0.11 (0.71)	0.14 (0.72)	-4.47**	639
Teaching and learning	0.01 (0.74)	-0.02 (0.78)	.55	623
Institutional environment	-0.07 (0.82)	0.07 (0.86)	-2.06*	631
School valuing	0.03 (0.67)	0.00 (0.73)	.45	627.520

Note. * = $p < .05$, ** = $p < .001$. Standard deviations appear in parentheses below means.

Next, a series of ANOVAs were conducted on all variables to examine mean differences based on student grade level. Results of the ANOVAs indicated that there were significant differences by grade on GPA (Welch's $F(3, 302.623) = 5.809, p = .001$), safety (Welch's $F(3, 342.703) = 10.251, p < .001$), and teaching and learning (Welch's $F(3, 342.157) = 9.354, p < .001$). Games-Howell post-hoc tests revealed there were significant differences between the lower (5th and 6th) and higher-grade levels (7th and 8th), for the safety and teaching and learning dimensions. In both cases, students in lower grades reported more favorable perspectives of these dimensions.

For the safety dimension, students in lower grades reported more favorable

perspectives of safety (5th grade, *Std M* = 0.15, *Std SD* = 0.81; 6th grade, *Std M* = 0.14, *Std SD* = 0.79) compared to the higher grades (7th grade, *Std M* = -0.20, *Std SD* = 0.67; 8th grade, *Std M* = -0.16, *Std SD* = 0.66). For the teaching and learning dimension, grades 5 (*Std M* = 0.11, *Std SD* = 0.88) and 6 (*Std M* = 0.18, *Std SD* = 0.73) had significantly different scores in the teaching and learning dimension compared to grade 7 (*Std M* = -0.21, *Std SD* = 0.74). However, only grade 6 had a significantly different teaching and learning score compared to grade 8 (*Std M* = -0.09, *Std SD* = 0.62). For GPA, significant differences on mean GPA were found between grades 5 and 6, grades 6 and 8, and grades 7 and 8. Average GPA was higher for grade 6 (*M* = 80.76, *SD* = 10.82) and 7 (*M* = 81.89, *SD* = 10.03) compared to grades 5 (*M* = 78.79, *SD* = 9.83) and 8 (*M* = 75.09, *SD* = 18.00).

Table 6

All Study Variable Means by Student Grade

	Grade				<i>F</i> / Welch's <i>F</i> [^]	<i>p</i>
	5	6	7	8		
GPA	78.79 (9.83) _a	80.76 (10.83) _{ab}	81.89 (10.03) _c	75.09 (18.00) _{bc}	5.809 [^]	.001
Attendance (transformed)	1.65 (0.72)	1.69 (0.75)	1.59 (0.73)	1.76 (0.73)	1.479	.219
Safety	0.15 (0.81) _{ab}	0.14 (0.79) _{cd}	-0.20 (0.67) _{ac}	-0.16 (0.66) _{bd}	10.251 [^]	< .001
Interpersonal relationships	-0.08 (0.78)	0.11 (0.74)	0.00 (0.69)	0.03 (0.68)	1.913	.126
Teaching and learning	0.11 (0.88) _a	0.18 (0.73) _{bc}	-0.21 (0.74) _{ab}	-0.09 (0.62) _c	9.354 [^]	< .001

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

Institutional environment	-0.09 (0.94)	0.08 (0.88)	-0.06 (0.78)	0.07 (0.75)	1.644 [^]	.179
School valuing	0.11 (0.83)	-0.01 (0.71)	-0.02 (0.61)	-0.02 (0.64)	1.034 [^]	.378

Note. Standard deviations appear in parentheses bellow means. Means with differing subscripts within rows are significantly different based on Games-Howell post hoc paired comparisons.

Another series of ANOVAs were conducted to identify significant differences based on student race/ethnicity. Results of the ANOVAs suggested there were significant differences by race/ethnicity on GPA (Welch's $F(3, 256.977) = 15.532, p < .001$), attendance ($F(3, 646) = 4.708, p = .003$), and relationships dimension of school climate ($F(3, 637) = 4.981, p = .002$). Games-Howell post-hoc tests revealed statistically significant differences on GPA across racial and ethnic groups. White students had a higher GPA ($M=83.01, SD = 10.04$) than Black ($M=75.15, SD = 13.47$) and Hispanic students ($M=79.04, SD = 12.20$). Furthermore, the Multiracial/Other group had a higher average GPA ($M=81.92, SD = 9.55$) than Black students. Regarding attendance, Tukey post-hoc tests revealed that there were differences in absenteeism between Hispanic and Black students, and Hispanic and Multiracial/Other students. Black ($M = 1.76, SD = 0.68$) and Multiracial/Other ($M=1.80, SD = 0.76$) students were more likely to be absent compared to Hispanic students ($M=1.50, SD = 0.74$). Finally, there were mean differences in the relationships dimensions of school climate among different racial/ethnic groups. Tukey post-hoc tests indicated that White students had less favorable perspectives of the relationships dimension ($Std M = -0.11, Std SD = 0.69$) compared to both

Hispanic students (*Std M* = 0.16, *Std SD* = 0.67) and students in the Multiracial/Other group (*Std M* = 0.15, *Std SD* = 0.73).

Table 7

All Study Variable Means by Student Race/Ethnicity

	Race/Ethnicity				<i>F</i> / Welch's <i>F</i> [^]	<i>p</i>
	White	Black/ African America n	Hispanic (Any race)	Multirac ial/Other		
GPA	83.01 (10.84) _{ab}	75.15 (13.47) _{ac}	79.04 (12.20) _b	81.92 (9.55) _c	15.532 [^]	.000
Attendance (transformed)	1.61 (0.76)	1.76 (0.68) _a	1.50 (0.74) _{ab}	1.80 (0.76) _b	4.708	.003
Safety	-0.02 (0.70)	-0.05 (0.80)	0.01 (0.79)	0.04 (0.71)	.317 [^]	.813
Interpersonal relationships	-0.12 (0.69) _{ab}	0.02 (0.76)	0.16 (0.67) _a	0.15 (0.73) _b	4.981	.002
Teaching and learning	0.03 (0.72)	-0.04 (0.78)	-0.02 (0.86)	0.03 (0.69)	.332	.802
Institutional environment	0.00 (0.81)	-0.05 (0.88)	-0.02 (0.87)	0.14 (0.79)	1.212	.304
School valuing	-0.06 (0.70)	0.05 (0.69)	0.00 (0.76)	0.13 (0.66)	1.740	.157

Note. Standard deviations appear in parentheses bellow means. Means with differing subscripts within rows are significantly different based on Tukey or Games-Howell post hoc paired comparisons.

Correlation analyses. Correlation analyses were performed to examine the relationships among all variables (see Table 8). All four school climate dimensions were positively correlated with each other, with safety and teaching and learning dimensions being most correlated ($r = .74, p < .001$) and the interpersonal relationships and teaching and learning dimensions being the least correlated ($r = .32$,

$p < .001$). As expected, the school climate dimensions were positively correlated with school valuing. Teaching and learning ($r = .57, p < .001$) and interpersonal relationships ($r = .31, p < .001$) were positively correlated with school valuing. Moreover, safety and institutional environment were both positively correlated with school valuing ($r = .58, p < .001$, and $r = .51, p < .001$ respectively). Contrary to what was expected, safety ($r = .05, p = .25$) and interpersonal relationships ($r = .05, p = .27$) were not significantly correlated with GPA. The teaching and learning dimension was related to GPA ($r = .08, p = .06$) but the finding was marginally significant. The fourth and final school climate dimension, institutional environment was positively and significantly correlated with GPA ($r = .09, p = .03$). Despite the fact that three of the four school climate dimensions were not correlated with the outcome variable (GPA), Hayes (2013) suggests that a significant indirect effect can still be found, even if the predictor and outcome variables are not significantly correlated. As predicted, school valuing was positively correlated with GPA ($r = .15, p < .001$).

The exploratory outcome, attendance, was represented by the percent of days students were absent from school. As expected, the two outcome variables were negatively correlated, suggesting that students with more absences had lower GPA's ($r = -.29, p < .001$). Moreover, among the school climate dimensions, only interpersonal relationships were negatively and significantly correlated with attendance ($r = -.09, p = .002$). Attendance was negatively correlated with school valuing, but the finding was only marginally significant ($r = -.05, p = .07$).

Table 8

Bivariate Correlations

	1	2	3	4	5	6	7
1. GPA	1	-.318**	.048	.046	.079	.089*	.146**
2. Attendance (transformed)		1	-.030	-.120**	-.051	-.092*	-.074^
3. Safety ¹			1	.392**	.739**	.571**	.576**
4. Relationships ¹				1	.320**	.437**	.312**
5. Teaching and learning ¹					1	.528**	.568**
6. Institutional environment ¹						1	.513**
7. School valuing ¹							1

¹ Standardized scales

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

^ Correlation is marginally significant at the .10 level (2-tailed).

The next section includes the results for the primary outcome, GPA. This is followed by the results for the exploratory outcome, attendance.

Primary Research Aim: GPA

The primary research aim included four hypotheses and two exploratory aims. Results for each hypothesis can be found below. Figure 2 presents the full model for the primary outcome (GPA), including the standardized coefficients. Factor loadings for the items for latent variables can be found in Table 9.

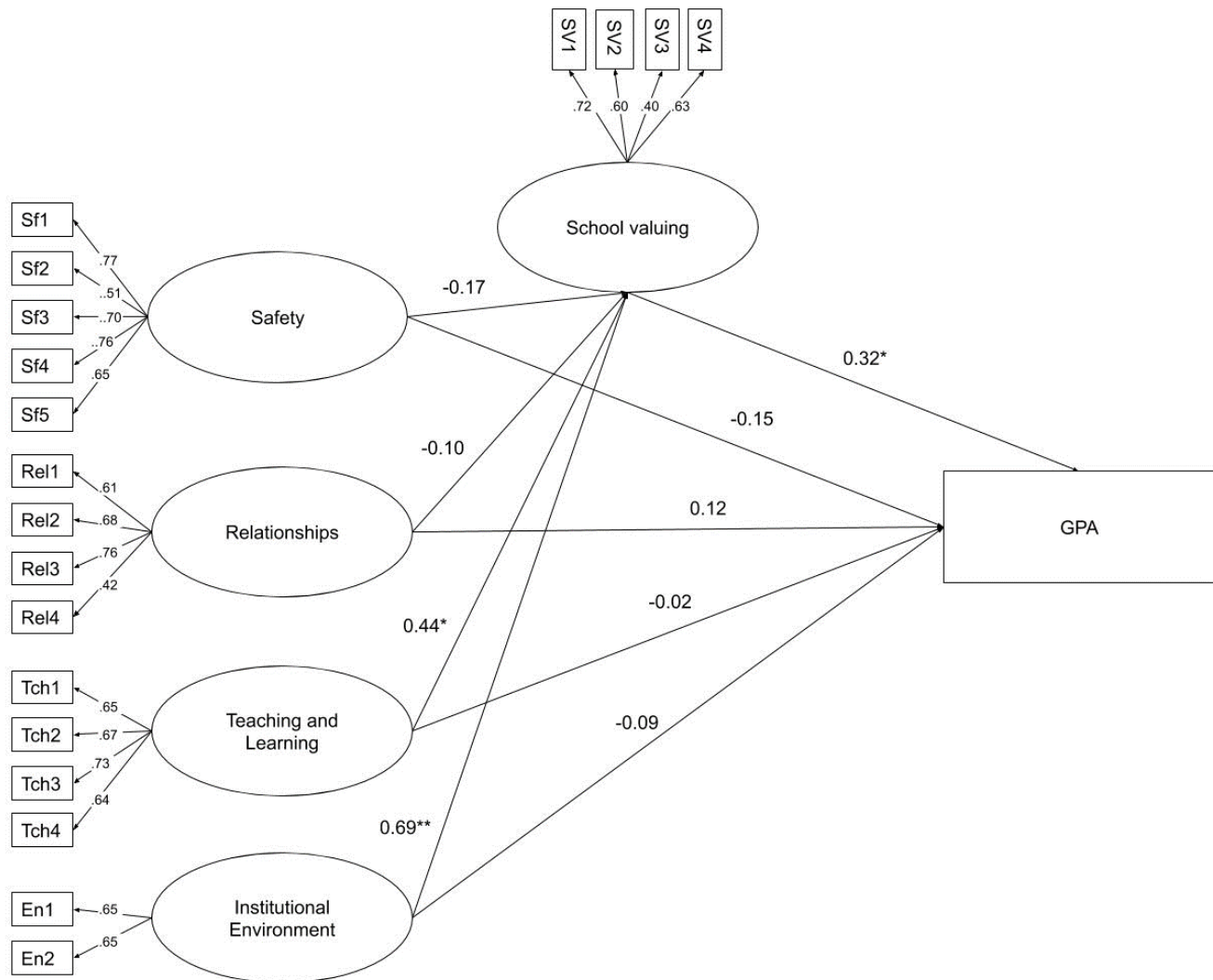


Figure 2. Full SEM Estimated Coefficients for GPA and School Valuing, Controlling Grade, Gender, Race/Ethnicity

* Marginally significant at the 0.10 level (2-tailed)

** Significant at the 0.05 level (2-tailed)

Table 9

Latent Variables Items, Standardized Factor Loadings, and Alpha Coefficients*

Item	Factor loading
Safety ($\alpha = .80$; standardized $\alpha = .81$)	
How much do the adults in your school care about how you feel?	.77

How much do the adults in your school ask you about how you feel?	.51
How often do the adults in your school help you feel better when you're unhappy?	.70
How much support do the adults at your school give you?	.76
I feel safe and comfortable with my teachers at this school.	.65
Interpersonal relationships ($\alpha = .72$; standardized $\alpha = .71$)	
How well do people at your school understand you as a person?	.61
How much respect do students at your school show you?	.68
Overall, how much do you feel like you belong at your school?	.76
Most students at my school treat each other with respect.	.42
Teaching and learning ($\alpha = .73$; standardized $\alpha = .77$)	
When my teachers tell me not to do something, I know they have a good reason.	.65
My teachers will always listen to students' ideas.	.67
My teachers treat me with respect.	.73
How often do your teachers seem excited to be teaching your classes?	.64
Institutional environment ($\alpha = .59$; standardized $\alpha = .60$)	
How fair or unfair are the rules for the students at this school?	.65
How positive or negative is the energy of the school?	.65
School valuing ($\alpha = .67$; standardized $\alpha = .67$)	
How interesting do you find the things you learn in your classes?	.72
How often do you use ideas from school in your daily life?	.60
How important is it to you to do well in your classes?	.40
How useful do you think school will be to you in the future?	.63

Note: Alpha coefficients and standardized alpha coefficients are reported in bold.

*Full SEM for outcome GPA ($\chi^2 = 806.74$, $df = 282$, $p < .001$; $\chi^2/df = 2.86$; RMSEA = .05; SRMR = .05; CFI = .88; TLI = .86).

As shown in Table 10, the goodness of fit indices indicated that the hypothesized conceptual model had acceptable to good model fit ($\chi^2 = 806.74$, $df = 282$, $p < .001$; $\chi^2/df = 2.86$; RMSEA = .05; SRMR = .05; CFI = .88; TLI = .86). CFI and TFI neared, but was less than, the .90 cutoff for good model fit, however, other indices met the standards for good model fit. Results for each hypothesis are presented below and standardized coefficients and significance levels are presented in Table 10

Goodness of Fit Statistics for Structural Equation Models (Full SEM And Indirect Effects), GPA

Model	χ^2, df, p	χ^2/df	RMSEA	SRMR	CFI	TLI
Full SEM (all school climate predictors, school valuing, GPA)	806.74, 282, $p < .001$	2.86	.05	.05	.88	.86
Indirect effects model (safety, school valuing, GPA)	224.40, 57, $p < .001$	3.94	.07	.06	.91	.88
Indirect effects model (relationships, school valuing, GPA)	140.34, 46, $p < .001$	3.05	.06	.04	.91	.88
Indirect effects model (teaching and learning, school valuing, GPA)	199.25, 46, $p < .001$	4.33	.07	.06	.89	.85
Indirect effects model (institutional environment, school valuing, GPA)	110.51, 27, $p < .001$	4.08	.07	.04	.90	.84
Indirect effects model (all school climate dimensions, school valuing, GPA)	657.684, 210, $p < .001$	3.13	.06	.06	.90	.88

In total, the predictors in the model explained 21% ($R^2 = .21$) of the variance in GPA (English and Math grades). Contrary to what was expected in hypothesis 1, the results indicated that all four school climate dimensions at T1 *did not* predict GPA at T2 after controlling for race, gender, and grade (safety, $\beta = -0.15$, $SE = 0.29$, $p = .60$; interpersonal relationships, $\beta = 0.12$, $SE = 0.12$, $p = .30$; teaching and learning, $\beta = -0.02$, $SE = 0.26$, $p = .95$; institutional environment, $\beta = -0.09$, $SE = 0.30$, $p = .76$). In contrast to hypothesis 2, interpersonal relationships were not significantly related to school valuing ($\beta = -0.10$, $SE = 0.11$, $p = .38$). However, in partial support of

hypothesis 2, teaching and learning was positively related to school valuing, but the finding was only marginally significant ($\beta = 0.44$, $SE = 0.23$, $p = .06$).

