

EVERYONE IS ENGAGED: A LONGITUDINAL EXAMINATION OF SCHOOL CLIMATE
AND STUDENT ENGAGEMENT IN HIGH SCHOOL STUDENTS

by

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(Under the Direction of Amy L. Reschly)

ABSTRACT

High school dropout is a nation-wide epidemic with long lasting individual, economic, and health outcomes. School climate and student engagement are complex multifaceted factors identified within the literature as protective mechanisms through which graduation rates and postsecondary enrollment might be encouraged. Using a national dataset, this longitudinal study examined these complex factors across time to put forth additional avenues for intervention and support for students most at risk of dropout as well as the impact on student outcomes.

INDEX WORDS: Student outcomes, school climate, student engagement

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CHAPTER 1

INTRODUCTION

Few experiences have consequences as serious and long lasting as dropping out of high school. Associated with negative psychosocial, health, and economic outcomes, high school dropout is a significant problem in the United States (Archambault, Janosz, & Pagini, 2009; Rumberger, 2011). Only 85% of students graduated high school in 2018 (National Center for Education Statistics [NCES], 2020), with those who did not graduate less likely to find jobs, become those who are paid the lowest wages (Snyder & Dillow, 2010), have poorer health (Currie, 2009), and more likely to commit and be incarcerated for a crime (Baum & Payea, 2004; Harlow, 2003; Lochner & Moretti, 2003; Petit & Western, 2004). Subsequently, these non-graduates as a group contribute less to their local, state, and federal economies (U.S. Department of Education, 2020), pay less in taxes, and rely more on public assistance programs (Ma, Pender, & Welch, 2016). Belfield and Levin (2007) estimated that each high school graduate generates approximately \$200,000 in government savings.

Although the overall national graduation rate is below expectations, it is particularly alarming when closely examining state, regional, and demographic group rates. Graduation rates among students who are racial and ethnic minorities, are from families with limited socioeconomic resources, come from single-parent headed households, or who have a disability fall well below the national average (DePaoli et al. 2018; McFarland et al., 2018). As school completion and dropout are both longitudinal processes (Finn, 1989), it is important to consider factors throughout students' educational careers that might impact their development. Student

engagement is one factor noted in the literature related to dropout. Positive engagement has potential to encourage school completion. Its association with meaningful academic and social outcomes, amenability to intervention, and importance throughout school for all students (Christenson et al., 2012) has made student engagement a construct of particular interest to educators, policy makers, and other stakeholders. Studies have explored the relationship between student engagement and high-school graduation (Balfanz, Herzog, & Iver, 2007; Finn & Rock, 1997; Lovelace, Reschly, & Appleton, 2017), post-secondary enrollment and persistence (Finn, 2006; Fraysier, Reschly, & Appleton, 2020), resilience and effort (Finn & Zimmer, 2012; National Research Council and the Institute of Medicine [NRC], 2004), lower-risk health behaviors (Griffiths et al., 2012), and overall subjective well-being (Heffner & Antaramian, 2016; Tian et al., 2016). Despite growing understanding regarding the relationship between student engagement and student outcomes, there are still clear areas of research need.

Longitudinal studies are an important approach to advance conceptualizations of student engagement and offer the unique opportunity to examine various factors at play throughout a student's schooling. Through longitudinal studies, research has highlighted the association between student engagement, academic, and occupational outcomes (Abbott-Chapman et al., 2014). Longitudinal studies also allow researchers and educators to better evaluate the effectiveness of changing policies, expectations, and environments on short-term and long-term outcomes. Studies such as Finn and Rock's (1997) seminal paper compare the outcomes of students placed at risk. Finn and Rock (1997) followed such risk students throughout high school to determine the factors that predicted those who were dropouts, non-resilient school completers,

and resilient school completers. That study was one of the first to illustrate the impact of student engagement on long-term outcomes, such as academic achievement, and its ability to serve as a protective factor against other factors influencing a student's decision to leave.

Dropout is often a result of repeated negative experiences within the school environment (Bridgeland, DiIulio, & Burke Morison, 2006), such as lack of support, psychosocial difficulties (Berti et al., 2017), bullying, and poor student-teacher relationships (Psacharopoulos & Patrinos, 2018). Although the literature highlights the complexity of the decision to leave school, a number of facets continue to be strongly and consistently associated with the decision, which might offer multiple avenues for intervention. Specifically, Rumberger (1987) grouped factors associated with dropout into demographic, family-related, economic, and individual factors. Dalton, Glennie, Ingels, and Wirt (2009) reported 83% of dropouts gave one or more school-based reasons for dropping out and 34% noted that family-related reasons also influenced their decision. Among the most common school-based reasons given for dropout were missing too many school days, poor grades or performance, and disliking school (Dalton et al., 2009). Finn (1989) described dropout as a process: when students repeatedly feel frustrated, helpless, and unsuccessful, students begin to become disengaged, experience learned helplessness, and lack motivation. Specifically, children often believe that appropriate effort will result in success; however, if effort is repeatedly not met with success, children might stop putting in effort and begin to withdraw (Nicholls, 1978, 1979, 1989). Rumberger (1987) further discussed the role of repeated negative experiences and gradual disengagement from school as process occurring over time including feeling unsafe inside the school building, experiencing unsupportive relationships

with teachers and peers, or having frequent interactions with disciplinary policies and practices. All of these factors, when compound over time, “push” a student out of school (Ross Epp & Epp, 2001).

Given the focus on individual-level factors in the decision to leave school, more broad system-wide school-, district-, and national-level factors that might be manipulated to retain students in larger numbers are the next area of focus for developing a complex and comprehensive model for dropout and resilience. Fatou and Kubiszewski (2018) examined the link between student engagement and school climate in 10th, 11th, and 12th grade students. The study found school engagement was associated with students’ perceptions of school climate. Findings allowed researchers to present a predictive model of school climate and student engagement, specifically affective engagement, and further illustrated the key role of school climate in student engagement and positive school experiences.

Definitions of school climate vary considerably across studies because it is difficult to identify and isolate specific facets of such a complex concept; however, school climate typically refers to factors such as norms, rules, relationships, and structures which then influence student and teacher experiences of the school environment (Cohen & Geier, 2010; National School Climate Council, 2007). Perceptions of discipline practices, school security and order, and student-teacher relationships are just some of the influential factors associated with school climate linked to dropout (Peguero & Bracy, 2015).

This dissertation attempts to examine the effect of school climate on the engagement and educational outcomes of students at-risk of dropping out of high school. Chapter 2 will review

prior research identifying specific groups of students at higher risk for dropout than their peers, including students who are racial and ethnic minorities and/or from low socioeconomic backgrounds (Alliance for Excellent Education [AEE], 2011; Ingels & Dalton, 2013), have a disability (AEE, 2011; Reschly & Christenson, 2006b), or identify as LGBTQIA (Bart, 1998). Chapter 2 will highlight the importance of school climate for student engagement (Fatou & Kubiszewski, 2018), academic achievement and graduation rates (Cohen & Geier, 2012; Devine & Cohen, 2007), feelings of belongingness (Allen et al., 2016), and dropout (Christenson, Reschly & Wylie, 2012). Chapter 3 details the design and method of the present study as informed by prior work using similar populations and variables.