There was no hypothesized directionality of the relations between two school climate dimensions (safety and institutional environment and school valuing (exploratory aim 1). The results indicated that institutional environment was positively and significantly related to school valuing ($\beta = 0.69$, $SE = 0.23$, $p = .002$), while safety was not significantly related to school valuing ($\beta = -0.17$, $SE = 0.28$, $p = 0.55$). Moreover, school valuing was positively related to GPA (hypothesis 3), but the finding was only marginally significant ($\beta = 0.32$, $SE = 0.19$, $p = .095$).

Table 11

Full SEM Estimated Coefficients for GPA and School Valuing

	GPA			School valuing		
	β	SE	p	β	SE	p
Safety	-0.15	0.29	.60	-0.17	0.28	.55
Relation	0.12	0.12	.30	-0.10	0.11	.38
Teach	-0.02	0.26	.95	0.44	0.23	.06
Enviro	-0.09	0.30	.76	0.69	0.23	.002
Black	-0.34	0.05	< .001	0.13	0.04	.003
Hispanic	-0.13	0.05	.006	0.05	0.04	.29
Multiracial/Other	-0.08	0.06	.172	0.06	0.04	.14
Female	0.21	0.04	< .001	0.04	0.04	.37
Grade 5	0.12	0.06	.06	0.08	0.05	.11
Grade 6	0.22	0.05	< .001	-0.08	0.05	.11
Grade 7	0.23	0.06	< .001	0.04	0.05	.40
Valu	0.32	0.19	.095	NA	NA	NA

Indirect effects analyses. Although the findings of the SEM model suggest that the direct effect of school climate dimensions on GPA was not significant (hypothesis 1), contemporary thought suggests that a lack of a direct effect should not be a prerequisite for testing indirect effects (Hayes, 2013). Indeed, it may be that the

association between X (each school climate dimension) and Y (GPA) is entirely accounted for by the mediating variable (school valuing). As such, a series of SEMs were used to test whether each of the four school climate dimensions were related to GPA via school valuing (hypothesis 4 and exploratory aim 2). Hypothesis 4 posited a positive indirect effect between two school climate dimensions (interpersonal relationships and teaching and learning) and GPA via school valuing, and exploratory aim 2 sought to explore whether the two remaining school climate dimensions (safety and institutional environment) were indirectly related to GPA via school valuing.

First, four individual models were tested to explore whether each school climate dimension and GPA were indirectly related via school valuing, without controlling for the other school climate dimensions. Each of the four models included one of the four school climate dimensions as the predictor, school valuing as the mediating variable, and GPA as the outcome. Following this, a fifth model which included all four school climate dimensions as predictors, school valuing as the mediating variable, and GPA as the outcome, was tested to explore if individual school climate dimensions had an effect when controlling for the other school climate dimensions. For each test of indirect effects, goodness of fit statistics were reported in Table 9. Furthermore, sizes of the indirect effects, the direct effects, total effects, and significance levels can be found in Table 12. The bootstrapping results are considered statistically significant if the confidence interval for the indirect effect based on 5,000 bootstrap samples does not contain zero.

Overall, among the four tests of indirect effects which examine individual school climate dimensions, school valuing, and GPA, two tests of indirect effects

were statistically significant. This indicated partial support for hypothesis 4 and exploratory aim 2. The first model tested the indirect effect between interpersonal relationships and GPA via school valuing (hypothesis 4). The goodness of fit indices revealed that the model had acceptable fit ($\chi^2 = 140.34$, $df = 46$, $p < .001$; $\chi^2/df = 3.05$; RMSEA = .06; SRMR = .04; CFI = .91; TLI = .88). The test of indirect effects revealed that interpersonal relationships did predict GPA via school valuing ($\beta = 0.07$, 95% CI [0.01, 0.13]) and the direct effect was not significant ($\beta = -0.02$, 95% CI [-0.13, 0.09]). Furthermore, in the model testing the indirect effect of interpersonal relationships on GPA via school valuing, school valuing was significantly related to GPA ($\beta = 0.15$, $SE = 0.66$, $p = .02$).

The second model included teaching and learning as the predictor variable. The goodness of fit indices revealed that the model had acceptable model fit ($\chi^2 = 199.25$, $df = 46$, $p < .001$; $\chi^2/df = 4.33$; RMSEA = .07; SRMR = .06; CFI = .89; TLI = .85). Contrary to what was proposed by the model (hypothesis 4), teaching and learning did not indirectly predict GPA via school valuing ($\beta = 0.14$, 95% CI [-0.04, 0.31]).

To test exploratory aim 2, a third model examined whether safety was indirectly related to GPA via school valuing. As shown in Table 9, the goodness of fit indices indicated that the hypothesized conceptual model had acceptable fit ($\chi^2 = 224.40$, $df = 57$, $p < .001$; $\chi^2/df = 3.94$; RMSEA = .07; SRMR = .06; CFI = .91; TLI = .88). Results indicated that the safety dimension of school climate did predict GPA via school valuing ($\beta = 0.17$, 95% CI [0.01, 0.13]). The direct effect between safety and GPA was not significant ($\beta = -0.10$, 95% CI [-0.30, 0.09]). Moreover, school

valuing was significantly related to GPA in the model testing the indirect effect of safety on GPA via school valuing ($\beta = 0.22$, $SE = 0.80$, $p = .03$).

The fourth model tested whether institutional environment indirectly predicted GPA via school climate (exploratory aim 2), which had acceptable model fit ($\chi^2 = 110.51$, $df = 27$, $p < .001$; $\chi^2/df = 4.08$; RMSEA = .07; SRMR = .04; CFI = .90; TLI = .84). The indirect effect was not significant ($\beta = 0.12$, 95% CI [-2.44, 2.68]).

Lastly, a follow-up model was tested to explore whether school climate dimensions independently related to GPA via school valuing, when all school climate dimensions and corresponding direct, indirect, and total effects were entered in the model. The goodness of fit indices indicated that the hypothesized conceptual model had acceptable fit ($\chi^2 = 657.68$, $df = 210$, $p < .001$; $\chi^2/df = 3.13$; RMSEA = .06; SRMR = .06; CFI = .90; TLI = .88). When all school climate dimensions were entered as predictors in the model simultaneously, the significant indirect effects found in individual models were no longer significant (interpersonal relationships ($\beta = -0.01$, 95% CI [-1.02, 0.99]); safety, ($\beta = -0.03$, 95% CI [-2.18, 2.12])). Consistent with the previous analyses, the indirect effects for teaching and learning ($\beta = 0.14$, 95% CI [-0.04, 0.31]) and institutional environment ($\beta = 0.12$, 95% CI [-2.44, 2.68]) were not significant.

Table 12

Bootstrapping Results for Indirect Effects (GPA)

Effect [^]	Individual indirect effects models				Full indirect effects models			
	Bootstrap Estimate		95% CI		Bootstrap Estimate		95% CI	
	β	SE	Lower	Upper	β	SE	Lower	Upper

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

Safety → SV								
→ GPA								
Direct Effect	-0.10	0.10	-0.30	0.09	-0.23	37.55	-73.82	73.36
Indirect								
Effect	0.17*	0.08	0.01	0.33	-0.03	1.09	-2.18	2.12
Total Effect	0.07	0.05	-0.02	0.15	-0.26	37.62	-74.00	73.48
Rel → SV →								
GPA								
Direct Effect	-0.02	0.06	-0.13	0.09	-0.02	21.53	-42.21	42.18
Indirect								
Effect	0.07*	0.03	0.01	0.13	-0.01	0.51	-1.02	0.99
Total Effect	0.04	0.05	-0.05	0.14	-0.03	21.48	-42.13	42.08
Teach → SV								
→ GPA								
Direct Effect	-0.04	0.11	-0.26	0.18	.11	33.09	-64.75	64.97
Indirect								
Effect	0.14	0.09	-0.04	0.31	.07	1.15	-2.17	2.32
Total Effect	0.10*	0.05	0.01	0.19	.19	33.13	-64.75	65.13
Enviro →								
SV → GPA								
Direct Effect	0.01	38.92	-76.27	76.28	0.10	55.02	-107.74	107.93
Indirect								
Effect	0.12	1.31	-2.44	2.68	0.11	1.89	-3.60	3.82
Total Effect	0.13	37.70	-73.77	74.012	0.21	54.03	-105.68	106.09
*Significant at the 0.05 level (2-tailed), ^ Rel = Relationships, Teach = Teaching and Learning, Enviro = Environment, SV = School Valuing								

In summary, the individual tests of indirect effects revealed a positive indirect effect between interpersonal relationships and safety dimensions of school climate and GPA via the mediating variable school valuing. However, these relationships did not hold when controlling for other school climate dimensions.

Secondary Research Aim: GPA

The second aim of the research was to examine whether indirect effects were stronger or weaker depending on students' race/ethnicity (exploratory aim 3) and gender (exploratory aim 4). Because the indirect effects models were analyzed on the whole sample, whereas the moderated indirect effects models were analyzed on

subgroups simultaneously, it is possible that an indirect effect is not significant in the whole sample but varies by subgroups. As such, the indirect effects models for each school climate dimension tested in the primary research aim were replicated in the secondary research aim.

To examine whether race and gender moderated the indirect effects found in the primary aim, a multigroup SEM approach was used by treating race and gender as grouping variables. As previously described, a series of steps were taken to assess for moderation effects. First, a series of SEM models were tested to assess for measurement invariance across groups. If measurement invariance was achieved, a second series of models were tested to assess for differences in structural paths.

Race and ethnicity. For the multigroup SEM models assessing moderating effects based on race and ethnicity, gender and grade were entered as covariates to the model. A series of four tests were conducted to assess possible moderating effects in the relationship between each individual school climate dimension, school valuing, and GPA based on race and ethnicity. Goodness of fit statistics for models can be found in Tables 13-16.

Safety and race/ethnicity. To examine whether race/ethnicity moderated the indirect effect between safety and GPA via school valuing, the indirect effects model with safety as the predictor, GPA as the outcome, school valuing as the mediating variable, and grade and gender as covariates, was simultaneously fit to the four racial/ethnic groups (Model A1). Second, the same model was tested, but all factor loadings were constrained to be equal across groups (Model A2). The unrestricted model was not significantly different from the model with factor loadings constrained

($\Delta\chi^2 / \Delta df = 23/21, p = .36$), indicating weak invariance. Next, the same model was tested with factor loadings and intercepts constrained to test for strong invariance (Model A3). The results indicated that Model A2 and A3 were significantly different ($\Delta\chi^2 / \Delta df = 67/24, p < 0.001$). An examination of the MI indicated an item (Valu2) with the highest chi-squared value ($\chi^2 = 15.74$) and as such this parameter was freed (Model A3i). Model A3i was compared with A2 (only factor loadings constrained). Results indicated that these models were significantly different ($\Delta\chi^2 / \Delta df = 49/21, p < 0.01$). An examination of MI revealed that Safety3 had the next highest chi-squared value ($\chi^2 = 7.01$). The previous model (Model A3i) was modified by freeing Safety3 (Model A3ii). Still, with Valu2 and Safety3 freed, results indicated that Model A2 and A3ii were marginally significantly different ($\Delta\chi^2 / \Delta df = 41/18, p = .001$). As such, the item (Safety1) with the next highest chi-squared value ($\chi^2 = 5.93$), was also freed and the previous model was modified (Model A3iii). A chi-squared test revealed these models were significantly different ($\Delta\chi^2 / \Delta df = 38/15, p < 0.001$). The MI revealed that the item with the next highest chi-squared value was Valu1 ($\chi^2 = 5.93$), and the model was once again modified to free this item (Model A3iv). Model A3iv was compared with the model with factor loadings constrained (Model A2) and the models were significantly different ($\Delta\chi^2 / \Delta df = 35/12, p = .001$). The item with the next highest chi-squared value is Safety2 ($\chi^2 = 3.47$). However, freeing Safety2 would mean that more than half of items on the factor would be freed. As such, the prerequisite of partial strong invariance was not met, and further moderation analysis was not conducted.

Table 13

Goodness of Fit Indices for Measurement Invariance (Model A: Safety – Race)

Model	χ^2 , df , p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model A1: Unrestricted model (all parameters free)	436.85, 260, $p <$.001	1.68	.07	.07	.91	.88
Model A2: Factor loadings constrained	459.60, 281, $p <$.001	1.64	.06	.07	.91	.88
Model A3: Factor loadings and intercepts constrained	526.38, 305, $p <$.001	1.73	.07	.08	.88	.87
Model A3i: Factor loadings and intercepts constrained, except Valu3	508.12, 302, $p <$.001	1.68	.07	.08	.89	.88
Model A3ii: Factor loadings and intercepts constrained, except Valu3, Safety3	500.78, 299, $p <$.001	1.67	.06	.08	.89	.88
Model A3iii: Factor loadings and intercepts constrained, except Valu3, Safety3, Safety1	497.99, 296, $p <$.001	1.68	.07	.08	.89	.88
Model A3iv: Factor loadings and intercepts constrained, except Valu3, Safety3, Safety1, Valu1	494.34, 293, $p <$.001	1.66	.06	.08	.90	.88

Interpersonal relationships and race/ethnicity. To examine whether race/ethnicity moderated the indirect effect between interpersonal relationships and GPA via school valuing, the indirect effects model with relationships as the predictor, GPA as the outcome, school valuing as the mediating variable, and grade and gender as covariates, was simultaneously fit to the four racial/groups (Model B1).

Subsequently, the same model was tested, but all factor loadings were constrained (Model B2). The results indicated that the unrestricted model (B1) was not significantly different from Model B2 with the factor loadings constrained ($\Delta\chi^2 / \Delta df = 25/18, p = .13$), indicating weak invariance. The third model tested was the same,

except both factor loadings and intercepts were constrained (Model B3). When Model B2 and B3 were compared, the results suggest that the two models were significantly different ($\Delta\chi^2 / \Delta df = 45/21, p = .002$). An examination of the MI indicated an item (Valu2) with the highest chi-squared value ($\chi^2 = 14.80$) and as such this parameter was freed. A fourth model was tested with all factor loadings and intercepts constrained except for Valu2 (Model B3i). The new model (Model B3i) was not significantly different from the model with factor loadings constrained (Model B2, $\Delta\chi^2 / \Delta df = 28/18, p = .06$), indicating partial strong variance.

Next, to test for moderation, the final model from measurement invariance testing was modified to fix regression paths to be equal across groups (Model B4). This new model (Model B4) was compared to the last model from measurement invariance testing (Model B3i), and the results suggest a significant difference between the models ($\Delta\chi^2 / \Delta df = 52/24, p < .001$). To test for moderation, each subsequent test restricted each path to identify race/ethnicity differences and compared with the freely estimated model. No significant differences were found, indicating that race/ethnicity did not moderate the relationship between interpersonal relationships and GPA via school valuing.