CHAPTER 2

LITERATURE REVIEW

Dropout epidemic

The National Center for Education Statistics (NCES) reported 85% of public high school students graduated in 2018. Although 85% is an improvement over past years, these rates mean an estimated 1.3 million students drop out of high school every year in the United States (Alliance for Excellent Education [AAE], 2011). Because students who drop out experience fewer job and income opportunities, chronic unemployment, higher likelihood of incarceration, and require more government assistance than their peers, dropouts will cost the U.S. approximately \$1.5 trillion in the next decade (AAE, 2011). Furthermore, high school dropout is linked to a cycle of poverty as students from low-income backgrounds are 5 times more likely to drop out than their higher-income peers (American Psychological Association, 2012). In light of the prospects facing those who drop out of high school, policymakers and educators have pushed to install programs, interventions, and policies to target and reduce dropout.

Many avenues for reducing dropout exist as the decision to leave school is complex. To create and implement effective interventions targeting dropout, it is important to review the factors influencing dropout across levels of schooling. A number of studies have identified and described developmental pathways along which dropout and school completion progress (e.g., Evans & Dibenedetto, 1990; Garnier, Stein, & Jacobs, 1997). Identifying factors that increase a student's risk for dropout is important at any stage in a student's educational career and can offer insight into possible directions for minimizing the effect of those factors.

Risk factors for dropout

Studies suggest a number of risk factors associated with dropout put a student at an higher risk for becoming disengaged from school, including coming from low socioeconomic status (SES) backgrounds (Hanson & Ginsburg, 1988; Rosenthal, 1998), having a disability or being an English language learner (Reschly & Christenson, 2006b), identifying as lesbian, gay, bisexual, and transgender (Bart, 1998), experiencing academic difficulties (deBettencourt, Zigmond, & Thornton, 1989; Ekstrom et al., 1986), and poor attendance (Barrington & Hendricks, 1989; Bruce et al., 2011; Kieffer, Marinell, & Neugebauer, 2014). Many of the risk factors associated with dropout (i.e., low socioeconomic status, racial and ethnic minority status) within the literature are complex factors associated with other negative outcomes or risk which contribute to complexity of the processes at play within the decision to leave school early. Furthermore, each risk factor is a dynamic set of processes and circumstances which then contribute to a student's overall educational experience.

Socioeconomic status

Countless studies illustrate the relationship between low SES and poor educational outcomes, including dropout. However, many of the factors and processes associated with low SES that might contribute to dropout can better be described in terms of the opportunity gap inherent within low SES backgrounds. Low household income, reliance on federal assistance programs, inadequate housing, and other experiences to which low SES students are exposed do not directly cause a student to become disengaged and dropout; rather, repeatedly missing out on

opportunities afforded to their higher SES peers compound over time creating a widening gap between higher and lower SES individuals. Bradley and Corwyn (2002) found children from low SES were not afforded opportunities, such as going on trips, visiting libraries, museums, theaters, and taking extracurricular lessons. Furthermore, parents with limited economic means are less likely to purchase books (Bradley & Corwyn, 2002), read to their children, engage their children in meaningful conversations, and provide teaching opportunities (Shonkoff & Phillips, 2000). Lacking these opportunities and exposure might hinder cognitive development and interpersonal skills (Ford & Lerner, 1992) in students from lower households as compared to their higher SES peers.

Beyond the gap in opportunities afforded to higher and lower SES children, individuals from low SES backgrounds are also more likely to be exposed to stressors, such as economic hardship, marital conflict, marital dissolution (Bradley & Whiteside-Mansell, 1997). Prolonged exposure to these stressors can lead to maladaptive functioning and negative responses (Taylor & Seeman, 1999). Exposure to stressors like these is also linked with depression and low self-esteem in parents (McLoyd, 1998), which directly impacts their parenting, leading them to invest in, participate with, and monitor their children less (Ram & Hou, 2003). Lam (2014) further discussed the feelings of hopelessness for the future many parents with limited economic resources experience, which might lead them to have lower expectations for their children and offer less support for goals. Lack of supervision, limited models for goal setting, and exposure to family and community stressors are all components of processes associated with the low SES risk factor in school dropout.

Race-Ethnicity

Disparities in graduation rates along racial and ethnic lines are also clear. American Indian/Alaska Native (74%), Black (79%), and Hispanic (81%) students have the lowest graduation rates compared to their White (89%) and Asian/Pacific Islander (92%) peers (NCES, 2020). In 2016, the American Psychological Association published an article outlining the inequalities at school that widen the gap between these racial and ethnic student groups and the role of implicit bias and systemic racism within education (Weir, 2016). Teachers and school staff unintentionally contribute to these educational and opportunity gaps by recommending fewer Black students for gifted education programs (Nicholson-Crotty et al, 2016), influencing the trajectory for fewer Black students to graduate high school or college (Gershenson, Holt & Papageorge, 2016), labeling Black students as troublemakers and recommending harsher punishments (Okonofua & Eberhardt, 2015), and giving less constructive feedback to Black students to foster academic growth (Harber et al., 2012).

Individual/Family/School/Community Contexts.

A review of the risk factors influencing a student's path toward school completion or dropout cannot be complete without discussing the contexts in which they develop and interact. Some factors, such as a student's effort, educational expectations, and academic performance occur at the individual student level. Beyond the student, there are family factors (e.g., expectations, relationships, support for learning), school factors (e.g., school structure, climate), and community factors (e.g., geographic location) that influence, and are influenced by, the

student. Individual factors are embedded within the larger context of a student's life, mediating and moderating student outcomes.

Individual risk factors are often compounded with additional familial, school, or community-based risk factors to increase a student's chances of choosing to leave school. For example, 50 percent of the nation's dropout can be linked to a group of schools across the United States referred to as "dropout factories." Dropout factories refer to schools where less than 60% of students graduate each year and only make up 12% of the national total despite producing approximately half of the dropout overall (AAE, 2011; Balfanz, Legters & Jordan, 2004). These "dropout factory" schools are disproportionately in low-income neighborhoods with high unemployment, crime, and poor health. These schools also have student bodies consisting of students predominantly identified as racial and ethnic minorities (AAE, 2011). For many students in these schools and communities, their exposure to multiple risk factors at the individual, family, school, and community level puts them in a challenging situations with regard to school completion.

Alterability.

Many of the aforementioned factors linked with dropout are more challenging to alter and therefore inappropriate targets for intervention, such as SES or intellectual ability; however, some factors identified as predictors of dropout and successful school completion are amenable to intervention, including student engagement. As lawmakers, educators, and other stakeholders become increasingly aware of the importance of maximizing a student's contact with protective

factors while minimizing the effect of risk factors, interventions targeting malleable variables within a student's life have become vital.

As interest in malleable risk factors amenable to intervention increases, there are protective factors to consider as well. Students who receive academic support (e.g., help with homework), experience productive parental monitoring, and attend schools that are perceived by students as having orderly school environments and warm and caring teachers are associated with resilience and a greater likelihood of school completion (Reschly & Christenson, 2006b; Reschly & Christenson, 2012). Feeling safe, supported, and valued are unsurprisingly central experiences for student and teacher success. A history of supportive teachers, safe schools, and fair discipline policies are alterable facets of schooling that have the potential to mitigate a student's exposure and response to additional risk factors. Thus, the complexity of intervening on an individual level might not be as effective or sustainable as intervention on a larger scale. Furthermore, classrooms, families, peer groups, and communities, provide both context and targets for intervention (Reschly, Pohl, & Christenson, 2020). Table 1 offers a summary of the risk factors associated with dropout and successful school completion, highlighting those that are amenable to intervention (malleable) and those that are perceived to be fixed.