Table 14

Goodness of Fit Indices for Measurement Invariance (Model B: Relationships –Race)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model B1: Unrestricted model (all parameters free)	383.79, 212, $p < .001$	1.81	.07	.07	.85	.80

Model B2: Factor loadings constrained	408.69, 230, $p < .001$	1.78	.07	.07	.85	.81
Model B3: Factor loadings and intercepts constrained	454.09, 251, $p < .001$	1.81	.07	.08	.83	.80
Model B3i: Factor loadings and intercepts constrained, except Valu 2	436.68, 428, $p < .001$	1.76	.07	.08	.84	.81

Teaching and learning and race/ethnicity. Next, although no significant indirect effect was found for the full sample, it is possible that the indirect effect is not significant in the whole sample but may vary by subgroup. To examine whether race/ethnicity moderated the indirect effect between teaching and learning and GPA via school valuing, the indirect effects model with teaching and learning as the predictor, GPA as the outcome, school valuing as the mediating variable, and grade and gender as covariates, was simultaneously fit to the four racial/groups (Model C1). The results indicated that the unrestricted model (C1) was significantly different from Model C2 with the factor loadings constrained ($\Delta\chi^2 / \Delta df = 31/18, p = .03$), indicating that weak invariance has not been met. To proceed with measurement invariance testing, and subsequent moderation analyses, configural equivalence must be established. As such, no further steps were taken.

Table 15

Goodness of Fit Indices for Measurement Invariance (Model C: Teaching– Race)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model C1: Unrestricted model (all parameters free)	376.66, 212, $p < .001$	1.78	.07	.07	.89	.85

Model C2: Factor loadings constrained	407.38, 230, $p < .001$	1.77	.07	.08	.88	.85
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Institutional environment and race/ethnicity. Like teaching and learning, it is possible that an indirect effect varies by subgroup, even though no significant indirect effect was found in the previous models. To examine whether race/ethnicity moderated the indirect effect between institutional environment and GPA via school valuing, the indirect effects model with institutional environment as the predictor, GPA as the outcome, school valuing as the mediating variable, and grade and gender as covariates, was simultaneously fit to the four racial/groups (Model D1). The results indicated that the unrestricted model (D1) was significantly different from Model D2 with the factor loadings constrained ($\Delta\chi^2 / \Delta df = 25/12, p = 0.01$), indicating that weak invariance has not been met. As described earlier, to proceed with measurement invariance testing and subsequent moderation analyses, configural equivalence must first be established. As such, no further steps were taken to probe for moderation.

Table 16

Goodness of Fit Indices for Measurement Invariance (Model D: Environment – Race)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model D1: Unrestricted model (all parameters free)	236.46, 128, $p < .001$	1.85	.07	.06	.88	.82
Model D2: Factor loadings constrained	261.85, 140, $p < .001$	1.87	.07	.07	.87	.81

Gender. For the multigroup SEM models assessing moderating effects based on gender, race and ethnicity and grade were entered as covariates to the model. A

series of four tests were conducted to assess possible moderating effects in the relationship between each individual school climate dimension, school valuing, and GPA based on gender. Goodness of fit statistics for models can be found in Tables 17-20.

Safety and gender. As described above, a series of steps were taken to test for measurement invariance before testing for moderation. To examine whether gender moderated the indirect effect between safety and GPA via school valuing, the indirect effects model with safety as the predictor, GPA as the outcome, school valuing as the mediating variable, and grade and race as covariates was simultaneously fit to both groups (male and female) with all parameters freely estimated (Model E1). Second, the same model was tested, but all factor loadings were constrained to be equal across groups (Model E2). The constrained model was not significantly different from the unconstrained model ($\Delta\chi^2 / \Delta df = 2/7, p = .98$), indicating that factor loadings were invariant across gender (weak invariance). Third, the same model was tested with both factor loadings and intercepts constrained (Model E3). Models E2 and E3 were significantly different ($\Delta\chi^2 / \Delta df = 25/8, p = .001$). An examination of the MI indicated the item (Valu3) with the highest chi-squared value ($\chi^2 = 7.97$). To test for partial strong invariance, Model E3 was modified by freeing the intercept for Valu3 (Model E3i). Model E3i was then tested against Model E2 (factor loadings constrained), and results indicated that these models were significantly different ($\Delta\chi^2 / \Delta df = 17/7, p = .01$). An examination of the MI revealed the item with the next highest chi-squared value (Valu2, $\chi^2 = 4.16$). Model E3 was modified again by freeing the intercept for both Valu3 and Valu2 (Model E3ii). This modified model was

tested against model E2 (factor loadings constrained), and results indicated that these models were significantly different ($\Delta\chi^2 / \Delta df = 15/6, p = .02$). Again, the MI were examined to determine the item with the next highest chi-squared value, which was Safety1 ($\chi^2 = 3.64$). Model E2 (with factor loadings constrained) was compared with this modified model (Model E3iii) and results indicated these models were not significantly different ($\Delta\chi^2 / \Delta df = 11/5, p = .05$).

Because weak and partial strong invariance was achieved, a series of tests were conducted to assess for moderation. To do so, a series of models were tested with each path fixed to be equal across gender. First, Model E3iii was modified to fix regression paths to be equal across groups (Model E4) and this was compared to the final model from measurement invariance testing (Model F3iii) and the results suggest a significant difference between the models ($\Delta\chi^2 / \Delta df = 22/12, p = .03$). To test for moderation, each subsequent test restricted each path to identify gender differences and compared with the freely estimated model. No significant differences were found, indicating that gender did not moderate the relationship between safety and GPA via school valuing.

Table 17

Goodness of Fit Indices for Measurement Invariance (Model E: Safety – Gender)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model E1: Unrestricted model (all parameters free)	349.12, 162, $p < .001$	2.16	.06	.06	.90	.87
Model E2: Factor loadings constrained	350.68, 169, $p < .001$	2.08	.06	.06	.90	.88

Model E3: Factor loadings and intercepts constrained	376.10, 177, $p < .001$	2.12	.06	.06	.89	.87
Model E3i: Factor loadings, intercepts constrained, except Valu3	368.17, 176, $p < .001$	2.09	.06	.06	.90	.88
Model E3ii: Factor loadings, intercepts constrained, except Valu3, Valu2	365.55, 175, $p < .001$	2.09	.06	.06	.90	.88
Model E3iii: Factor loadings, intercepts constrained, except Valu3, Valu2, Safety1	361.89, 174, $p < .001$	2.08	.06	.06	.90	.88

Interpersonal relationships and gender. To examine whether gender moderated the indirect effect between interpersonal relationships and GPA via school valuing, the indirect effects model with relationships as the predictor, GPA as the outcome, school valuing as the mediating variable, and grade and race/ethnicity as a covariate, was simultaneously fit to both groups (Model F1). Second, the same model was tested, but all factor loadings were constrained (Model F2). The unrestricted model was not significantly different from the model with factor loadings constrained ($\Delta\chi^2 / \Delta df = 7/6, p = .33$), indicating weak invariance. To assess for strong invariance, the same model was tested with factor loadings and intercepts constrained (Model F3). However, results indicated that Model F2 and F3 were significantly different ($\Delta\chi^2 / \Delta df = 38/7, p < .001$). An examination of the modification indices indicated an item (Valu3) with the highest chi-squared value ($\chi^2 = 8.12$). To test for partial strong invariance, Model F3 was modified by freeing the intercept for Valu3 (Model F3i). When Model F3i was compared with F2 (only factor loadings constrained), results indicated these models were significantly different ($\Delta\chi^2 / \Delta df = 29/6, p < 0.001$). An examination of MI revealed an item (Rel2) with the next highest chi-squared value

($\chi^2 = 6.52$). Model F3i was further modified by also freeing Rel2 (Model F3ii). Still, results indicated that Model F3 and F3ii were significantly different ($\Delta\chi^2 / \Delta df = 23/5$, $p < .001$). As such, the item (Rel1) with the next highest chi-squared value ($\chi^2 = 6.36$) was freed. Again, Model F2 was compared with the newest model (Model F3iii), and a chi-squared test revealed these models were significantly different ($\Delta\chi^2 / \Delta df = 20/4$, $p = .001$). The MI suggest that the item with the next highest chi-squared value was Valu2 ($\chi^2 = 4.01$). Model F3iii was modified to free Valu 2 (Model F3iv). When Model F3iv was compared to Model F2, the results suggest that the models were significantly different ($\Delta\chi^2 / \Delta df = 17/3$, $p = .001$). The item with the next highest chi-squared value is Rel4 ($\chi^2 = 3.33$). However, freeing Rel4 would mean that more than half of items on the factor would be freed. As such, the prerequisite of partial strong invariance was not met, and further moderation analysis was not conducted.

Table 18

Goodness of Fit Indices for Measurement Invariance (Model G: Relationships - Gender)

Model	χ^2 , df , p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model F1: Unrestricted model (all parameters free)	250.19, 134, $p < .001$	1.87	.05	.05	.90	.86
Model F2: Factor loadings constrained	257.04, 140, $p < .001$	1.84	.05	.05	.90	.87
Model F3: Factor loadings and intercepts constrained	294.56, 147, $p < .001$	2.00	.06	.05	.87	.84
Model F3i: Factor loadings and intercepts constrained, except Valu3	286.37, 146, $p < .001$	1.96	.05	.05	.88	.85

Model F3ii: Factor loadings and intercepts constrained, except Valu3, Rel2	279.62, 145, $p < .001$	1.93	.05	.05	.88	.85
Model F3iii: Factor loadings and intercepts constrained, except Valu3, Rel2, Rel1	276.89, 144, $p < .001$	1.92	.05	.05	.88	.85
Model F3iv: Factor loadings and intercepts constrained, except Valu3, Rel2, Rel1, Valu2	274.49, 143, $p < .001$	1.92	.05	.05	.88	.85

Teaching and learning and gender. Although no significant indirect effect was found for the full sample, it is possible that the indirect effect is not significant in the whole sample but may vary by subgroup. As such, a multigroup SEM was tested to examine whether gender moderated the indirect effect between teaching and learning and GPA via school valuing. The indirect effects model with teaching and learning as the predictor, GPA as the outcome, school valuing as the mediating variable, and grade and race/ethnicity as covariates was simultaneously fit to both groups (Model G1). Next, the same model was tested but all factor loadings were constrained (Model G2). The unrestricted model was not significantly different from the model with factor loadings constrained ($\Delta\chi^2 / \Delta df = 3/6, p = .81$), indicating weak invariance. To assess for strong invariance, the same model was tested with factor loadings and intercepts constrained (Model G3). However, results indicated that Model G2 and G3 were significantly different ($\Delta\chi^2 / \Delta df = 25/7, p < .001$). An examination of the modification indices indicated an item (Valu3) with the highest chi-squared value ($\chi^2 = 7.92$). To test for partial strong invariance, Model G3 was modified by freeing the intercept for Valu3 (Model G3i) and compared with Model G2 (factor loadings constrained). Results indicated that these models were

significantly different ($\Delta\chi^2 / \Delta df = 17/6, p = .01$). An examination of MI revealed an item (Valu2) with the next highest chi-squared value ($\chi^2 = 4.34$). Model G2 (factor loadings constrained) was compared with the newest model (Model G3ii), and a chi-squared test revealed these models were significantly different ($\Delta\chi^2 / \Delta df = 14/5, p = .02$). Again, the MI was examined to identify the item with the next highest chi-squared value, which was Teach4 ($\chi^2 = 4.34$). The MI was examined and the item with the next highest chi-squared value was Teach1 ($\chi^2 = 0.82$). Model G3iii was modified to free Teach1. Compared to Model G2 (factor loadings constrained), Model G3iv was significantly different ($\Delta\chi^2 / \Delta df = 11/3, p = .01$). The item with the next highest chi-squared value was Valu1 ($\chi^2 = .28$). However, freeing Rel4 would mean that more than half of items on the factor would be freed. As such, the prerequisite of partial strong invariance was not met, and further moderation analysis was not conducted.

Table 19

Goodness of Fit Indices for Measurement Invariance (Model H: Teaching – Gender)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model G1: Unrestricted model (all parameters free)	320.63, 134, $p < .001$	2.39	.07	.06	.88	.83
Model G2: Factor loadings constrained	323.66, 140, $p < .001$	1.66	.06	.06	.88	.84
Model G3: Factor loadings and intercepts constrained	348.27, 147, $p < .001$	2.37	.07	.06	.87	.84
Model G3i: Factor loadings and intercepts constrained, except Valu3	340.29, 146, $p < .001$	2.33	.06	.06	.87	.84

Model G3ii: Factor loadings and intercepts constrained, except Valu3, Valu2	337.59, 145, $p < .001$	2.33	.06	.06	.87	.84
Model G3iii: Factor loadings and intercepts constrained, except Valu3, Valu2, Teach4	334.34, 144, $p < .001$	2.32	.06	.06	.87	.84
Model G3iii: Factor loadings and intercepts constrained, except Valu3, Valu2, Teach4, Teach1	334.17, 143, $p < .001$	2.34	.06	.06	.87	.84

Institutional environment and gender. Like teaching and learning, it is possible that the indirect effect between institutional environment and GPA via school valuing is significant by subgroup, although it was not for the whole sample. Consequently, a multigroup SEM was tested to examine whether gender moderated the indirect effect between institutional environment and GPA via school valuing. The indirect effects model with institutional environment as the predictor, GPA as the outcome, school valuing as the mediating variable, and grade and race/ethnicity as covariates was simultaneously fit to both groups (Model H1). Next, the same model was tested but all factor loadings were constrained (Model H2). The unrestricted model was not significantly different from the model with factor loadings constrained ($\Delta\chi^2 / \Delta df = 1/4, p = .99$), indicating weak invariance. To assess for strong invariance, the same model was tested with factor loadings and intercepts constrained (Model H3). However, results indicated that Model H2 (factor loadings constrained) and H3 (factor loadings and intercepts constrained) were significantly different ($\Delta\chi^2 / \Delta df = 18/5, p = .003$). An examination of MI revealed an item (Valu3) with the highest chi-squared value ($\chi^2 = 7.75$). Model H2 (factor loadings constrained) was compared with the newest model (Model H3i), and a chi-squared test revealed these models

were significantly different ($\Delta\chi^2 / \Delta df = 10/4$, $p = .04$). The MI was examined and the item with the next highest chi-squared value was identified (Valu2, $\chi^2 = 4.07$). Model J3 was modified to free both Valu3 and Valu2 (Model H3ii). Model H2 (factor loadings constrained) was compared with the newest model (Model H3ii), and a chi-squared test revealed these models were not significantly different ($\Delta\chi^2 / \Delta df = 7/3$, $p = .06$), indicating partial strong invariance.

To test for moderation, paths were first fixed to be equal across groups (Model H4) and compared to the final model from measurement invariance testing (Model H3ii). There was a significant difference between the models ($\Delta\chi^2 / \Delta df = 22/12$, $p = .04$). To test for moderation, each subsequent test restricted each path to identify gender differences. No significant differences were found, indicating that gender did not moderate the relationship between institutional environment and GPA via school valuing.

Table 20

Goodness of Fit Indices for Measurement Invariance (Model H: Environment – Gender)

Model	χ^2 , df , p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model H1: Unrestricted model (all parameters free)	189.78, 84, $p < .001$	2.26	.06	.05	.88	.83
Model H2: Factor loadings constrained	190.07, 88, $p < .001$	2.16	.06	.05	.89	.84
Model H3: Factor loadings and intercepts constrained	207.80, 93, $p < .001$	2.23	.06	.05	.87	.83

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Model H3i: Factor loadings, intercepts constrained, except Valu3	199.99, 92, $p < .001$	2.17	.06	.05	.88	.84
Model H3ii: Factor loadings, intercepts constrained, except Valu3 and Valu2	197.43, 91, $p < .001$	2.17	.06	.05	.88	.84
Primary Research Aim: Attendance						

All analyses were replicated for a second exploratory outcome, attendance.

The full model for attendance including the standardized coefficients is presented in Figure 3.

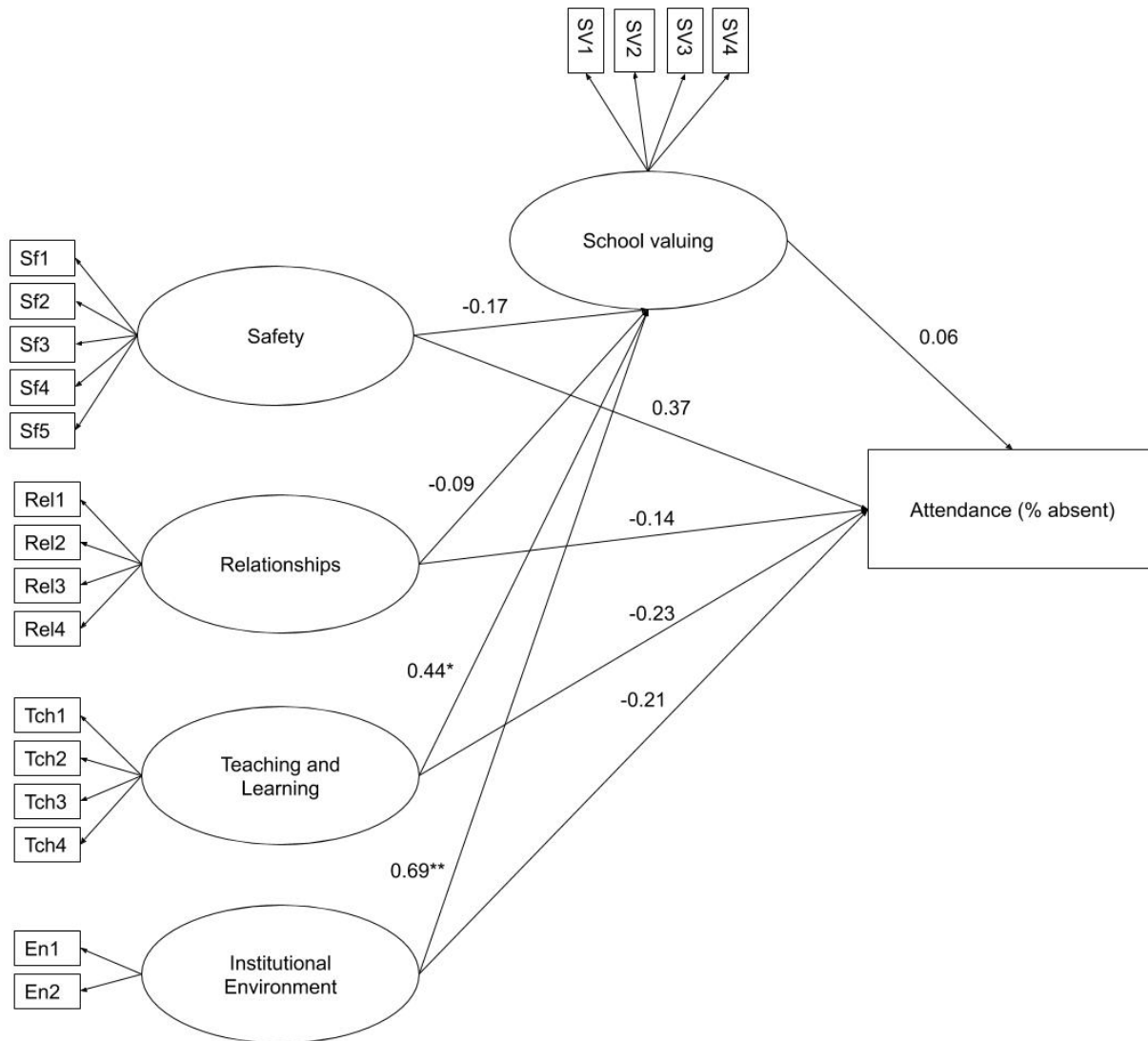


Figure 3. Full SEM Estimated Coefficients for Attendance and School Valuing, Controlling Grade, Gender, Race/Ethnicity

* Marginally significant at the 0.10 level (2-tailed)

** Significant at the 0.05 level (2-tailed)

As shown in Table 21, the goodness of fit indices indicated that the hypothesized conceptual model did have acceptable model fit ($\chi^2 = 788.40$; $df = 282$, $p < .001$; $\chi^2/df = 2.80$; RMSEA = .05; SRMR = .05, CFI = .89; TLI = .87). Almost all

indices met the cut-off for good model except for CFI and TFI which neared, but were less than, the .90 cutoff. Results for attendance are presented below.

Table 21

Goodness of Fit Statistics for Structural Equation Models (Full SEM and Indirect Effects), Attendance

Model	χ^2 , <i>df</i> , <i>p</i>	χ^2/df	RMSEA	SRMR	CFI	TLI
Full SEM (all school climate predictors, school valuing, attendance)	788.40, 282, $p < .001$	2.80	.05	.05	.89	.87
Indirect effects model (safety, school valuing, attendance)	201.40, 57, $p < .001$	3.53	.06	.06	.92	.89
Indirect effects model (relationships, school valuing, attendance)	124.24, 46, $p < .001$	2.70	.05	.04	.92	.90
Indirect effects model (teaching and learning, school valuing, attendance)	178.37, 46, $p < .001$	3.88	.07	.06	.90	.87
Indirect effects model (institutional environment, school valuing, attendance)	90.10, 27, $p < .001$	3.34	.06	.04	.92	.88
Indirect effects model (all school climate dimensions, school valuing, attendance)	627.09, 210, $p < .001$	2.99	.06	.06	.90	.88

In total, the predictors in the model were able to explain 7.5% ($R^2 = .075$) of the variance in attendance. There were no specific hypotheses because the outcome was exploratory. The findings of the full model were mostly consistent with the GPA findings (Table 22). The results indicated that all four school climate dimensions at T1 did not predict attendance at T2 (safety, $\beta = 0.37$, $SE = 0.30$, $p = .22$; interpersonal relationships, $\beta = -0.14$, $SE = 0.11$, $p = .20$; teaching and learning, $\beta = -0.23$, $SE = 0.28$,

$p = .43$; institutional environment, $\beta = -0.21$, $SE = 0.28$, $p = .45$). Similar to the model with GPA as the outcome, interpersonal relationships was not significantly related to school valuing ($\beta = -0.09$, $SE = 0.11$, $p = .40$), however, teaching and learning was positively related to school valuing, but the finding was marginally significant ($\beta = 0.44$, $SE = 0.23$, $p = .05$). Concerning the other two school climate dimensions, safety was not significantly related to school valuing ($\beta = -0.17$, $SE = 0.28$, $p = .55$), however institutional environment was positively and significantly related to school valuing ($\beta = 0.69$, $SE = 0.23$, $p = .002$). Finally, unlike the outcome GPA, school valuing was not significantly related to attendance ($\beta = 0.06$, $SE = 0.19$, $p = .76$).

Table 22

Full SEM Estimated Coefficients for Attendance and School Valuing

	Attendance			School valuing		
	β	SE	p	β	SE	p
Safety	0.37	0.30	.22	-0.17	0.28	.55
Relation	-0.14	0.11	.20	-0.09	0.11	.40
Teach	-0.23	0.28	.43	0.44	0.23	.05
Enviro	-0.21	0.28	.45	0.69	0.23	.002
Black	0.10	0.06	.07	0.13	0.04	.003
Hispanic	-0.05	0.05	.32	0.05	0.04	.28
Multiracial/Other	0.11	0.05	.02	0.07	0.04	.14
Female	-0.01	0.04	.90	0.03	0.04	.38
Grade 5	-0.09	0.06	.11	0.08	0.05	.10
Grade 6	-0.04	0.05	.43	-0.08	0.05	.11
Grade 7	-0.12	0.05	.02	0.04	0.05	.39
Valu	0.06	0.19	.76	NA	NA	NA

Indirect effects analyses. The series of five tests of indirect effects for the outcome GPA was replicated for the outcome attendance. The first four SEM models included one of the four school climate dimensions as the predictor, school valuing as the mediating variable, attendance (% absenteeism) as the outcome, and grade as a

covariate. For each test of indirect effects, goodness of fit statistics are reported in Table 21. The bootstrapping results are considered statistically significant if the confidence interval for the indirect effect based on 5,000 samples does not contain zero (Table 23).

Unlike the outcome GPA, none of the four tests of indirect effects were statistically significant. As such, there was no evidence to suggest that school climate was indirectly related to attendance via school valuing. The first model whether interpersonal relationships was indirectly related to attendance via school valuing. The goodness of fit indices revealed that the model had acceptable fit ($\chi^2 = 124.24$, $df = 46$, $p < .001$; $\chi^2/df = 2.60$; RMSEA = .05; SRMR = .04; CFI = .92; TLI = .90) and the test of indirect effects revealed that interpersonal relationships did not predict attendance via school valuing ($\beta = -0.003$, 95% CI [-0.05, 0.06]). However, the direct effect ($\beta = -0.15$, 95% CI [-0.26, -0.04]) and total effect ($\beta = -0.15$, 95% CI [-0.24, -0.06]) were significant. The second model included teaching and learning as the predictor variable. The goodness of fit indices revealed that the model had acceptable model fit ($\chi^2 = 178.37$, $df = 46$, $p < .001$; $\chi^2/df = 3.88$; RMSEA = .07; SRMR = .06; CFI = .90; TLI = .87), but teaching and learning did not indirectly predict attendance via school valuing ($\beta = -0.03$, 95% CI [-0.19, -0.13]). The third model examined whether safety was indirectly related to attendance via school valuing. The goodness of fit indices indicated that the hypothesized conceptual model had acceptable fit ($\chi^2 = 201.40$, $df = 57$, $p < .001$; $\chi^2/df = 3.53$; RMSEA = .06; SRMR = .06; CFI = .92; TLI = .89). Results indicated that the safety dimension of school climate did not predict attendance via school valuing ($\beta = -0.05$, 95% CI [-0.19, -0.09]). The fourth model

tested whether institutional environment indirectly predicted GPA via school climate, which had acceptable model fit ($\chi^2 = 90.10$, $df = 27$, $p < .001$; $\chi^2/df = 3.34$; RMSEA = .06; SRMR = .04; CFI = .92; TLI = .88). The indirect effect was not significant ($\beta = 0.10$, 95% CI [-0.24, 0.43]).

Although no individual tests of indirect effects were significant, a follow-up model was tested to examine whether school climate dimensions were independently indirectly related to attendance via school valuing. Consistent with the previous analyses, there was no significant indirect effects in the model that included all school climate dimensions (safety, $\beta = -0.02$, 95% CI [-1.28, 1.24]; interpersonal relationships, $\beta = -0.01$, 95% CI [-0.68, 0.66]; teaching and learning, $\beta = 0.05$, 95% CI [-1.37, 1.46]; institutional environment, $\beta = 0.07$, 95% CI [-2.48, 2.61]).

Table 23

Bootstrapping Results for Indirect Effects (Attendance)

Effect^	Individual indirect effects models				Full indirect effects model			
	Bootstrap Estimate		95% CI		Bootstrap Estimate		95% CI	
	β	SE	Lower	Upper	β	SE	Lower	Upper
Safety → SV → Attendance								
Direct Effect	0.003	0.10	-0.19	0.19	0.39	27.51	-53.53	54.30
Indirect Effect	-	-	-	-	-	-	-	-
Total Effect	-0.05	0.07	-0.19	0.09	0.02	0.64	-1.28	1.24
Rel → SV → Attendance								
Direct Effect	-	-	-	-	-	-	-	-
Indirect Effect	0.15*	0.06	-0.26	-0.04	0.14	11.09	-21.87	21.64
Total Effect	-0.003	0.03	-0.05	0.06	0.01	0.34	-0.68	0.66
Inst. Env. → SV → Attendance								
Direct Effect	-	-	-	-	-	-	-	-
Indirect Effect	0.15*	0.05	-0.24	-0.06	0.14	10.94	-21.57	21.29

Teach → SV →**Attendance**

Direct Effect					-			
	-0.05	0.10	-0.25	0.15	0.27	23.61	-46.55	46.00
Indirect Effect	-0.03	0.08	-0.19	0.13	0.05	0.72	-1.37	1.46
Total Effect					-			
	-0.07	0.05	-0.17	0.02	0.23	23.28	-45.86	45.40

Enviro → SV →**Attendance**

Direct Effect					-			
	-0.23	3.61	-7.30	6.85	0.22	33.41	-65.70	65.25
Indirect Effect	0.10	0.17	-0.24	0.43	0.07	1.30	-2.48	2.61
Total Effect					-			
	-0.13	3.66	-7.31	7.05	0.16	32.45	-63.75	63.44

*Significant at the 0.05 level (2-tailed), ^ Rel = Relationships, Teach = Teaching and Learning, Enviro = Environment, SV = School Valuing

Secondary Research Aim: Attendance

Although none of the indirect effects models were significant, it is possible that an indirect effect is not significant in the whole sample but is significant by subgroup. As such, a multigroup SEM's were tested to examine whether race and gender moderates the indirect effects models for each school climate dimension for attendance.

Race and ethnicity. For the multigroup SEM models assessing moderating effects based on race and ethnicity, gender and grade were entered as covariates to the model. A series of four tests were conducted to assess possible moderating effects in the relationship between each individual school climate dimension, school valuing, and attendance based on race and ethnicity. Goodness of fit statistics for models can be found in Tables 24-27.

Safety and race/ethnicity. To examine whether race/ethnicity moderated the indirect effect between safety and attendance via school valuing, the indirect effects

model with safety as the predictor, attendance as the outcome, school valuing as the mediating variable, and grade and gender as covariates, was simultaneously fit to the four racial/ethnic groups (Model K1). Second, the same model was tested, but all factor loadings were constrained to be equal across groups (Model K2). The unrestricted model was not significantly different from the model with factor loadings constrained ($\Delta\chi^2 / \Delta df = 22/21, p = .40$), indicating weak invariance. Next, the same model was tested with factor loadings and intercepts constrained to test for strong invariance (Model K3). The results indicated that Model K2 and K3 were significantly different ($\Delta\chi^2 / \Delta df = 58/24, p < .001$). An examination of the MI indicated an item (Valu2) with the highest chi-squared value ($\chi^2 = 14.89$) and as such this parameter was freed (Model K3i). Model K3i was compared with K2 (only factor loadings constrained). Results indicated that these models were significantly different ($\Delta\chi^2 / \Delta df = 41/21, p = .004$). An examination of MI revealed that Safety3 had the next highest chi-squared value ($\chi^2 = 7.36$). The previous model (Model K3i) was modified by freeing Safety3 (Model K3ii). Still, with Valu2 and Safety3 freed, results indicated that Model K2 and K3ii were significantly different ($\Delta\chi^2 / \Delta df = 41/18, p = .01$). As such, the item (Valu1) with the next highest chi-squared value ($\chi^2 = 6.81$), was also freed and the previous model was modified (Model K3iii). A chi-squared test revealed these models were significantly different ($\Delta\chi^2 / \Delta df = 31/15, p = .008$). The MI revealed that the item with the next highest chi-squared value was Safety1 ($\chi^2 = 5.47$), and the model was once again modified to free this item (Model A3iv). Model A3iv was compared with the model with factor loadings constrained (Model K2) and the models were significantly different ($\Delta\chi^2 / \Delta df = 29/12, p = .004$). The item with

the next highest chi-squared value is Safety2 ($\chi^2 = 2.50$). However, freeing Safety2 would mean that more than half of items on the factor would be freed. As such, the prerequisite of partial strong invariance was not met, and further moderation analysis was not conducted.

Table 24

Goodness of Fit Indices for Measurement Invariance (Model K: Safety – Race)

Model	χ^2 , df , p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model K1: Unrestricted model (all parameters free)	430.00, 260, $p < .001$	1.65	.06	.07	.91	.88
Model K2: Factor loadings constrained	451.91, 281, $p < .001$	1.61	.06	.07	.91	.89
Model K3: Factor loadings and intercepts constrained	510.21, 305, $p < .001$	1.64	.06	.08	.89	.87
Model K3i: Factor loadings and intercepts constrained, except Valu2	493.37, 302, $p < .001$	1.63	.06	.08	.89	.88
Model K3ii: Factor loadings and intercepts constrained, except Valu2, Safety3	485.52, 299, $p < .001$	1.62	.06	.08	.90	.88
Model K3iii: Factor loadings and intercepts constrained, except Valu2, Safety3, Valu1	482.93, 296, $p < .001$	1.63	.06	.08	.90	.88
Model K3iv: Factor loadings and intercepts constrained, except Valu2, Safety3, Valu1, Safety1	480.73, 293, $p < .001$	1.64	.06	.08	.90	.88

Interpersonal relationships and race/ethnicity. Next, to examine whether race/ethnicity moderated the indirect effect between interpersonal relationships and attendance via school valuing, the indirect effects model with interpersonal relationships as the predictor, attendance as the outcome, school valuing as the

mediating variable, and grade and gender as covariates, was simultaneously fit to the four racial/ethnic groups (Model L1). Second, the same model was tested, but all factor loadings were constrained to be equal across groups (Model L2). The unrestricted model was not significantly different from the model with factor loadings constrained ($\Delta\chi^2 / \Delta df = 24/18, p = .17$), indicating weak invariance. Next, the same model was tested with factor loadings and intercepts constrained to test for strong invariance (Model L3). The results indicated that Model L2 and L3 were not significantly different, but neared significance ($\Delta\chi^2 / \Delta df = 32/21, p = .05$).