Protective factors

In light of the countless and complex factors associated with risk, disengagement, and dropout, malleable factors that protect against these processes has become a nation-wide priority for educational policy makers, educators, and school administrators. As risk factors vary across time, individual, and circumstance, identification and support of students who are most at risk or are

experiencing the greatest number of risk factors have come to the forefront of dropout reduction efforts. Methods put forth to encourage retention and graduation include changes in curriculum, increased in-school access to resources and support, cultivating a supportive school climate, student tracking, and improved home-school relations (Bridgeland et al., 2006). Applied literature and practical guides for educators strongly advocate for monitoring multiple complex individual factors and outcomes for millions of students, such as attendance, positive supportive student/teacher relationships, and social skill development (Bridgeland et al., 2006; Dynarski, Clarke et al, 2008; Ekstrom et al., 1986; Rumberger, et al., 2017). Researchers have posited a number of theoretical models and constructs to better define the multifaceted processes of dropout, the most prominent of which are described below.

Student Engagement

Student engagement is a multidimensional construct (Fredricks, Blumenfeld, & Paris, 2004) used to refer to the time spent actively participating in and identifying with school (e.g., Appleton et al., 2006; Fredricks, Blumenfield, & Paris, 2004; Dynarski et al., 2008; Finn, 1989; Finn & Rock, 1997). It is associated with protecting against high school dropout and fostering successful school completion, as well as post-secondary persistence and success (Finn, 2006; Fraysier & Reschly, 2022; Fraysier, Reschly, & Appleton, 2020). Due to its amenability to intervention and importance throughout schooling (Christenson et al., 2012), student engagement has become a construct of interest to policymakers, educators, and families alike. Student engagement is specifically associated with resilience and effort (Finn & Zimmer, 2012; Masten et al., 2022; National Research Council and the Institute of Medicine [NRC], 2004), subjective

well-being (Heffner & Antaramian, 2016; Tian et al., 2016), academic achievement (Appleton & Reschly, 2019; Balfanz, Herzog, & Iver, 2007; Finn & Rock, 1997), and postsecondary enrollment and persistence (Finn, 2006; Fraysier & Reschly, 2022; Fraysier et al., 2020).

Despite disagreements within the literature regarding the subtypes of engagement in the student engagement construct, most researchers agree it encompasses cognitive, affective, and behavioral components (Reschly & Christenson, 2012, 2022). Cognitive engagement refers to the amount of effort a student is willing to invest in their own learning by setting goals and using strategies to facilitate their own comprehension. Affective engagement refers to internal experiences, including a student's sense of belonging within their school, their relationships with peers and teachers, and their beliefs regarding the value of learning (Appleton et al., 2006). These affective components are associated with achievement and engagement and are thought to impact a student's willingness to participate (Fredricks et al., 2004; Hamre & Pianta, 2001; Hughes, 2011). Appleton and colleagues (2006) further divided behavioral engagement into more defined academic and behavioral domains. Appleton et al. (2006) conceptualized behavioral engagement as attendance, appropriate behavior, and participation in school and extracurriculars, while academic engagement referred to behaviors such as time spent on academic tasks and credits earned toward graduation. Regardless of the specific model used to describe student engagement, the impact of student, family, school, and community level factors on its development is a vital element. Models of engagement regard it as a mediator between contexts and outcomes (e.g., Connell & Wellborn, 1991; Reschly & Christenson, 2012; Skinner & Belmont, 1993; Skinner et al., 2008). Inherent in this model is the notion that families,

schools, communities, peer groups influence engagement, which, in turn, impacts proximal and distal outcomes of interest (Reschly & Christenson, 2012; 2022).

Longitudinal examinations of student engagement offer valuable insight into student outcomes and for the examination of the influence of families, schools, communities, and peer groups on students' engagement. Furthermore, student engagement follows developmental pathways leading to a student's successful school completion or dropout (e.g., Evans & Dibenedetto, 1990; Garnier, Stein, & Jacobs, 1997). Research suggests engagement declines as students progress through elementary to high school (Appleton & Reschly, 2018; NRC, 2004; Wigfield & Eccles, 2000; Wylie & Hodgen, 2012) and long-term exposure to risk factors across contexts might present an additional facet for examination to further conceptualizations of student engagement. Longitudinal studies highlight factors and periods in students' lives that might be more sensitive to certain experiences as they develop over time (Christenson et al., 2012; Reschly & Christenson, 2012). For example, one study found cognitive and affective engagement in high school were predictive of post-secondary enrollment and persistence (Fraysier et al., 2020). Similar studies can highlight potential targets for effective intervention. Initiatives geared toward increasing attendance, using mentorship to create positive teacher-student and peer relationships, and instituting schoolwide bullying prevention programs aim to encourage retention and successful school completion in all students within a school or district. Although most protective and risk factors have thus far been described on an individual level, research suggests that school- and district-wide factors are among those malleable factors which might be amenable to intervention. These wider reaching initiatives and policies can be part of

universal school-wide interventions aimed at improving student engagement and academic success for all students across schooling, and, in fact, might be most effective when implemented within an RTI or MTSS framework (Reschly, Pohl, & Christenson, 2020).

School Climate

Students spend approximately seven hours at school five days per week, making school one of the settings in which a student spends most of their time. For many, it is also the first place a child encounters society's norms, values, and culture (Eccles & Roeser, 2011; Kozol, 1991; Roeser, Eccles, & Sameroff, 2000; Wang & Dishion, 2012). Negative school experiences and poor perceptions of school climate (i.e., bullying, poor teacher-student relationships, frequent behavioral referrals) might contribute to a student's disengagement from school. When students perceive that their school is tolerant of bullying, sexual harassment, and other negative experiences, their poor perceptions of school climate are associated with greater psychological distress, withdrawal from school, poorer self-esteem, and perceptions of school safety (Ormerod, Collinsworth, & Perry, 2008). Furthermore, student perceptions of school climate are a significant predictor of increased sexual harassment.

Learning outcomes are influenced by school climate (Barile et al., 2012) by increasing sense of security (Benbenishty & Astor, 2005), preventing and reducing violence and bullying (Karcher, 2002a, 2002b; Skiba, 2015), improving wellness, participation, citizenship, and respect for diversity (Berkowitz & Bier, 2005), and reducing the risk of mental disorders and substance addiction (National School Board Association [NSBA], 2017). Research suggests school climate also shapes interactions between students, teachers, families, and the community (Berkowitz,

Moore, Astor & Benbenishty, 2016; Durlak et al., 2011). This shaping occurs through a number of ecological processes independent of academic factors, including high-quality classroom management and social norms (Cohen, 2012; Cohen et al., 2009; Thapa et al., 2013). Studies reveal safe and positive school environments might protect students from social inequities, such as poverty, and improve academic performance (Bradley & Corwyn, 2002; Michael et al., 2015; Myhr et al. 2017). However, there has been a call for more longitudinal studies of how the dynamic process of school climate interacts with student development to produce academic and nonacademic outcomes over time. Early longitudinal examinations of school climate and student outcomes suggest student grades and school perceptions change across time (e.g., discipline, norms). Because student perceptions of school climate appeared to positively correlate with student grades, students and student performance might be more sensitive to different facets of school climate. How and when these students have these experiences might also interact with students' maturity and growth, as well as academic experiences at different points throughout schooling (e.g., increased rigor, changing expectations, changing social and peer dynamics) (Daily et al., 2020).