Next, to test for moderation, the final model from measurement invariance testing was modified to fix regression paths to be equal across groups (Model L4). This new model (Model L4) was compared to the last model from measurement invariance testing (Model L3) and the results suggest a significant difference between the models ($\Delta\chi^2 / \Delta df = 47/24, p = .003$). To test for moderation, each subsequent test restricted each path to identify race/ethnicity differences and compared with the freely estimated model. No significant differences were found, indicating that race/ethnicity did not moderate the relationship between interpersonal relationships and attendance via school valuing.

Table 25

Goodness of Fit Indices for Measurement Invariance (Model L: Relationships - Race)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model L1: Unrestricted model (all parameters free)	369.31, 212, $p < .001$	1.74	.07	.07	.86	.81

Model L2: Factor loadings constrained	392.81, 230, $p < .001$	1.71	.07	.07	.86	.82
Model L3: Factor loadings and intercepts constrained	425.20, 251, $p < .001$	1.69	.07	.07	.85	.82

Teaching and learning and race/ethnicity. The third model examined whether race/ethnicity moderated the indirect effect between teaching and learning and attendance via school valuing. The model, which was simultaneously fit to the four racial/ethnic groups, had teaching and learning as the predictor, attendance as the outcome, school valuing as the mediating variable, and grade and gender as covariates (Model M1). Next, the same model was tested, but all factor loadings were constrained to be equal across groups (Model M2). When Model M1 (unrestricted model) and M2 (factor loadings constrained) were compared, results indicated that the models were significantly different ($\Delta\chi^2 / \Delta df = 30/18, p = .03$), indicating that weak invariance was not met. Configural equivalence must be established to proceed with measurement invariance testing. As such, no further steps were taken.

Table 26

Goodness of Fit Indices for Measurement Invariance (Model M: Teaching - Race)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model M1: Unrestricted model (all parameters free)	362.90, 212, $p < .001$	1.71	.07	.07	.90	.86
Model M2: Factor loadings constrained	393.16, 230, $p < .001$	1.71	.07	.08	.89	.86

Institutional environment and race/ethnicity. The next model examined whether race/ethnicity moderated the indirect effect between institutional environment and attendance via school valuing. The model, which was simultaneously fit to the four racial/ethnic groups, had teaching and learning as the predictor, attendance as the outcome, school valuing as the mediating variable, and grade and gender as covariates (Model N1). Next, the same model was tested, but all factor loadings were constrained to be equal across groups (Model N2). Model N1 (unrestricted model) was compared with M2 (factor loadings constrained), and results indicated that the models were significantly different ($\Delta\chi^2 / \Delta df = 25/12, p = .02$), indicating that weak invariance was not met. As such, no further steps were taken because configural equivalence was not established.

Table 27

Goodness of Fit Indices for Measurement Invariance (Model N: Environment – Race)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model N1: Unrestricted model (all parameters free)	215.09, 128, $p < .001$	1.68	.07	.06	.90	.84
Model N2: Factor loadings constrained	240.01, 140, $p < .001$	1.71	.07	.07	.88	.84

Gender. For the multigroup SEM models assessing moderating effects based on gender, race and ethnicity and grade were entered as covariates to the model. A series of four tests were conducted to assess possible moderating effects in the relationship between each individual school climate dimension, school valuing, and

attendance based on gender. Goodness of fit statistics for models can be found in Tables 28-31.

Safety and gender. To examine whether gender moderated the indirect effect between safety and attendance via school valuing, the indirect effects model with safety as the predictor, attendance as the outcome, school valuing as the mediating variable, and grade and race/ethnicity as covariates, was simultaneously fit to both groups (male and female) (Model P1). Second, the same model was tested, but all factor loadings were constrained to be equal across groups (Model P2). The unrestricted model was not significantly different from the model with factor loadings constrained ($\Delta\chi^2 / \Delta df = 1/7, p = .99$), indicating weak invariance. Next, Model P2 was modified by also constraining intercepts (Model P3). Model P2 was compared to Model P3 and results suggest that the two models were not significantly different ($\Delta\chi^2 / \Delta df = 15/8, p = .06$), indicating partial strong invariance.

Next, to test for moderation, the final model from measurement invariance testing was modified to fix regression paths to be equal across groups (Model P4). This new model (Model P4) was compared to the last model from measurement invariance testing (Model P3) and the results suggest there was no significant difference between the models ($\Delta\chi^2 / \Delta df = 9/12, p = .67$). As such, no further steps were taken because the regression coefficients do not vary by gender.

Table 28

Goodness of Fit Indices for Measurement Invariance (Model P: Safety - Gender)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
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Model P1: Unrestricted model (all parameters free)	330.73, 162, $p < .001$	2.04	.06	.06	.91	.88
Model P2: Factor loadings constrained	332.15, 169, $p < .001$	1.97	.06	.06	.91	.89
Model P3: Factor loadings and intercepts constrained	346.96, 177, $p < .001$	1.96	.05	.06	.91	.89

Interpersonal Relations and gender. To explore whether gender moderated the indirect effect between interpersonal relationships and attendance via school valuing, the indirect effects model with interpersonal relationships as the predictor, attendance as the outcome, school valuing as the mediating variable, and grade and race/ethnicity as covariates was simultaneously fit to male and female students (Model Q1). Next, the same model was tested, but all factor loadings were constrained to be equal across groups (Model Q2). Model Q1 was not significantly different than Model Q2 ($\Delta\chi^2 / \Delta df = 7/6, p = .29$), indicating weak invariance. Following this, Model Q2 was modified to also constrain intercepts (Model Q3), and a comparison of the models indicated that they were significantly different ($\Delta\chi^2 / \Delta df = 25/7, p = .001$). An examination of the modification indices showed that Valu3 had the highest chi-squared value ($\chi^2 = 8.26$), and Model Q3 was modified to free the intercept for Valu3 (Model Q3i). Model Q2 and Model Q3i were compared and found to be significantly different ($\Delta\chi^2 / \Delta df = 16/6, p = .01$). The modification indices revealed the item with the next highest chi-squared value (Rel2, $\chi^2 = 6.97$). The model was modified again to free the intercept for Rel2 (Model Q3ii). Model Q2 (factor loadings constrained) was compared with Model Q3ii (factor and intercepts

constrained except for Valu3 and Rel2) and results revealed that the models were not statistically different ($\Delta\chi^2 / \Delta df = 9/5, p = .10$), indicating partial strong invariance.

The final model from measurement invariance testing was then modified to constrict regressions (Model Q4). Model Q3ii was then compared to Q4, and results suggest that there was no significant difference between the models ($\Delta\chi^2 / \Delta df = 14/12, p = .31$). Consequently, no further steps were taken to probe for moderation effects because the regression coefficients did not vary by gender.

Table 29

Goodness of Fit Indices for Measurement Invariance (Model Q: Relationships - Gender)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model Q1: Unrestricted model (all parameters free)	243.16, 134, $p < .001$	1.81	.05	.05	.89	.86
Model Q2: Factor loadings constrained	250.49, 140, $p < .001$	1.79	.05	.05	.90	.87
Model Q3: Factor loadings and intercepts constrained	275.27, 147, $p < .001$	1.87	.05	.05	.88	.85
Model Q3i: Factor loadings and intercepts constrained, except Valu3	266.95, 146, $p < .001$	1.83	.05	.05	.89	.86
Model Q3ii: Factor loadings and intercepts constrained, except Valu3, Rel2	259.76, 145, $p < .001$	1.79	.05	.05	.89	.87

Teaching and learning and gender. To examine whether gender moderated the indirect effect between teaching and learning and attendance via school valuing, the indirect effects model with teaching and learning as the predictor, attendance as the outcome, school valuing as the mediating variable, and grade and race/ethnicity as

covariates, was simultaneously fit to both groups (male and female) (Model R1). Second, the same model was tested, but all factor loadings were constrained to be equal across groups (Model R2). When the two models were compared, results suggested they were not significantly different ($\Delta\chi^2 / \Delta df = 2/6, p = .91$), indicating weak invariance. To assess for strong invariance, the model with factor loadings constrained (Model R2) was compared with a modified model with factor loadings and intercepts constrained (Model R3). Results indicated that Model R2 and R3 were significantly different ($\Delta\chi^2 / \Delta df = 14/7, p = .04$). The modification indices were examined to determine what item intercept should be freed. The item with the highest chi-squared value was Valu3 ($\chi^2 = 8.32$), and as such, Model R3 was modified to free this item (Model R3i). Results suggest the model with the factor loadings constrained (Model R2) was not significantly different from the newly modified model (Model R3i, $\Delta\chi^2 / \Delta df = 6/6, p = .42$).

Next, to test for moderation, the final model from measurement invariance testing was modified to fix regression paths to be equal across groups (Model R4). Model R4 was compared to the last model from measurement invariance testing (Model R3i). Results suggest there was no significant difference between the models ($\Delta\chi^2 / \Delta df = 9/12, p = .73$), indicating that the regression coefficients do not vary by gender. As such, no further steps were taken.

Table 30

Goodness of Fit Indices for Measurement Invariance (Model R: Teaching - Gender)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
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Model R1: Unrestricted model (all parameters free)	307.99, 134, $p < .001$	2.30	.06	.06	.88	.84
Model R2: Factor loadings constrained	310.08, 140, $p < .001$	2.21	.06	.06	.88	.85
Model R3: Factor loadings and intercepts constrained	324.52, 147, $p < .001$	2.21	.06	.06	.88	.85
Model R3i: Factor loadings and intercepts constrained, except Valu3	316.14, 146, $p < .001$	2.17	.06	.06	.88	.85

Institutional environment and gender. Lastly, a multigroup SEM was tested to examine whether gender moderated the indirect effect between institutional environment and attendance via school valuing. The indirect effects model with institutional environment as the predictor, attendance as the outcome, school valuing as the mediating variable, and grade and race/ethnicity as covariates was simultaneously fit to both groups (Model S1). Next, the same model was tested but all factor loadings were constrained (Model S2). The unrestricted model was not significantly different from the model with factor loadings constrained ($\Delta\chi^2 / \Delta df = 1/4, p = .96$), indicating weak invariance. Next the model was modified to also constrain intercepts (Model S3). Results suggest Model S3 was significantly different than the model with only factor loadings constrained (Model S2, $\Delta\chi^2 / \Delta df = 12/5, p = .03$). The modification indices revealed the item with the highest chi-squared value was Valu3 ($\chi^2 = 8.05$), and the model was modified to free this item (Model S3i). Model S2 (factor loadings constrained) and the modified model with factor loadings and intercepts constrained except for Valu3 (Model S3i) were not significantly different ($\Delta\chi^2 / \Delta df = 4/4, p = .39$).

To test for moderation, the final model from measurement invariance testing was modified to fix regression paths to be equal across groups (Model S4). Model S4 was compared to the last model from measurement invariance testing (Model S3i). Results suggest there was no significant difference between the models ($\Delta\chi^2 / \Delta df = 15/12, p = .25$), indicating that the regression coefficients do not vary by gender. As such, no further steps were taken to probe for moderation.

Table 31

Goodness of Fit Indices for Measurement Invariance (Model S: Environment - Gender)

Model	χ^2, df, p	χ^2 / df	RMSEA	SRMR	CFI	TLI
Model S1: Unrestricted model (all parameters free)	176.17, 84, $p < .001$	2.10	.06	.05	.89	.83
Model S2: Factor loadings constrained	176.77, 88, $p < .001$	2.01	.06	.05	.89	.85
Model S3: Factor loadings and intercepts constrained	188.99, 93, $p < .001$	2.03	.06	.05	.89	.84
Model S3i: Factor loadings and intercepts constrained, except Valu3	180.89, 92, $p < .001$	1.97	.06	.05	.89	.85

Discussion

For decades, school climate has been of interest to researchers and practitioners in a wide range of academic disciplines because of its potential influence on student outcomes. In community psychology, it is believed that when there is “fit” between the needs of the members of the school community and the resources in the school environment, more positive outcomes may occur. Research suggests that

middle school is a particularly challenging time for youth because they experience tremendous developmental changes during this period, and thus, it is especially imperative that schools meet the needs of students during this time. Students who perceive their schools negatively are more likely to have negative psychosocial and academic outcomes, whereas those who feel supported, welcome, and respected are more likely to attend, participate, and find meaning in school (Eccles et al., 2000; Henry & Huzinga, 2007; Wang & Eccles, 2018). Moreover, data suggest that students who see utility in their schooling are more likely to engage and participate in school and have higher levels of academic achievement (Brickman et al., 2009; Martin & Steinbeck, 2017).

The current study examined if school climate dimensions are associated with academic achievement via school valuing among middle school students. The study also addressed whether student gender and race/ethnicity moderated any significant indirect effects. Overall, with all school climate dimensions in the SEM model, the results suggest that one of the dimensions of school climate, institutional environment is significantly and positively related to school valuing, after controlling for grade, race, and gender. Moreover, although the findings of the full model do not support a direct relation between any of the school climate dimensions and GPA, the findings do suggest that the other two dimensions of school climate, interpersonal relationships and safety are significantly, indirectly related to GPA through school valuing, when the other school climate dimensions are not controlled. These indirect effects, however, do not hold when all school climate dimensions are included in the same model. Regarding the outcome attendance, there was no evidence to suggest

that school climate dimensions are related indirectly or directly related to student attendance, or that school valuing is related to attendance. The next sections will include a discussion of the interpretation of results, implication of the findings, considerations for future studies, and limitations of the current study.

School Climate and GPA: Direct Relationship

Contrary to hypothesis, in the full SEM there was a null association between school climate dimensions and academic achievement (hypothesis 1). This finding was surprising considering previous studies demonstrating an association between global school climate and measures of academic achievement (Hopson & Lee, 2011; Maxwell, 2016; Voight & Hanson, 2017). However, several other studies found no relationship between global school climate and academic achievement (Reynolds, Lee, Turner, Bromhead, & Subasic, 2017; Hopson et al., 2014).

Similarly, there have been mixed results among studies which examine specific aspects of the school environment. For example, some studies indicate that the interpersonal relationships dimension of school climate is associated with achievement (Anderman, 2002; Bear et al., 2014; Daily, Mann, Kristjansson, Smith, & Zullig, 2019; Jia et al., 2009; Pérez-Gualdrón & Helms, J, 2017), while others found a null association (Gillen-O'Neel & Fuligni, 2013; Gutman & Midgley, 2000). As is generally the case, there may also be publication bias, whereby non-significant results are not published, but significant findings are. As a result, it may be that the school climate literature, overall, may be skewed towards significant or positive findings.

Of note, one of the four dimensions of school climate, institutional environment was significantly related to GPA at the zero-order level, although this relation became nonsignificant in the full SEM. The covariates gender, race, and grade were all significant in the full model, and it is likely that institutional environment lost significance due to the influence of these covariates. Furthermore, because institutional environment was moderately correlated with the other school climate dimensions, it is possible that the non-significant finding in the full model are a result of shared variance with the other predictors.

School Climate Dimensions and School Valuing

Regarding school valuing, it was posited that two dimensions of school climate (interpersonal relationships and teaching and learning) would be associated with this important aspect of student engagement (hypothesis 2). Interpersonal relationships was not found to be related to school valuing in the full GPA model, although it was significant at the zero-order level. As noted above, the loss of significance may be due to the influence of the covariates and/or overlapping variance with the other predictors.