Despite agreement regarding its importance, there is significant disagreement within the literature regarding definitions and components of school climate. First, there is debate regarding what facets actually makeup school climate. The U.S. Department of Education conceptualized school climate using a three-domain model of safety, engagement, and environment though other models, displayed in Table 2.2, have been proposed in an attempt to capture the dynamic multilevel construct. Cohen and Geier (2010) identified safety, relationships, teaching and

learning, and institutional environment as the four most commonly referenced domains of school climate in the literature. Safety refers to things like the rules and norms of a school, perceptions of physical safety, and emotional support. Relationships encompass social support for both teachers and students, respect for diversity, and perceptions school connectedness. Support for learning and professional relationships are contained within the domain of teaching and learning, and institutional environment describes the physical environment in which students and teachers move (Cohen & Geier, 2010).

Second, researchers disagree on whether these facets and domains remain stable across schooling. Some researchers propose that there are differences in school climate as one moves from middle school to high school (Waasdorp et al., 2020) such as changing behavioral expectations, course load, and academic rigor. Further, evidence suggests that differences in perceptions of school climate exist within the same school based on the reporter (Nusser & Haller, 1995). Regardless of definition or reporter, it is widely acknowledged that school climate shapes the experiences of all stakeholders and reflects the norms, values, and goals that makeup the broader goals of the school (Wang & Degol, 2016). Disagreements on conceptualization and finer points of what is included in the term “school climate” make measuring and reporting on the construct difficult (Waasdorp et al., 2020). Before embarking on extended longitudinal studies of this complex concept, meaningful and valid measures must be created using agreed upon characteristics of importance.

Furthermore, within the debate regarding definition and components of school climate, important differences also exist in student, teacher, and community perceptions of school

climate. In fact, Mitchell, Bradshaw, and Leaf (2010) reported no association between teacher and student reports of school climate, indicating that as primary stakeholders in the educational process, students' needs differ in significant and meaningful ways from those of all other stakeholders. Teacher reports were related to classroom-level factors, such as classroom management and students' disruptive behavior. Students' ratings were influenced more by school-level factors, including mobility and student-teacher relationships. Although all stakeholders benefit from a positive school climate, it is clear students are uniquely positioned within multiple systems to offer direct evaluation of school climate and its association with students' own outcomes. Despite the impact of both on student outcomes, there are few studies examining the relationship between school climate and student engagement (Bear et al., 2018). School climate is a key aspect of the context in which students exist, impacting their engagement. Students who perceive their school as a safe, fair, and supportive place are more likely to attend, receive better grades, and engage (Bryk & Thum, 1989; Malika, 2021).

School climate and student engagement

Evidence suggests that students are more engaged and attain higher academic achievement when exposed to a positive school climate (Konold, Cornell, & Malone, 2018; Wang & Degol, 2016). Attending a school that prioritizes a sense of belongingness by using multiculturally sensitive teaching, organizing field trips, or encouraging students to work in groups increases student engagement (Conchas, 2001). Emerging dimensional models of school climate and student engagement highlight the overlap between constructs and suggest that

student engagement and school climate work in concert (Fatou & Kubiszewski, 2018; Janosz & Bouthillier, 2007; Lee et al. 2017; Loukas et al. 2006). These malleable multilevel constructs beg for more close examinations of how each facet relates, therefore offering potential avenues to improved student outcomes.

Ripksi and Gregory (2009) specifically examined predictors of individual and school level engagement and achievement to better understand the individual and group differences associated with perceptions of school climate. Students within the same school can have vastly different experiences and perceptions (Ripksi & Gregory, 2009), offering a variety of different paths to engagement and dropout which may be vital in high school dropout prevention. As discussed by Finn (1989), students' participation and identification with school predicts engagement and achievement, highlighting the importance of including individual student-level reports in school climate studies such as this one. Understanding the specific and broader impacts of school climate on student engagement allows for more clear and accurate investigations of these multicomponent factors. Emerging research suggests student perceptions of school safety are correlated with their behavior while in and out of school. Perceptions of an unsafe school environment is correlated with behavioral and academic engagement specifically as it increases absenteeism (Nansel et al. 2001), lowers commitment to schoolwork (Rivers et al., 2009), and increases the frequency of behavioral problems (Gregory & Cornell, 2009; Wang et al., 2010; Wentzel et al., 2010). Further, student perceptions of school-wide structure, disciplinary fairness, and positive student-teacher relationships resulted in higher behavioral, academic, and affective engagement.

Ripski and Gregory (2010) examined school and individual-level data to explore the relations between student perceptions, teacher perceptions, and academic achievement. Consistent with earlier research, their findings suggest that when students perceive instability, hostility, and unfairness within school practices, students report lower cognitive and academic engagement and academic achievement. Bradshaw, Waasdorp, Debnam, and Johnson's (2014) examination of a 3-factor school climate model further dovetailed with this emerging research, indicating that as students perceive the school culture as one of equality, fairness, and structure, student achievement increases and behavioral problems decrease. Yang et al. (2018) reported that school-level school climate was a significant and meaningful moderator of the relationship between student-level bullying victimization and affective engagement. In addition, Yang and colleagues replicated findings reported by other studies that showed students in schools with a more positive climate reported higher engagement. Prior studies have examined school climate domains, which might overlap with engagement subtypes, such as student support and positive student-teacher relationships (Cornell et al., 2016; Estell & Perdue, 2013; Fernández-Zabala et al., 2016; Kaplan Toren & Seginer, 2015).

As previously discussed, many models have been put forth to identify and measure underlying mechanisms for this pattern, including disidentification with school (Finn, 1989; Steele, 1992) and lack of affective bonds with school personnel (Pianta, 1999). Although the theoretical underpinnings may be less clear, these studies underscore the importance of school-wide practices and culture even outside individual classrooms. As the effect of school climate and student engagement on student outcomes becomes increasingly visible, educational

authorities have issued guidelines (U.S. Department of Education, 2014) and new paradigms (Seligman, 2011) to promote and improve school climate and outcomes much the same way as student engagement has become a target for school policy. However, despite evidence that both constructs reflect and result in similar student experiences, student and engagement and school climate continue to be investigated and discussed as separate topics.

Bearing in mind the need for further investigations of the relationship between school climate and student engagement and the call for more longitudinal studies of both constructs, a longitudinal examination of these constructs on student outcomes would begin to fill in this gap in the literature. Furthermore, as at-risk student groups have the most to gain from schoolwide dropout interventions and might be the most sensitive to school climate effects, such interventions present a clear target population with which to investigate the effect of school climate as a moderator of student engagement and longitudinal educational outcomes.

Purpose of the Current Study

In light of the long-lasting repercussions associated with high school dropout, additional research is merited examining the impact of school climate on student engagement and educational outcomes. Some studies found that 20-25% of the variability in student outcomes can be attributed to school characteristics (Li, 2007; Rumberger & Palardy, 2005), including school composition, structure, resources, cohesion (Stewart, 2007) and practices (e.g., policies, teacher expectations, perceptions of leadership (Rumberger & Palardy, 2005). The present study aims to further investigate the engagement of at-risk student groups, including students with disabilities (Reschly & Christenson, 2006b), racial and ethnic minority and/or low SES

backgrounds (AAE, 2011; Ingles & Dalton, 2013) in the larger context of school climate and environment. Research questions for this study include:

1) How does school climate relate to student engagement in higher risk and minority status groups (i.e., Black, learning disabled, ELL)?

2) What components of school climate have the most impact on student outcomes, (i.e., high school dropout, post-secondary attendance)?

Table 1. *Fixed and malleable risk factors associated with dropout and successful school completion.*

	Fixed Factors	Malleable Factors (amenable to intervention)
<i>School</i>	School location	Weak adult authority
	School control (Public)	Large school size (>1000 students)
		High student-teacher ratios
		Few caring staff-student relationships
		Poor or uninteresting curricula
		Low expectations
		Experience with bullying or harassment
<i>Student</i>	Impulsivity	Frequent absences
	Disability status	Behavioral problems
	Gender (male, nonbinary)	Poor academic achievement
	Sexual orientation	Grade retention
		Working
		Lack of engagement or disengagement
<i>Background</i>	Low SES	Low educational expectations
	English Language Learner	Permissive parenting styles
	Mobility	Poor supervision and monitoring
	Racial or ethnic minority status	
	Household stress	
	Single parent households	

Sources: Rosenthal (1998); Reschly and Christenson (2006b); Reschly & Christenson (2012); Reschly, Christenson, & Wylie (2012); Jordan et al., (1999); Rumberger (1995); Christenson (2008)

Table 2. *Commonly cited conceptualizations of school climate*

Source	Definition
Department of Education (2013), p. 2	“A multi-faceted concept that describes the extent to which a school community creates and maintains a safe school campus, a supportive academic, disciplinary, and physical environment, and respectful, trusting, and caring relationships throughout the school community”
Cohen et al. (2009), pp. 180-213	“The quality and character of school life” including “norms, values, and expectations that support people feeling socially, emotionally, and physically safe”
National School Climate Center (2013)	“School climate refers to the quality and character of school life. School climate is based on patterns of students', parents' and school personnel's experience of school life and reflects norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures. A sustainable, positive school climate fosters youth development and learning necessary for a productive, contributing and satisfying life in a democratic society”
Freiberg & Stein (1999), p. 11	“The heart and soul of the school. It is about that essence of a school that leads a child, a teacher, and an administrator to love the school and to look forward to being there each school day”
Thapa, Guffey, Higgins-D'Alessandro (2013), p. 369	“School climate...reflects students', school personnel's, and parents' experiences of school life socially, emotionally, civically, and ethically as well as academical.”

CHAPTER 3

METHOD

Data Source

This study used unrestricted data from the High School Longitudinal Study of 2009 (HSLs:09) conducted by the National Center for Education Statistics (NCES). HSLs:09 collected data in four waves following students through high school and post-secondary experiences (Ingels et al., 2011; Ingels et al., 2013). Data were collected from 944 schools across the United States first collected from participants during their ninth-grade year in 2009 with follow-up surveys in 2012 and 2016, allowing researchers to follow respondents throughout and beyond their educational careers (Ingels et al., 2011; Ingels et al., 2013). Participants were asked about their academic experiences, background, home language, and social relationships. The NCES provides several analytic weights that account for the sampling technique used to collect the data and for the probability of missingness due to nonresponse. We used the main weight for the last follow up, as that is what NCES recommends for analyzes such as ours which includes data for all waves of the survey.

Furthermore, these data allow empirical examinations of short term and longitudinal outcomes on students and stakeholders across a variety of domains, including geographic region, school control, perceptions of school and teacher expectations, and school discipline (Ingels et al., 2015; Ingels et al., 2011; Ingels et al., 2013). Wang and Degol (2016) discussed the developmental complexity missed by cross-sectional investigations of student variables. Longitudinal studies allow for better conceptualizations of how student perceptions, experiences,

and reports develop over time. This study seeks to extend and refine models of school climate and student engagement.

Participants

Participants were respondents to a nationally representative survey of approximately 23,000 ninth graders, their caregivers, teachers, school administrators, and school counselors. Participants were diverse in terms of race, gender, socioeconomic status (SES), family makeup, and many other factors, allowing research to examine how different groups respond within and across schools (Ingels et al., 2011; Ingels et al., 2013). This sample was representative of public school students across the United States. Respondents were students, their caregivers, teachers, and school administrators as recent studies have stressed the importance of multi-informant strategies to best capture the multifaceted nature of school-related variables, such as climate (Cantrell & Kane, 2013; Wang & Degol, 2016). Table 3 outlines important demographic characteristics of the sample used in this study.

Table 3. *Demographic Characteristics for Study Sample*

Demographic		2009 9 th Graders	2009 11 th Graders
Variables		Sample size (Percentage)	Sample size (Percentage)
Sample Size		19,273	17,848
Gender	Female	9,880 (51.3%)	9,156 (51.3%)
	Male	9,387 (48.7%)	8,686 (48.7%)

Race/Ethnicity	American			
	Indian/Alaskan Native, non-Hispanic	125 (0.6%)	118 (0.7%)	
	Asian, non-Hispanic	1,604 (8.3%)	1,506 (8.4%)	
	Black/African American, non-Hispanic	2,052 (10.6%)	1,880 (10.5%)	
	Hispanic, no race specified	386 (2.0%)	201 (1.1%)	
	Hispanic, race specified	2,817 (14.6%)	2,766 (15.5%)	
	More than one race, non-Hispanic	1,653 (8.6%)	1,584 (8.9%)	
	Native Hawaiian/Pacific Islander, non-Hispanic	100 (0.5%)	95 (0.5%)	
	White, non-Hispanic	9,694 (50.3%)	9,698 (54.3%)	
	Missing	842 (4.4%)	-	
	Socioeconomic Status	First Quantile	3,276 (17.0%)	3,003 (16.8%)
		Second Quantile	3,450 (17.9%)	3,326 (18.6%)
		Third Quantile	3,700 (19.2%)	3,351 (18.8%)
	Fourth Quantile	3,619 (18.8%)	3,524 (19.7%)	
	Fifth Quantile	3,466 (18.0%)	3,368 (18.9%)	
	Missing	1,762 (9.1%)	1,276 (7.1%)	
Locale	City	4,562 (23.7%)	4,183 (23.4%)	
	Suburban	7,136 (37.0%)	6,654 (37.3%)	
	Town	2,268 (11.8%)	2,099 (11.8%)	

	Rural	5,307 (27.5%)	4,912 (27.5%)
Region	Northeast	2,803 (15.5%)	2,636 (14.8%)
	Midwest	4,955 (25.7%)	4,631 (25.9%)
	South	7,980 (41.4%)	7,348 (41.2%)
	West	3,535 (18.3%)	3,228 (18.1%)

Variables

Independent variables

Demographic variables. Demographic variables describing student sex, special education status, parental SES, and racial/ethnic minority status served as covariates of this study. Existing research indicates individuals of different racial/ethnic backgrounds and SES are associated with a variety of student outcomes, such as postsecondary attendance, which suggests a need to account for these variables in the model (Cahalan et al., 2016; McFarland et al., 2017; Pew Research Center, 2014). Race/ethnicity, parental SES, and special education status were included as composites created by NCES from student questionnaires, parent questionnaires, or school- provided sampling rosters. Refer to Table 2 for detailed information regarding the demographics of the sample used in this study. All demographic variables were taken from the first wave of responses as it was considered unlikely that students would self-report different demographic information at subsequent follow ups.