The second hypothesized predictor, teaching and learning was not significantly related to school valuing, although it neared significance ($p = .06$), after controlling for gender, race, grade, and the other school climate dimensions). It may be that other school climate dimensions - especially the safety dimension which was highly correlated with teaching and learning - may have influenced this relationship due to shared variance. While the current study does not provide evidence for a relationship between teachers engagement in the classroom and school valuing, prior

evidence indicates that when students feel as though their teachers are enthusiastic and listen to their ideas, then students are more likely to find utility in their schooling, which consequently affects student outcomes (Strambler & Weinstein, 2010; Ulmanen, Soini, Pietarinen, & Pyhältö, 2016; Wentzel, Muenks, McNeish, & Russell, 2017). In fact, there is evidence that teacher engagement and affect play a significant role in student motivation and achievement (Mahler, Großschedl, & Harms, 2018; Lazarides, Buchholz, & Rubach, 2018). It may be that teachers' excitement about class content is transmitted to the whole classroom, thus creating a classroom climate that is enthusiastic about the subject matter, which then influences individual student motivation and valuing (Lazarides et al., 2018). Like these studies, a causal sequence was proposed in the current study, whereby it was hypothesized that school climate dimensions would influence school valuing, rather than vice versa. However, questions remain about the directionality of these relationships, since reciprocal relationships were not tested. Indeed, it may be that students who value school perceive their teachers as more engaged or may experience better treatment by their teachers (Patall et al., 2018).

Concerning the exploratory analyses, the relationship between safety and school valuing was not significant, although, once again, there had been a significant zero order relation. As noted above, the loss in significance may be due to overlapping variance with the other predictors, and/or the influence of the covariates. On the other hand, consistent with the significant zero order relation, the results indicated a significant positive relationship between institutional environment and school valuing, after taking the other school climate dimensions into account and

controlling for grade, gender, and race. Institutional environment is relatively understudied compared with the other school climate dimensions (Wang & Degol, 2016; Grazia & Molinari, 2020) and as such, this finding was somewhat unexpected. However, a few studies have found a positive relationship between institutional environment and academic achievement (Maxwell, 2016; Uline & Tschannen-Moran, 2007). Uline and Tschannen-Moran (2007), for example, found a positive relationship between institutional environment and academic achievement, and suggested that a clean, fair, and organized school may implicitly communicate to students that they are valued by the school. The current study findings suggest that if students perceive their schools to have a positive ethos and fair rules, then they will feel valued by their school, and in turn, will value what they learn at school.

School Valuing and GPA

In contrast to what was predicted, school valuing was not significantly related to GPA (hypothesis 3) in the full structural equation model with all school climate dimensions and covariates included. However, the zero-order correlation between school valuing and GPA was positive and significant and the relationship between school valuing and GPA was significant in the two indirect effects models (safety and relationships) where significant indirect effects were found. This is consistent with theoretical and empirical work which indicates that students' perceptions of school content being valuable or relevant to their personal lives or future goals is associated with greater student achievement (Eccles et al., 2000; Irvin et al., 2011; Wigfield et al., 2000; Litalien et al., 2017). It is possible that the significant zero-order correlation

between school valuing and GPA lessened in the full SEM due to the inclusion of all school climate and demographic variables.

While there was no evidence for a significant relationship between school valuing and GPA in the SEM model including all school climate dimensions and covariates, previous evidence suggests that school valuing may be an important factor in student achievement. Several studies by Eccles and colleagues (1989, 1993, 2011) utilizing the expectancy-value model of achievement as a framework found that students' academic achievement is determined by two factors: student self-efficacy and subjective task values (a superordinate construct that encompasses intrinsic values and utility values; school valuing is one type of utility value, Wigfield & Eccles, 2000).

School Valuing as a Mediating Variable of School Climate and GPA

The next set of analyses aimed to understand whether school climate dimensions were indirectly related to student achievement via school valuing. Notably, results indicated some support for an indirect pathway of influence, with both the interpersonal relationships and the safety dimensions related to academic achievement via school valuing (hypothesis 4, exploratory aim 2). The interpersonal relationship subscale in the current study is aligned with other constructs, such as school connectedness, sense of belonging, or peer relationships. As such, the current study findings are consistent with research examining the mediating role of student engagement in the relationship between interpersonal relationships (or aligned constructs) and student achievement (Arslan, 2016; Reynolds et al., 2017). It may be when students feel a sense of belonging at school, they are more likely to identify and

value school, which may then impact their academic behaviors and outcomes.

Although it was not tested as part of the current study, an alternative pathway of influence may exist: it may be that when students value their academics, they form a greater attachment and identification with school, which in turn, influences their academic outcomes (Ruzek & Schenke, 2019).

Similarly, the results indicate a significant indirect effect for the safety dimension of school climate, indirectly influencing GPA via school valuing (exploratory aim 2). In the current study, the measure for safety focused on students' level of *emotional safety*, including one item assessing whether students felt safe (rather than asking whether they felt unsafe) and three items assessing whether they could trust their teachers. It is also aligned with measures of student-teacher trust. Consistent with this result, Fan and Williams (2018) found that positive relationships with teachers indirectly impacted math and reading scores through its relations with student motivation. Furthermore, Roorda and colleagues (2017) investigated whether student engagement acts as a mediator in the association between affective teacher-student relationships (which referred to relationships characterized by closeness, care, and trust) and student achievement. Aligned with the current study findings, they found that student engagement mediated the association between teacher-student relationships and achievement in both elementary and middle schools.

Taken together, the findings emphasize the importance of supportive and trusting relationships within the school community to promote students' valuing of school, with the eventual goal to increase student achievement. Consistent with person-environment fit theory (Rappaport, 1977), the findings suggest that when

students find fit within the school environment, school valuing and student achievement will follow. In particular, the nature and quality of student interactions with peers and teachers play an important role in this relationship.

It is important to note that the two significant indirect effects discussed above were no longer significant when all school climate dimensions were included in a full indirect effects model. This suggests that there are not any independent indirect effects when all school climate dimensions are simultaneously controlled. The dimensions safety and teaching and learning are strongly correlated, and interpersonal relationships was moderately correlated with institutional environment. As such, it may be that the effects found in the individual indirect effects models disappear due to shared variance explained by the different predictors.

Contrary to hypothesis 4, the results suggest that teaching and learning was not indirectly related to GPA via school valuing. A systematic review on the associations between teacher-student relationships and student engagement (Quin, 2017) concluded that positive student-teacher relationships in the classroom are positively related to student engagement, however, the author identified only three studies examining school engagement, broadly, as a mediator between teacher-student relationships and academic grades (Lam et al., 2012; Perry, Liu, & Pabian, 2010; Zimmer-Gembeck, Chipuer, Hanisch, Creed, & McGregor, 2006). In contrast to the current study, all three studies that found significant mediating relationships used measures of student engagement that included behavioral, cognitive, and emotional dimensions of engagement. As a result, these studies may have been more able to capture the broader phenomenon of student engagement in a way not possible when

focusing solely on school valuing. Moreover, two of the three studies included only high school students (Perry et al., 2010; Zimmer-Gembeck et al., 2006) and two of the three studies sampled students from outside of the United States (Lam et al., 2012; Zimmer-Gembeck). Future research is needed to explore these relationships at the middle school level, as it may be that these relationships are stronger at the high school level.

Although institutional environment was positively related to school valuing, after controlling for the other school climate dimensions and demographic variables, results indicated that institutional environment was not indirectly related to GPA via school valuing (exploratory aim 2). There is little research exploring possible mediating variables in the relationship between institutional environment and student achievement, however, there is evidence that other dimensions of school climate, such as the school's social environment (Maxwell, 2016; Uline & Tschannen-Moran, 2007) mediate the relationship between the institutional environment and student achievement. Unlike the current study, these studies include items reflecting the quality of the school facility, school building features and age, as well as students' overall impression of the school ethos (which are more aligned with the institutional environment items used for the current study).

Race and Gender, School Climate, and GPA

The results from the multigroup structural equation models to examine moderated indirect effects revealed that several items did not display factor loading and intercept invariance, suggesting that youth of different genders or racial/ethnic groups may have interpreted or responded to these items differently to the school

climate and school valuing items. The modification indices revealed that students of different racial backgrounds responded differently to several items from the school valuing and safety scales. Moreover, boys and girls responded differently to several items from the school valuing scale and the safety and relationships subscales. While examining measurement differences based on student gender and race/ethnicity was not the focus of the study, future research on these items may be conducted to examine these underlying differences. The results emphasize the need to test measurement differences by race and gender before comparing results across groups and drawing conclusions.

Among the race/ethnicity multigroup models that met the criteria for weak and partial strong invariance (race/relationships), there was no evidence to suggest that race/ethnicity moderated any significant indirect effects. In the literature, there is mixed evidence about whether race/ethnicity moderates the relationships between school climate dimensions (or aligned constructs), school valuing (or aligned constructs), and GPA with some studies indicating racial differences (Buehler, Fletcher, Johnston, & Weymouth, 2015; Niehaus et al., 2016), and other studies finding no differences (Benner, Graham, & Mistry, 2008; Gillen-O'Neel & Fuligni, 2013).

Still, results from the preliminary analysis suggest that White students had a higher GPA than Black and Hispanic students. This is consistent with a large body of work documenting the “achievement gap” between White, Black, and Hispanic (non-English language learner) students [see Carnoy and Garcia (2017) for summary of national trends]. Overall, a substantial gap exists between Black and White, and

Hispanic and White students test scores, however, the gap has declined in the past two decades. There are several possible explanations for this gap, including but not limited to, a greater emphasis on discipline targeting youth of color, inequities in educational resources, different academic expectations, and generational poverty which disproportionately impacts Black communities.

Results from the preliminary analysis also suggest that White students had less favorable perspectives of the relationships dimension compared to both Hispanic and Multiracial/Other students. Other studies have shown the same pattern as it relates to White and Hispanic students (Goodenow & Grady, 1993). Studies suggest that school belonging may be particularly important for Hispanic youth as it relates to student motivation and may be a mechanism through which the negative effects of discriminatory stress are mitigated (Goodenow, 1993b; Roche & Kuperminc, 2012).

Two gender multigroup models met the criteria for weak and partial strong invariance (gender/safety; gender/environment), however, results indicated no moderating effects based on gender. While there is some evidence of gender differences in the relationship between school climate indicators (or aligned constructs), school valuing, and GPA (Hughes, Im, & Allee, 2015), several studies find no gender differences (Jia et al., 2009; Lam et al., 2012, Loukas, Suzuki, & Horton, 2006; Perry et al., 2010; Wang & Eccles, 2012).

While there were no gender differences in the indirect effects analysis, the results from the preliminary analyses indicated there were gender differences for GPA and two school climate dimensions (interpersonal relationships and institutional environment). Preliminary analysis revealed that female students had a significantly

higher GPA than male students. Overall, the literature suggests that girls tend to have higher grades than boys (Reyes, Brackett, Rivers, White, & Salovey, 2012). However, there is some evidence that gender differences in achievement may be dependent on the subject, with girls scoring higher in reading and comprehension, and boys scoring higher in math (Else-Quest, Hyde, & Linn, 2010; Voyer & Voyer, 2014). The current study combined math and reading courses into a single score, but future research may consider disaggregating these scores to detect differences by subject. For example, it may be that girls' experiences with teachers in the classroom have a larger effect on math scores because of potential stereotype threat. It may be that a significant moderation effect was difficult to detect because reading and math scores were combined into a single score.

The findings also indicated that female students had less favorable perspectives of their interpersonal relationships compared to male students. This contrasts with some research that suggests that girls report higher school belonging than boys across a range of student ages (Gillen-O'Neel & Fuligni, 2013; Hughes et al., 2015). On the other hand, middle school girls tend to experience more forms of victimization (except for physical bullying) than boys, and as such, for some girls, middle school relationships may be more difficult to navigate (Shukla et al., 2016).

Additionally, preliminary analysis results suggest that female students had less positive views of their school environment compared to male students. There is little research on gender differences with respect to the institutional environment domain. Studies linking institutional environment and student achievement have not included gender in their models (Dura'n-Narucki, 2008; Maxwell, 2016) so it is unclear

whether female and male students perceive this domain differently. Future research should include gender to understand whether gender moderates the relationship between institutional environment and student achievement.

Although it was beyond the scope of this study, it is important to note that the effect of any stratification marker, such as gender or race/ethnicity, may be indicative of dynamics operating in the broader sociocultural context within and beyond the school setting. For example, if a school emphasizes equality, inclusion, or cultural pluralism, and all members of the school share those values, the school cultural context may have less value as it relates to students sense of belonging, valuing, and achievement. It may also be that systemic oppressions beyond the school walls, such as sexism or racism, may have proximal or distal impact on a student's perception of school, school valuing, and their academic achievement. While the current measure did not assess student perspectives of cultural pluralism or perspectives of treatment based on gender or race in their community or broader society, future studies may include this to explore under what conditions race and gender play a role in the relation between school climate and achievement.

School Climate and Attendance

In addition to examining GPA, all analyses were replicated for a secondary outcome, attendance. School absenteeism is a risk factor for academic underachievement and school dropout (Gottfried, 2010; United States Department of Education, 2019). Nationally, about 14% of students in middle schools are considered chronically absent, defined as students who miss more than 15 days of school in a year (United States Department of Education, 2019).

Overall, there was no evidence to suggest that student perspectives of school climate were associated with student attendance, either directly or indirectly via school valuing. Little research has specifically examined the relationship between school climate and absenteeism. However, a handful of studies have found a significant association between school climate and attendance (Brookmeyer, Fanti, & Henrich, 2006; Hendron & Kearney, 2016; Van Eck et al., 2017), which aligned with the preliminary analysis results in the current study which indicated that the interpersonal relationships dimension was inversely related to student absenteeism. In other words, students with more favorable views of interpersonal relationships had lower levels of absenteeism.

While there is a dearth of research examining the relationship between school climate dimensions and attendance, the lack of significant relationships in the model was unexpected because previous research has documented the association between constructs aligned with school climate and attendance or absenteeism (Havik et al., 2015; Benner & Wang, 2014; Brookmeyer et al., 2006; Henry & Huzinga, 2007). It may be that a lack of significant findings in the full SEM and subsequent models testing indirect effects may be due to unmeasured exogenous variables. The measures used for the current study were not inclusive of all components of each school climate dimension, and as thus they may not have adequately captured the aspect of each dimension that relates to attendance or absenteeism. For example, school factors found to be associated with attendance that were not included in the current study included school size (Benner & Wang, 2014, Brookmeyer et al., 2006) and involvement with delinquent peers (Henry & Huzinga, 2007). On the other hand, a

caring school community, which is aligned with the items used for the interpersonal relationships and safety dimensions of school climate in the current study, was not significantly associated with truancy (Henry & Huzinga, 2007).

Student attendance is considered an indicator of “behavioral engagement” and behavioral engagement is one of the three components of the “student engagement” construct (which also includes cognitive engagement and emotional engagement). School valuing, on the other hand, is an indicator of emotional engagement. While there is little research specifically examining school valuing and student attendance or absenteeism, it was expected that they would be related, because previous research has found that behavioral engagement and emotional engagement are significantly associated (Finn, 1989; Wang et al., 2011). As Voelkl (1996) describes, if students do not feel as though they belong and value school, then they may be predisposed to being absent, since the perceived utility (or lack of utility) may play a role in whether students decide to attend or not attend school. It may be that other indicators of emotional engagement such as emotional withdrawal from school or enjoyment of school learning may be better predictors of attendance (Finn, 1989; Wang & Fredericks, 2014) or that school valuing does play a role in whether students attend school, but only in combination with other emotional engagement predictors that are not measured as part of the current study.

Moreover, the bulk of the research exploring risk factors for chronic absence point to other student, family, and school factors that were not included in the current study (United States Department of Education, 2019; García & Weiss, 2018; Wilkins, 2008). Student characteristics such as parental education, parental supervision, family

socioeconomic status, family structure support, student race/ethnicity, disability status, and student mode of transportation have all been found to be associated with student absenteeism/attendance (Allen, Way, & Casillas, 2019; Garcia & Weiss, 2018; Gee, 2018; Gottfried, 2017; Lim, Davis, Choi, & Chen, 2019; Stein & Grigg, 2019).