Academic achievement. Academic achievement information came from transcript data regarding students' grade point average (GPA). Two items addressed student GPA: overall GPA and academic GPA. Overall GPA referred to a student's performance across all classes, and academic GPA referred to a student's performance in core classes and excluded elective classes.

School climate. The conceptualization of school climate used in this investigation draws heavily from the work of Cohen and Geier (2010), Thapa, Cohen, Guff, and Alessandro (2013), and Kotok, Ikoma, and Bodovski (2016). Specifically, Thapa et al., (2013) argued for the use of reliable measurement assessing student, family, staff, and community perceptions of school in the areas of safety, relationships, teaching and learning, and institutional environment. Kotok et al. (2016) also included relationships and teaching and learning in their model along with disciplinary order and disciplinary fairness while excluding institutional environment to create a similar though distinct model of school climate. To create a comprehensive model of the multi-faceted construct of school climate, we sought to account for the complexity of in-school experiences across reporters by including interpersonal domains--consistent with Kotok et al.'s (2016) Relationships and Teaching and Learning domains--alongside the physical domain of institutional environment as discussed by both Cohen and Geier (2010) and Thapa and colleagues (2013). However, in light of conceptual disagreement within the literature regarding the components of school climate and data accessibility, the fourth domain referring to perceptions of safety while at school was excluded.

Our proposed three-factor model of School Climate was constructed using parent, teacher, administrator, and student responses across all waves of responding regarding relationships, teaching and learning, and institutional environment. Specifically, the Relationships variable was constructed with the same items used to create Kotok et al.'s (2016) School Attachment factor, addressing perceptions of positive and supportive relationships between teachers and students.

Kotok and associates' (2016) Academic Climate variable addressing the norms, goals and values of a school was renamed Teaching and Learning within our model to better describe the overlap with the conceptualizations of Thapa et al. (2013) and Cohen and Geier (2010).

Although Kotok et al. (2016) excluded physical factors from their model, we chose to use items addressing adequacy of physical facilities and access to resources to make up the Institutional Environment factor. This factor was included in our model to further highlight the role of physical environment on student and stakeholder experiences as discussed by Thapa et al. (2013) and Cohen and Geier (2010). Access to well-maintained spaces and resources, including books, paper, and other supplies, are a part of students' daily school experiences and created a more representative factor model for our investigation. Confirmatory factor analysis (CFA) then verified our three-factor model of school climate. Results were consistent with those reported by previous studies within this dataset, including Kotok et al. (2016) who reported Cronbach's alpha values of 0.84 across all school climate variables serving as both exogenous outcome predictors and endogenous variables in relation to the school characteristics. See Table 4 for more information.

Outcome variables

Student engagement. Student engagement variables were constructed using the conceptual framework described by Appleton and colleagues (2006), Fraysier and Reschly (2022), and NCES-created composites. Consistent with the method reported by Kotok et al., (2016), a Cronbach's alpha of 0.5 was used as a cutoff for all composites to preserve reliability (see Table 3). Behavioral, affective, and cognitive engagement factors within the HSLs:09

dataset were constructed in the same way as Fraysier and Reschly (2022). Behavioral engagement was created using NCES-created variables and student responses regarding their preparedness for class, attendance, extracurricular participation and suspensions with a reliability of $\alpha = 0.73$ (Ingels et al., 2013). Cognitive engagement was also created from 12 of the NCES-created self-report items related to the students' beliefs about their control over and the relevance of their math and science schoolwork. Similarly, affective engagement consisted of eight items related to students' perceptions of whether teachers valued and listened to student ideas, treated students with respect, how peers and family members impacted their class selection and future plans (see Table 3).

Dropout and postsecondary outcomes. Variables regarding student dropout and persistence were constructed using student, school, and caregiver responses. Dropout was a composite binary indicator of whether the student had a known dropout episode during high school, reported during any wave of the study. Postsecondary enrollment was a binary indicator of students' enrollment in postsecondary education, including college, university, community college, trade school or other occupational school, on or around November of 2013 (the fall semester after what was their traditional senior year). Student responses regarding postsecondary enrollment were included to extend the existing literature regarding the impact of school climate and student engagement on long term student outcomes. Previous research suggests that both school climate and student engagement have long-lasting impacts on students' ultimate outcomes beyond high school graduation (e.g., Finn, 2006; Fraysier, Reschly, & Appleton, 2020), and the current study aims to further investigate these associations.

Missing values

Previous studies imputed values for missing values on both predictors and outcomes in the final analysis (Alvarado & An, 2015; Allison, 2002; Ingels et al., 2011; Ingels et al., 2013; Royston, 2005; von Hippel, 2007a). This study used the weights provided and multiple imputation to account for missingness. Between 11 and 59% of data were missing for each variable.

Table 4. *Names and Descriptions of Variables*

Variable	Description
Achievement	
High School Academic GPA	GPA for all academic courses at 3 rd follow up- HS Transcript student level composites (X3TGPAACAD X3)
High School Total GPA	Overall GPA computed at 3 rd follow up- HS Transcript student level composites (X3TGPATOT X3)
Academic outcomes	
High school completion status	Ever dropped-out status at second follow up (X4EVERDROP)
Postsecondary enrollment	Immediate Plans to Enroll in Postsecondary Institution Item <i>Which of the following activities will you be doing on or around November 1st: Taking classes from a college, university, community college, trade school, or other occupational school?</i> (S3CLASSES).

Student Engagement

Behavioral engagement

School Engagement Scale-9th grade composite
NCES-created summed composite of four items
(X1SCHOOLENG):

How often do you a) go to class without your homework done? b) go to class without pencil or paper? c) go to class without books? d) go to class late?

Student Behavior Scale-11th grade composite

NCES-created factor composite of seven items from the first follow-up including (X2BEHAVEIN): *How many times did the following thing happen during the last six months (you were in school)? a) you were late for class, b) you were absent from school c) you attended class without your homework done d) you attended class without pencil and paper, computer, or other device for taking notes e) you attended class without books or other reading materials f) You cut or skipped class g) you were put on in-school suspension*

Cognitive Engagement

Future Goals and Aspirations- 11th grade composite
Factor composite of four items (S2EDUASP, S2EDUEXP, S2SUREDIP, S2SUREBA) *If there were no barriers, how far in school would you want to go? As things stand now, how far in school do you think you will actually get? How sure are you that you will receive a high school diploma? How sure are you that you will pursue a bachelor's degree?*
Cronbach's alpha = 0.73

Control/Relevance of Schoolwork- 9th grade composite

Factor composite of twelve items (S1PAYOFF, S1GETINTOCLG, S1MWASTE, S1MBORING, S1MUSELIFE, S1MUSEJOB, S1SWASTE, S1SBORING, S1SUSELIFE, S1SUSEJOB):

How much do you agree or disagree with the following statements: a) school is often a waste of time b) studying in school rarely pays off later with good jobs c) even if you

study you will not be able to get into college d) you think (math/science) class is a waste of time, e) you think (math/science) class is boring, f) what students learn in (math/science) class is useful for everyday life, g) what students learn in (math/science) class will be useful for a future career.

Control/Relevance of Schoolwork- 11th grade composite
Factor composite of twelve items (S2PAYOFF, S2DOOKAY, S2BADGRADES, S2SCHWASTE, S2MWASTE, S2MBORING, S2MUSECLG, S2MUSEJOB, S2SWASTE, S2SBORING, S2SUSECLG, S2SUSEJOB):
How much do you agree or disagree with the following statements: a) studying in high school rarely pays off later with good jobs? b) People can do okay even if they drop out of high school c) Students with bad grades often get good jobs after high school d) High school is often a waste of time e) you think (math/science) course is a waste of your time, f) you think (math/science) class is boring, g) (math/science) is useful for college h) (math/science) is useful for a future career?

Affective Engagement

Student/Teacher Relationships- 9th grade composite
Factor composite of eight items, four each for math and science teacher (S1MTCHVALUES, S1MTCHRESPECT, S1MTCHFAIR, S1MTCHTREAT, S1STCHVALUES, S1STCHRESPECT, S1STCHFAIR, S1TCHTREAT): *How much do you agree or disagree with the following statements about your teacher? Your teacher a) values and listens to students' ideas b) treats students with respect c) treats every student fairly d) treats some kids better than other kids.*

Student/Teacher Relationships- 11th grade composite
Factor composite of ten items, five each for math and science teacher (S2MTCHTREAT, S2MTCHTHINK, S2MTCHGIVEUP, S2MTCHEASY, S2MTCHINTRST, S2STCHTREAT, S2STCHTHINK, S2STCHGIVEUP, S2STCHEASY, S2STCHINTRST): *How much do you agree*

or disagree with the following statements about your teacher? Your teacher a) treats some kids better than other kids b) wants students to think, not just memorize things c) doesn't let people give up when the work gets hard, d) makes math/science interesting, e) makes math/science easy to understand.

Family Support for Learning- 9th grade composite
Factor composite of ten items, five for each parent
(S1MOMTALKM, S1DADTALKM, S1MOMTALKS,
S1DADTALKS, S1MOMTALKOTH, D1DADTALKOTH,
S1MOMTALKCLG, S1DADTALKCLG,
S1MOMTALKPRB, S1DADTALKPRB):

Since the beginning of the year, who have you talked to about a) which math courses to take this year b) which science courses to take this year c) which courses to take this year other than math and science courses d) going to college and e) personal problems.

Peer Support for Learning-9th Grade composite
Factor composite of six items (S1FRNDTALKM,
S1FRNDTALKS, S1FRNDTALKOTH,
S1FRNDTALKCLG, S1FRNDTALKPROB,
S1FRNDTALKJOB): *Since the beginning of the year, who have you talked to about a) which math courses to take this year b) which science courses to take this year c) which courses to take this year other than math and science courses d) going to college e) personal problems and f) possible jobs or careers as an adult.*

Peer Support for Learning-11th grade composite
Factor composite of five items (S2FRGRADES,
S2FRDROPOUT, S2FRCLGEXAM, S2FR4Y,
S2FRFTJOB): *How many of your friends a) get good grades b) have ever dropped out of high school c) have taken the PSAT, ACT, PLAN or ACT d) plan to attend a 4-year college e) plan to have a full-time job instead of continuing their education.*

School Climate

<i>Teaching and Learning</i>	<p>Responses around if teaching is limited by low morale among students; teachers set high standards for teaching; teachers set high standards for students' learning; teachers have given up on some students; teachers care only about smart students; teachers expect very little from students; teachers work hard to make sure all students learn; teachers set high standards for themselves (C1TTEACHING, C1TLEARNING, C1TGIVEUP, C1TWORKHARD, M1CLEARGOALS, N1CLEARGOALS)</p> <p>Cronbach's alpha = .71</p>
<i>Student Teacher Relationships</i>	<p>Factor composite of ten items, five each for math and science teacher (S1TALKPROB, S1PROUD, S1SAFE): <i>How much do you agree or disagree with the following statements about your teacher? Your teacher a) treats some kids better than other kids b) wants students to think, not just memorize things c) doesn't let people give up when the work gets hard, d) makes math/science interesting, e) makes math/science easy to understand.</i></p> <p>Cronbach's alpha = .72</p>
<i>Institutional Environment</i>	<p>Teaching is limited by shortage of textbooks for student use Teaching is limited by inadequate physical facilities Lack of teacher resources and materials is a problem (N1BOOKS, N1FACILITIES, A1RESOURCES, A2RESOURCES)</p> <p>Cronbach's alpha = .76</p> <hr/>

Analyses

Before beginning main analysis procedures, confirmatory factor analyses (CFA) were conducted to verify the construction of composite variables Student Engagement and School Climate. Due to the nonnormality of the data, robust root mean square error (RMSEA), comparative fit indices (CFI), and Tucker-Lewis indices (TLI) were used to confirm goodness of

fit. Cutoffs for this study were RMSEA values of less than or equal to 0.06 (with 90% confidence intervals at or below 0.06), and CFI and TLI values that met or exceeded 0.95 (Hu & Bentler, 1999; Brown, 2015) for all composites used in this study. Specifically, the School Climate composite (robust RMSEA = 0.032, robust CFI = 0.982, robust TLI = 0.976) demonstrated sufficiently excellent to good model fit (MacCallum, Browne, & Sugawara, 1996) and was deemed appropriate for use in subsequent analysis. However, the Student Engagement composite did not demonstrate sufficient model fit (robust RMSEA = 0.063, robust CFI = 0.769, robust TLI = 0.709). Without an appropriate model, the Student Engagement composite was removed from analyses.

Most recent studies examining school climate used multilevel modeling to investigate the moderating effects of school climate on student perceptions and outcomes (Cornell, Shukla, & Konold, 2016; Kotok, Ikoma, & Bodovski, 2016; Yang, Chan, & Ma, 2020). For example, Fraysier and Reschly (2022) used a cross-sectional design with the ninth and eleventh-grade cohorts in the HSLS:09 dataset. Fraysier and Reschly (2022) used Hierarchical Linear Modeling (HLM) procedure to allow for both individual and group-level variable analysis as well as account for the nested nature of various school-level variables and the subsequent variance. In fact, one review of the literature reported that approximately 60% of school climate studies only used single-level statistical models (Berkowitz et al., 2017), therefore violating the independence assumption and its impact on estimated standard errors (Raudenbush & Bryk, 2002). Furthermore, Reise and colleagues (2005) noted that individual student-level reports are likely to be influenced by lower- (e.g., peers) and higher- (e.g., school culture) level factors. Including

multiple informants from each school in combination with more complex individual level data allows investigators to capture the dynamic nature of school climate and student engagement (Dedrick & Greenbaum, 2011; Konold & Cornell, 2015; Reise et al., 2005).