Race and Gender, School Climate, and Attendance

Overall, there was no evidence to suggest that race/ethnicity moderated the indirect effect between school climate dimensions and attendance via school valuing. Like the GPA models, three of the four models examining race/ethnicity differences did not meet the criteria for measurement invariance, indicating that youth of different racial and ethnic groups may have responded to survey items differently. The modification indices for attendance models suggested that students with different racial/ethnic backgrounds responded differently to several items from the school valuing scale and several items from the safety subscale. Furthermore, boys and girls responded differently to one item from the school valuing scale and one item from the relationships subscale.

Like the GPA findings, only one race/ethnicity multigroup model (race/relationships) met the criteria for weak and partial strong invariance, however, there was no evidence to suggest that race/ethnicity moderated any effects between this school climate domain, school valuing, and attendance. The moderating role of race/ethnicity on the relationship between school climate, school valuing, and attendance (or aligned constructs) has received little research focus. In fact, only one study was found that explored the relationship between school climate and attendance, which included a moderating role of race and ethnicity (Hendron &

Kearney, 2016). This study did not find any racial/ethnic differences in the relationship between school climate dimensions and attendance.

Results from the preliminary analyses revealed that there were significant differences in absenteeism among students from different racial/ethnic groups. Specifically, Black and Multiracial/Other students were more likely to be absent compared to Hispanic students. This finding is consistent with national data, indicating that Asian, White, and Hispanic students are less likely to be chronically absent compared to African American, Multiracial, Pacific Islander, and Native American middle school students (Gee, 2018).

Concerning gender, all four multigroup SEM models including each school climate domain, school valuing, and attendance met the criteria for weak and partial strong measurement invariance. However, further testing revealed no significant differences by gender. There is little research on the moderating role of gender in the relationship between school climate dimensions, school valuing, and attendance (or aligned constructs). Among the published work that exists, there is mixed evidence regarding gender differences in the relationship between school climate perspectives (or aligned constructs) and attendance, with some findings indicating gender differences in the relationship between aspects of school climate and attendance (Feldman et al., 2014), and others suggesting no gender differences (De Wit, Karioja, & Rye, 2010; Hendron & Kearney, 2016).

In the current study, there was no significant differences in attendance between female and male students. Evidence from previous studies are mixed with some evidence indicating that male students are more frequently truant than female

students (Sälzer, Trautwein, Lüdtke, & Stamm, 2012), and other studies suggesting the opposite (Garcia & Weiss, 2018; Henry & Huzinga, 2007). Recent national data indicate that eighth-grade boys had a higher full-attendance rate (did not miss any school) compared to girls, but there were no significant differences in chronic absenteeism by gender (García & Weiss, 2018; Wilkens, 2008).

Strengths and Limitations

The current study has several strengths including the fact that it includes two sources of data (student self-report and teacher reported transcript grades), encompasses a racially diverse sample of students, and includes different dimensions of school climate, rather than a single global measure of school climate. Furthermore, although the school climate and student engagement literatures are extensive, the body of research examining both constructs in one study is relatively small and this study helps to bridge this gap. Consistent with what is described in contemporary scholarship (Hayes, 2013; Hayes & Rockwood, 2016), the current study found significant indirect effects even though a direct effect was not initially found. A strength of the study was that the magnitude of indirect effects was explicitly tested using the state-of-art bootstrapping method. Still, there are several notable limitations.

First, the school climate data are incomplete because student subjective perceptions of the school environment assessed, rather than school climate perspectives from multiple reporters (from teachers, principals, or independent observers). Students may be influenced by social desirability and may respond in a way that appeases or pleases teachers, peers, or researchers, which could lead to biased results. However, scholars suggest that there is utility in examining student

perspectives, because it can provide a better understanding of how students construct their experience in school, which is valuable to study in relation to student outcomes (Roeser & Eccles, 1998).

While a strength of the current study was its specific attention to the differing dimensions of school climate, the PSS was not developed with specific attention to dimensions of school climate, and thus, the measures did not capture the complexity and multidimensionality of each dimension. For example, the “safety” subscale emphasizes emotional safety, rather than physical safety, and may be more aligned with the construct student-teacher trust. The institutional environment measure contains only two items and does not include questions about whether there is adequate space and materials for students. Moreover, the measures used do not include items related to school racial climate, school leadership, or parent or community members’ involvement in school. Future studies would benefit from more comprehensive measures that capture the various dimensions of each school climate. Relatedly, school climate measures are limited in that most focus on the individual level of analysis, rather than the school level.

School valuing is viewed as a factor within the emotional engagement dimension of school engagement and was of interest in this study (Wang et al., 2011). School valuing is only one indicator of student engagement, and it is likely that other unmeasured emotional, cognitive, and behavioral factors within the larger construct of student engagement play a role in the relationship between school climate and academic achievement. Future research should include other indicators of student engagement to better understand these relationships.

One limitation of the attendance data is that teachers may inaccurately report students as absent. Still, official school records are more accurate than other methods for determining school absences such as student or parent reports, because self-report may be subject to recall bias. In addition, the demographic data (race, ethnicity, and gender) was reported to the school district by students' parents and may not adequately reflect the way students self-identify. Students' social identities matter for exploring perceptions of school climate because these identities may impact the way students construct their understanding of their interactions and experiences. Future research may address this by asking students to identify their racial and gender identities.

Relatedly, due to the small sample sizes and its consequence on statistical power, students identified as Asian, Pacific Islander, Native Hawaiian, and Native Alaskan were collapsed with the "Multiracial" group, and as such, analyses teasing out the effects for each of these groups was not possible. Grouping "Multiracial" individuals together in a single category has inherent problems because it ignores the reality that people who are multiracial likely have unique and differing social and political histories and cultural traditions (Pew Research Center, 2015). As such, to preserve the data of students from groups that are underrepresented in the sample were grouped with the "Multiracial" group to form a "Multiracial/Other" group. A larger sample with oversampled minority groups would allow for larger numbers of students in each demographic subcategory, reducing the need to collapse demographic categories and ideally also examine other demographic categories such as sexual orientation and immigration status.

The current study examined the relationship between student perspectives of school climate and school valuing at T1 and GPA and attendance a year later (T2) among students who were in 5th through 8th grade at T1. High school GPA and attendance scores were used for students who were in 8th grade at T1, and thus in 9th grade at time 2. Consequently, there are other unmeasured factors unique to this group of students that may have influenced the outcome variables, such as the difficulties associated with the transition to high school or perspectives of the high school context (Benner, Boyle, & Bakhtiari, 2017). However, these students were kept in the sample, because research shows elements of the middle school climate are predictive of achievement in the first years of high school (Langenkamp, 2009; Langenkamp, 2010). Specifically, positive relationships with teachers and peers in middle school have been shown to influence academic achievement in the first year of high school (Langenkamp, 2009; Langenkamp, 2010).

Relatedly, the academic achievement score was created by converting letter grades for math and English to numbers, and then taking the average of the scores. In this sample, 9th graders may have taken math or English courses with different levels of course rigor (e.g. honors, advanced placement). The issue with how to optimally deal with grade data is debated, and there is no consensus regarding the best method for aggregating ordinal data into a single composite measure (Lang, 2007; Hansen, Sadler, & Sonnert, 2019). Consistent with similar studies (Gutman, 2006; Wang, 2012), the current study did not weight the 9th grade math and English grades by course difficulty; this is a limitation of the outcome data. Future studies should

consider alternative approaches for handling these data such as converting the grades to weighted averages or rigor-adjusted averages to partially address this limitation.

Another limitation of the study involves issues around causality and directionality. As noted above, the inclusion of a mediating variable implies directionality and temporality in the relationship between school climate (T1), school valuing (T1), and academic achievement (T2). The current study was guided by previous theoretical and empirical work which assumes a temporal sequence between these factors. However, as previously noted, it may be that the relationships between these variables are reciprocal (Patall et al., 2018; Ruzek & Schenke, 2019; Skinner & Belmont, 1993). In the future, a more robust examination, such as a longitudinal investigation of the likely bi-directional influences between school climate, school valuing, and academic outcomes, would provide a deeper understanding of these relationships.

Lastly, data were collected from one public middle school in Pennsylvania during the 2017-2018 school year, and the 2018-2019 school year academic and outcome data were collected by the Pottstown School District. Moreover, the site for this study was undergoing an SEL intervention, which is unique to the school district. The data and findings may not be representative or generalizable for other middle schools. No school-level or multi-level analyses are possible because the study was limited to student perceptions in a single school, and future work should ideally include multiple schools to do setting-level comparisons.

Implications for Practice

The current study supports previous research which emphasizes the importance of school climate for student achievement and extended the research further by proposing school valuing as an explanatory psychological mechanism which influences this relationship. The findings highlight the need for positive and trusting relationships between students and their teachers and peers. Since all dimensions of school climate are malleable, programs and interventions focused on improving the interpersonal dynamics between all members of the school community would be useful in indirectly impacting student achievement. For example, social-emotional learning programs – such as *Second Step*, the program being implemented in the study context – may be important to improving the interpersonal relationships in the school context. Evidence suggests that SEL interventions can impact students' psychosocial and academic outcomes through influencing aspects of school climate (McCormick et al., 2015; Stalker, et al., 2018; Top, Liew, & Luo, 2016). For example, evaluation of the school-based intervention program INSIGHTS SEL found that the program impacted math achievement via improvements in classroom emotional support (McCormick et al., 2015).

The teaching and learning dimension of school climate involves the ability of teachers to meaningfully engage students in the classroom and attend to the different learning styles of students. Although there was no evidence in the current study to suggest that teaching and learning related to either student achievement or school valuing, previous evidence suggests it may still be important for student success (Wentzel et al., 2017). One potential way to improve student engagement in the

classroom is to foster subject-specific enthusiasm among teachers in pre- or in-service teacher education workshops (Mahler et al., 2018). Building teacher enthusiasm may generate excitement and interest among students, which may increase their school valuing. However, to adequately support students, teachers require strategies, time, training, and support to withstand their occupational stress. In fact, as it relates to teaching and learning, Shen and colleagues (2015) found that teacher burnout was negatively related to students' perceptions that their teacher provided an academic context with opportunity and autonomy in class activities, which in turn, was negatively related to students' motivation and engagement. Furthermore, Bottiani, Duran, Pas, and Bradshaw (2019) found that student disruptive behavior was related to teachers' levels of stress and burnout, but this stress was mitigated once teacher resources were included in the model. Programs or interventions focused on increasing teachers' personal resources (such as mindfulness or SEL training), classroom resources (such as classroom management support), and organizational resources (such as collegial leadership or teacher affiliation) may be useful to help teachers better cope with job related stress (Bottiani et al., 2019; Braun, Roeser, Mashburn, & Skinner, 2018; Iancu, Rusu, Măroiu, Păcurar & Maricuțoiu, 2018).

Finally, the institutional environment in this study referred to students' perceptions concerning the broader ethos in the school and whether school rules were fair or unfair. While there was no evidence that the institutional environment dimension was directly or indirectly related to academic achievement, it emerged as significant predictor of school valuing. As such, there may be utility to attending to the school institutional environment, since school valuing has been shown to relate to

student persistence in academics (Niehaus et al., 2016; Wang, Degol, & Ye, 2015).

Like other dimensions of school climate, a thorough school improvement process that includes self-evaluation processes could be used to address issues within the institutional environment (Germana & Ben-Peretz, 2020). A cyclical and comprehensive school improvement process that includes all stakeholders within the school community could help to shed light on the strengths and weaknesses in the school context, and also promote a culture of evaluation that commits to using data to inform its decisions.

In the current study, school valuing was not significantly related to student achievement in the full SEM. Still, it may be valuable for school-based programs or interventions to intentionally focus on building student interest in school by providing applied opportunities for students to identify and practice the ways school applies to their lives. Examples of this are problem-based learning (PBL), career relevant instruction, or service-learning, all of which allow students to acquire knowledge and skills through problems or instruction rooted in real world problems, students' lives or future goals (Willems & Gonzalez-DeHass, 2012). In PBL, teachers provide problem-solving activities that students can connect with and therefore see as more meaningful. Indeed, there is evidence to suggest that students who engaged in PBL had higher levels of task value and intrinsic goal orientation compared with a control-group (Sungur & Tekkaya, 2006). Another example is career relevant instruction, which refers to teachers bringing in examples of relevant careers aligned with the content and skills in the class content. Evidence suggests that this approach may be effective in promoting school valuing (Orthner, et al., 2010; Rose & Akos, 2014).

Lastly, service-learning is another method through which students can learn skills and knowledge through community service experiences. While the research on service learning and school valuing is limited, initial evidence suggests that quality service-learning experiences were associated with students valuing of school (Meyer, 2006).

Future Research

While this study provided some insights into the relationships between school climate dimensions, school valuing, and achievement, there are several recommendations for future research.

While there are numerous school climate frameworks, such as the 3-factor ED School Climate Surveys (EDSCLS) model (U.S. Department of Education, 2016), or the National School Climate Center framework with six school climate categories, recent reviews (Lewno-Dumdie, et al., 2020; Wang & Degol, 2016) suggest that there are five dimensions of school climate (safety, interpersonal relationships, teaching and learning, institutional environment, and the school improvement process). Future research should consider using this framework to explore school climate, so that there is more consistency across school climate research. If studies are consistent in utilizing this framework, and reliable and valid measures are developed or used in alignment with this framework, the findings from school climate studies may be more reliably understood when aggregated.

In the current study, the safety dimension of school climate was akin to the concept of student-teacher trust and the interpersonal relationships dimension was aligned with the construct of sense of belonging or school connectedness. Additional theoretical work is needed to explore the ways in which these concepts converge and

diverge, so that a more refined operationalization of the “relationships” dimension of school climate may be developed. Relatedly, theoretical and empirical work is needed on the school climate dimension, the school improvement process. Since the school improvement process has been discussed as a dimension in recent reviews of school climate (Lewno-Dumdie et al., 2020; Wang & Degol, 2016), more refinement is needed on the definition and construct, so that reliable and valid quantitative measures can be developed. Qualitative research on the school improvement process would also be a valuable addition to the literature and would help facilitate quantitative measure development. Relatedly, future research should assess measurement invariance across different subgroups of students and may consider using qualitative methods to assess student interpretation of items based on gender and race/ethnicity.

The current research included students’ perspectives of school climate, but future research should include multiple reporters, such as teachers, school leadership, or parents when examining school climate. Furthermore, questions remain about the direction of relationships between school climate, school valuing, and academic achievement. Longitudinal research that includes more than two timepoints would be useful in exploring the reciprocal relationships between school climate and student engagement across time. Additionally, future research should include multiple schools to allow for school-level and multi-level analyses.

This study aimed to explore the relationships between school climate and a component of student engagement, school valuing. More research on the relationship between school climate and student engagement, broadly, is needed to further explore

the mechanisms through which school climate may influence student outcomes.

Lastly, there was not sufficient evidence to suggest that student perspectives of school climate were significantly associated with attendance. However, this relationship is understudied, and more research is needed to explore what aspects of the school environment relate, if at all, to attendance. Empirical work in this area would also aid in developing climate-based programs to specifically address absenteeism (Hendron & Kearney, 2016).

Conclusion

How and for whom is school climate associated with academic achievement?

This is the question the current study sought to answer. For decades, scholars and practitioners have been interested in some iteration of this question. Many believe that the school environment is something that can be improved on. If school climate can influence student psychological and academic outcomes, then it may be a worthwhile effort.

The current study built upon previous studies examining the relationship between school climate dimensions and student achievement in two ways. First, unlike most empirical studies on school climate, the current study considered multiple aspects of school climate, rather than utilizing a single school climate scale with a small number of items (Grazia & Molinari, 2020). Additionally, this study not only examined whether school climate dimensions were associated with student achievement, but also posited one potential psychological mechanism, school valuing, through which school climate may wield influence on academic achievement.

Consistent with expectations, the findings indicate that students who perceive higher levels of warm and caring interpersonal relationships and higher levels of safety with their teachers achieve at higher levels through the influence of school valuing. Furthermore, while no demographic differences were found, the current study highlights the need to explore whether students with different racial/ethnic background or genders respond to or have different interpretations of school climate indicators. While more research is needed to further explore the directionality of these relationships, the current study suggests that in addition to focusing on improving school climate, it is also imperative to address the psychosocial mechanisms through which school climate relates to academic achievement. Without attending to both school climate and student motivation and engagement factors, the attempts to increase student achievement may be incomplete and limited.

Appendix A

Parent Letter

Dear Parent or Caregiver:

I am writing to update you on the social and emotional learning program being implemented in the Pottstown School District. Social and emotional learning, or SEL, teaches children skills found to be important to success in school and in life. These skills include: understanding and managing emotions, setting and achieving goals, showing empathy for others, maintaining positive relationships, and making responsible decisions. Many studies have shown that when children learn SEL in school their school performance goes up and they feel less emotional distress.

Pottstown is currently using SEL in all its schools. The *Second Step* program is being used in grades pre-K through 8 and the *School Connect* program in grade 9. Teachers and staff have worked hard to teach SEL, and they report that students enjoy strengthening their social and emotional skills. As we approach the end of the school year, we will conduct annual surveys of students to check on our progress implementing SEL. Questions on the survey have been given to children in schools across the country.

Here is a summary of what will take place:

- In late May or early June (depending on the school), we will administer the Pottstown School District SEL Survey to children in grades 3-9.
- The survey will be given during class and will take about 10-15 minutes to complete.
- The survey asks children what they like about school, how they usually deal with feelings, how they get along with others at school, and how important school is to them.
- The survey will use a unique ID for each child, so no names will appear on the survey, and no one will know individual children's responses to questions.
- Findings from the survey will be made available to school administrators, teachers, and parents, but only at the group level; no individual information about children will be reported.
- Children will be told that their participation is voluntary and that they may skip items if they like.
- The survey is not a test and there are no right and wrong answers. Children's grades will not be affected if they do not complete the survey.

The District's implementation of SEL has been supported by consultants from The Scattergood Foundation and The Consultation Center at Yale University: Drs. Samantha Matlin, Michael Strambler, and Jacob Tebes. They have consulted to teachers and administrators at the classroom and building level, and conducted in-service trainings. Now they have agreed to help the District administer the survey and analyze its findings so we can improve our use of SEL.

If you do not want your child to complete the survey, please print and sign the attached form by May 21, 2018 and return it to the principal's office of your child's school. Since the survey will be analyzed by The Consultation Center at Yale University, the form uses required language from the Yale Human Subjects Committee to ensure that parents/caregivers have been given an opportunity not to have their child complete the

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

survey. If you have questions or concerns, please do not hesitate to reach out to me at 610-323-8200 or lkolka@pottstown12.org.

Sincerely,

Laurie Kolka

Director of Curriculum, Instruction, and Professional Development

If you do not want your child to complete the Pottstown School District SEL Survey, please print and sign the form below and return it to the principal's office of your child's school.

Participation in the Pottstown School District SEL Survey is completely voluntary. Your child is free to decline to participate, to end participation at any time for any reason, or to refuse to answer any individual question without penalty. Your and your child's decision to participate will not affect their relationship with the school or teachers.

If you have any questions about this survey, you may contact the evaluators/consultants at The Consultation Center at Yale University, Drs. Jacob Tebes (jacob.tebes@yale.edu), Samantha Matlin (samantha.matlin@yale.edu), or Michael Strambler (michael.strambler@yale.edu) or you can call (203) 789-7645 to speak with them directly.

If you would like to talk with someone other than Drs. Tebes, Matlin, or Strambler to discuss concerns or to discuss your child's rights as a participant in this survey, you may contact the Yale University Human Subjects Committee, 203-785-4688, human.subjects@yale.edu. Additional information is available at <http://your.yale.edu/research-support/human-research/research-participants/rights-research-participant>.

Please withdraw my child from participating in the 2018 *Pottstown School District SEL Survey*.

Child's Name (please print): _____

Parent/Guardian Signature: _____

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

Name of School _____

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

Appendix B

Pottstown School District SEL Survey (Grades 3-5)

This survey asks you questions about your school. It includes questions about people at your school, what you like at school, and how you deal with your feelings while at school. This is not a test. There are no right or wrong answers. No one will be able to find out how you or anyone else answered. No names will ever be reported, instead we will use a unique code number that will be kept confidential. Your school will only see a report that combines everyone's answers, not your individual answers. Please answer each question as honestly as you can. The survey will take about 10-15 minutes to complete. Whether or not you decide to complete the survey is up to you. It is completely voluntary. You are free to decline to participate, to stop the survey for any reason, or to not answer a question.

If you agree to do the survey, continue below. If you do NOT want to do the survey, check here ____ and stop. _____

OK, let's get started. To help you get the hang of this survey, here are a few practice questions.

How much do you agree with the following statements? (Please mark an X in the box that fits your answer best.)	 Strongly Disagree	 Disagree	 Agree	 Strongly Agree
Practice Question #1: I like ice cream.				
Practice Question #2: Most students at my school like ice cream.				

OK, now let's start the survey.

How much do you agree with the following statements? (Please mark an X in the box that fits your answer best.)	 Strongly Disagree	 Disagree	 Agree	 Strongly Agree
Most students at my school treat each other with respect.				

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

How much do you agree with the following statements? (Please mark an X in the box that fits your answer best.)	 Strongly Disagree	 Disagree	 Agree	 Strongly Agree
When my teachers tell me not to do something, I know they have a good reason.				
I feel safe and comfortable with my teachers at this school.				
My teachers will always listen to students' ideas.				
My teachers treat me with respect.				
Most students at my school like to put others down.				
Most students at my school help each other learn.				
Most students at my school don't get along together very well.				

Now here are some different questions about your school.

	DO NOT UNDERSTAND me at all	Understand me a little	Understand me somewhat	Understand me a lot	COMPLETELY UNDERSTAND me
How well do people at your school understand you as a person?					

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	GIVE ME NO SUPPORT at all	Give me a little bit of support	Give me some support	Give me a lot of support	GIVE ME A GREAT DEAL of support
How much support do the adults at your school give you?					

	GIVE ME NO RESPECT at all	Give me a little bit of respect	Give me some respect	Give me quite a bit of respect	GIVE ME A GREAT DEAL of respect
How much respect do students at your school show you?					

	I feel like I DO NOT BELONG at all	I feel like I belong a little bit	I feel like I belong somewhat	I feel like I belong a lot	I feel like I COMPLETELY BELONG
Overall, how much do you feel like you belong at your school?					

Here are some more questions about your school.

	The adults at my school DO NOT CARE at all	The adults at my school care a little	The adults at my school care some	The adults at my school CARE A LOT
How much do the adults in your school care about how you feel?				

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	My classmates DO NOT CARE at all	My classmates care a little	My classmates care some	My classmates CARE A LOT
How much do your classmates care about how you feel?				

	The adults at my school NEVER ASK	The adults at my school ask once a month	The adults at my school ask once a week	The adults at my school ASK ONCE A DAY
How much do the adults in your school ask you about how you feel?				

	My classmates NEVER ASK	My classmates ask once a month	My classmates ask once a week	My classmates ASK ONCE A DAY
How much do your classmates ask you about how you feel?				

	The adults at my school NEVER HELP ME FEEL BETTER	The adults at my school help me feel better once in a while	The adults at my school usually help me feel better	The adults at my school ALWAYS HELP ME FEEL BETTER
How often do the adults in your school help you feel better when you're unhappy?				

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	My classmates NEVER HELP ME FEEL BETTER	My classmates help me feel better once in a while	My classmates usually help me feel better	My classmates ALWAYS HELP ME FEEL BETTER
How often do your classmates help you feel better when you're unhappy?				

Please answer the following questions about yourself.

	Almost NEVER	Once in a while	Sometimes	Usually	Almost ALWAYS
How often are you able to control your emotions when you need to?					
Once you get upset, how often can you get yourself to relax?					

	I am NOT ABLE to stay calm at all	I am able to stay slightly calm	I am able to stay somewhat calm	I am able to stay very calm	I am ABLE to stay extremely calm
When things go wrong for you, how calm are you able to stay?					

Here are a few more questions to answer about yourself.

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	NEVER	Once in a while	Usually	ALWAYS
When you're in class, how often do you focus on doing your work during class time?				
When you're in class, how often do you make yourself pay attention even when class is boring?				
When you're in class, how often do you give up doing an assignment when it's difficult?				
When you're in class, how often do you stop doing an assignment if it seems like it will take too long?				

OK. We are almost done. Here are some final questions about your school.

	I find the things I learn NOT AT ALL INTERESTING	I find the things I learn slightly interesting	I find the things I learn somewhat interesting	I find the things I learn QUITE INTERESTING
How interesting do you find the things you learn in your classes?				

	Almost NEVER	Once in a while	Sometimes	FREQUENTLY
How often do you use ideas from school in your daily life?				

	NOT AT ALL IMPORTANT	Slightly important	Somewhat important	QUITE IMPORTANT
How important is it to you to do well in your classes?				

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	NOT AT ALL USEFUL	Slightly useful	Somewhat useful	QUITE USEFUL
How useful do you think school will be to you in the future?				

	Almost NEVER	Once in a while	Sometimes	Frequently	Almost ALWAYS
How often do your teachers seem excited to be teaching your classes?					

	EXTREMELY UNFAIR	Quite unfair	Somewhat unfair/fair	Quite fair	EXTREMELY FAIR
How fair or unfair are the rules for the students at this school?					

	EXTREMELY NEGATIVE	Quite negative	Somewhat negative/positive	Quite positive	EXTREMELY POSITIVE
How positive or negative is the energy of the school?					

	EXTREMELY HURTFUL	Hurts quite a bit	Somewhat hurts/helps	Helps quite a bit	EXTREMELY HELPFUL
At your school, how much does the behavior of other students hurt or help your learning?					

You are all done! Thank you for completing this survey!

Appendix C

Pottstown School District SEL Survey (Grades 6- 9)

This survey asks you questions about your school. It includes questions about people at your school, what you like at school, and how you deal with your feelings while at school. This is not a test. There are no right or wrong answers. No one will be able to find out how you or anyone else answered. No names will ever be reported, instead we will use a unique code number that will be kept confidential. Your school will only see a report that combines everyone's answers, not your individual answers.

Please answer each question as honestly as you can. The survey will take about 10-15 minutes to complete. Whether or not you decide to complete the survey is up to you.

It is completely voluntary. You are free to decline to participate, to stop the survey for any reason, or to not answer a question.

If you agree to do the survey, continue below. If you do NOT want to do the survey, check here ____ and stop.

OK, let's get started. To help you get the hang of this survey, here are a few practice questions.

How much do you agree with the following statements? (Please mark an X in the box that fits your answer best.)	 Strongly Disagree	 Disagree	 Agree	 Strongly Agree
Practice Question #1: I like ice cream.				

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

How much do you agree with the following statements? (Please mark an X in the box that fits your answer best.)	 Strongly Disagree	 Disagree	 Agree	 Strongly Agree
Practice Question #2: Most students at my school like ice cream.				

OK, now let's start the survey.

How much do you agree with the following statements?
(Please mark an X in the box that fits your answer best.)

Most students at my school treat each other with respect.				
When my teachers tell me not to do something, I know they have a good reason.				
I feel safe and comfortable with my teachers at this school.				
My teachers will always listen to students' ideas.				
My teachers treat me with respect.				
Most students at my school like to put others down.				
Most students at my school help each other learn.				
Most students at my school don't get along together very well.				

Now here are some different questions about your school.

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	DO NOT UNDERSTAND me at all	Understand me a little	Understand me somewhat	Understand me a lot	COMPLETELY UNDERSTAND me
How well do people at your school understand you as a person?					

	GIVE ME NO SUPPORT at all	Give me a little bit of support	Give me some support	Give me a lot of support	GIVE ME A GREAT DEAL of support
How much support do the adults at your school give you?					

	GIVE ME NO RESPECT at all	Give me a little bit of respect	Give me some respect	Give me quite a bit of respect	GIVE ME A GREAT DEAL of respect
How much respect do students at your school show you?					

	I feel like I DO NOT BELONG at all	I feel like I belong a little bit	I feel like I belong somewhat	I feel like I belong a lot	I feel like I COMPLETELY BELONG
Overall, how much do you feel like you belong at your school?					

Here are some more questions about your school.

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	The adults at my school DO NOT CARE at all	The adults at my school care a little	The adults at my school care some	The adults at my school CARE A LOT
How much do the adults in your school care about how you feel?				

	The classmates DO NOT CARE at all	My classmates care a little	My classmates care some	My classmates CARE A LOT
How much do your classmates care about how you feel?				

	The adults at my school NEVER ASK	The adults at my school ask once a month	The adults at my school ask once a week	The adults at my school ASK ONCE A DAY
How much do the adults in your school ask you about how you feel?				

	My classmates NEVER ASK	My classmates ask once a month	My classmates ask once a week	My classmates ASK ONCE A DAY
How much do your classmates ask you about how you feel?				

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	The adults at my school NEVER HELP ME FEEL BETTER	The adults at my school help me feel better once in a while	The adults at my school usually help me feel better	The adults at my school ALWAYS HELP ME FEEL BETTER
How often do the adults in your school help you feel better when you're unhappy?				

	My classmates NEVER HELP ME FEEL BETTER	My classmates help me feel better once in a while	My classmates usually help me feel better	My classmates ALWAYS HELP ME FEEL BETTER
How often do your classmates help you feel better when you're unhappy?				

Please answer the following questions about yourself.

	Almost NEVER	Once in a while	Sometimes	Usually	Almost ALWAYS
How often are you able to control your emotions when you need to?					
Once you get upset, how often can you get yourself to relax?					

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	I am NOT ABLE to stay calm at all	I am able to stay slightly calm	I am able to stay somewhat calm	I am able to stay very calm	I am ABLE to stay extremely calm
When things go wrong for you, how calm are you able to stay?					

Here are a few more questions to answer about yourself.

	NEVER	Once in a while	Usually	ALWAYS
When you're in class, how often do you focus on doing your work during class time?				
When you're in class, how often do you make yourself pay attention even when class is boring?				
When you're in class, how often do you give up doing an assignment when it's difficult?				
When you're in class, how often do you stop doing an assignment if it seems like it will take too long?				

OK. We are almost done. Here are some final questions about your school.

	I find the things I learn NOT AT ALL INTERESTING	I find the things I learn slightly interesting	I find the things I learn somewhat interesting	I find the things I learn QUITE INTERESTING
How interesting do you find the things you learn in your classes?				

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	Almost NEVER	Once in a while	Sometimes	FREQUENTLY
How often do you use ideas from school in your daily life?				

	NOT AT ALL IMPORTANT	Slightly important	Somewhat important	QUITE IMPORTANT
How important is it to you to do well in your classes?				

	I DO NOT APPRECIATE SCHOOL AT ALL	I appreciate school a little bit	I appreciate school somewhat	I APPRECIATE SCHOOL QUITE A BIT
How much do you see yourself as someone who appreciates school?				

	NOT AT ALL USEFUL	Slightly useful	Somewhat useful	QUITE USEFUL
How useful do you think school will be to you in the future?				

	Almost NEVER	Once in a while	Sometimes	Frequently	Almost ALWAYS
How often do your teachers seem excited to be teaching your classes?					

	EXTREMELY UNFAIR	Quite unfair	Somewhat unfair/fair	Quite fair	EXTREMELY FAIR
How fair or unfair are the					

SCHOOL CLIMATE, SCHOOL VALUING, ACADEMIC ACHIEVEMENT

	EXTREMELY UNFAIR	Quite unfair	Somewhat unfair/fair	Quite fair	EXTREMELY FAIR
rules for the students at this school?					

	EXTREMELY UNPLEASANT	Quite unpleasant	Somewhat unpleasant/pleasant	Quite pleasant	EXTREMELY PLEASANT
How pleasant or unpleasant is the physical space at your school?					

	EXTREMELY NEGATIVE	Quite negative	Somewhat negative/positive	Quite positive	EXTREMELY POSITIVE
How positive or negative is the energy of the school?					

	EXTREMELY HURTFUL	Hurts quite a bit	Somewhat hurts/helps	Helps quite a bit	EXTREMELY HELPFUL
At your school, how much does the behavior of other students hurt or help your learning?					

You are all done! Thank you for completing this survey!

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