In contrast, other investigations, such as Kotok, Ikoma, and Bodovski (2016), argued for the use of structural equation modeling (SEM) to more accurately measure and explore the complex and sometimes indirect effects of school climate variables on drop out (Byrne, 1998; Kline, 2011; Lei & Wu, 2007). Specifically, Kotok et al., (2016) attempted to limit the potential for biased estimates when using HLM as it only accounts for measurement error associated with one endogenous variable (Kline, 2007).

To determine how school climate (SC) related to student outcomes in this sample, the relation between the components of school climate impacted student outcomes (SC -> Student outcomes) was investigated. Based on previous research regarding the relations between student outcomes, school climate, and student characteristics (e.g., Finn, 2006; Fraysier et al., 2020) we predicted that each component of school climate would increase students' likelihood of staying in school and enrolling in postsecondary education. As both student engagement and school climate are correlated with improved outcomes, investigations like this one are believed to be vital to the expansion of school climate and student engagement literature. As researchers attempt to gain more dynamic conceptualizations of students and their outcomes, the current investigation will further understanding of how to best serve all students on a large scale.

In this study, data analysis was conducted using a longitudinal design with a 9th grade cohort at first and final follow ups. The data were weighted with NCES-provided analytic weights

throughout analyses to account for sampling bias and missing data (Ingels et al. 2011, 2013, 2015). HLM was used to better account for the nested nature of the data and the subsequent variance at school and student levels. Two research questions were posed: 1) How does school climate relate to student engagement in higher risk and minority status groups (i.e., Black, learning disabled, ELL)? 2) What components of school climate have the most impact on student outcomes, (i.e., high school dropout, post-secondary attendance)?

Student Engagement and School Climate in High Risk Students

Without an appropriate model for student engagement, we were unable to explore the role of student engagement in high risk student populations. As much of the emerging literature suggests improved student outcomes are possible using school climate and student engagement models, a thorough investigation of a combined of school climate and student engagement model is necessary. However, a meaningful exploration of the conceptual combination of these two multifaceted complex constructs is not within the scope of this project. Future research addressing conceptual haziness will be discussed in coming chapters of this dissertation.

School Climate and Student Outcomes

Five successive models were created to better examine the effects of specific variables. The first model used only demographic data. The second model contained demographic and academic data; the third model incorporated Teaching and Learning data. The fourth model included Student Teacher Relationships and Institutional Environment. The fifth model was the final model incorporating all variables. All models were run for research question 2 with postsecondary enrollment and dropout status serving as outcome variables.

Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC) fit statistics were calculated to determine the fit of the model (Garson, 2013). The BIC tends to be more conservative towards type II error where the AIC adjusts for model complexity and is less conservative than the BIC. We used the logit link function across models with the assumption that y_{it} has a Bernoulli distribution (Fransier & Reschly, 2022; Lovelace et al., 2014; Rabe-Hesketh & Skrondal, 2012; Raudenbush & Bryk, 2002). All models shown below are shown without transformation to the link function for clarity.

Model 1: Demographic Model

Equations 1 and 2 used the same variables, including sex, race/ethnicity, SES, and ELL and SPED status for dropout and postsecondary enrollment.

$$(1) \text{ Dropout}_{it} = \beta_{0i} + \beta_{1i}(\text{SEX}) + \beta_{2i}(\text{RACE}) + \beta_{3i}(\text{SES}) + \beta_{4i}(\text{ELL}) + \beta_{5i}(\text{SPED}) + r_{it}$$

$$(2) \text{ Postsecondary}_{it} = \beta_{0i} + \beta_{1i}(\text{SEX}) + \beta_{2i}(\text{RACE}) + \beta_{3i}(\text{SES}) + \beta_{4i}(\text{ELL}) + \beta_{5i}(\text{SPED}) + r_{it}$$

Model 2: Academic Model

All demographic variables from the first model were retained with overall and academic GPA added as level 1 predictors for dropout and postsecondary enrollment.

$$(3) \text{ Dropout}_{it} = \beta_{0i} + \beta_{1i}(\text{SEX}) + \beta_{2i}(\text{RACE}) + \beta_{3i}(\text{SES}) + \beta_{4i}(\text{ELL}) + \beta_{5i}(\text{SPED}) + \beta_{6i}(\text{GPA}) + r_{it}$$

$$(4) \text{ Postsecondary}_{it} = \beta_{0i} + \beta_{1i}(\text{SEX}) + \beta_{2i}(\text{RACE}) + \beta_{3i}(\text{SES}) + \beta_{4i}(\text{ELL}) + \beta_{5i}(\text{SPED}) + \beta_{6i}(\text{GPA}) + r_{it}$$

Model 3: Teaching and Learning Model

All demographic and academic variables from the second model were retained with Teaching and Learning variables added for dropout and postsecondary enrollment.

$$(5) \text{ Dropout}_{i,j} = \beta_{i,j} + \beta_{i,j}(\text{SEX}) + \beta_{i,j}(\text{RACE}) + \beta_{i,j}(\text{SES}) + \beta_{i,j}(\text{ELL}) + \beta_{i,j}(\text{SPED}) + \beta_{i,j}(\text{GPA}) + \beta_{i,j}(\text{Teaching and Learning}) + r_{i,j}$$

$$(6) \text{ Postsecondary}_{i,j} = \beta_{i,j} + \beta_{i,j}(\text{SEX}) + \beta_{i,j}(\text{RACE}) + \beta_{i,j}(\text{SES}) + \beta_{i,j}(\text{ELL}) + \beta_{i,j}(\text{SPED}) + \beta_{i,j}(\text{GPA}) + \beta_{i,j}(\text{Teaching and Learning}) + r_{i,j}$$

Model 4: Relationships Model

All demographic, academic, and learning variables from the second model were retained with Student Teacher Relationships included for dropout and postsecondary enrollment.

$$(7) \text{ Dropout}_{i,j} = \beta_{i,j} + \beta_{i,j}(\text{SEX}) + \beta_{i,j}(\text{RACE}) + \beta_{i,j}(\text{SES}) + \beta_{i,j}(\text{ELL}) + \beta_{i,j}(\text{SPED}) + \beta_{i,j}(\text{GPA}) + \beta_{i,j}(\text{Teaching and Learning}) + \beta_{i,j}(\text{Student Teacher Relationships}) + r_{i,j}$$

$$(8) \text{ Postsecondary}_{i,j} = \beta_{i,j} + \beta_{i,j}(\text{SEX}) + \beta_{i,j}(\text{RACE}) + \beta_{i,j}(\text{SES}) + \beta_{i,j}(\text{ELL}) + \beta_{i,j}(\text{SPED}) + \beta_{i,j}(\text{GPA}) + \beta_{i,j}(\text{Teaching and Learning}) + \beta_{i,j}(\text{Student Teacher Relationships}) + r_{i,j}$$

Model 5: Final Model

All variables from the previous models were retained with the final inclusion of Institutional Environment for dropout and postsecondary enrollment.

$$(9) \text{ Dropout}_{i,j} = \beta_{i,j} + \beta_{i,j}(\text{SEX}) + \beta_{i,j}(\text{RACE}) + \beta_{i,j}(\text{SES}) + \beta_{i,j}(\text{ELL}) + \beta_{i,j}(\text{SPED}) + \beta_{i,j}(\text{GPA}) + \beta_{i,j}(\text{Teaching and Learning}) + \beta_{i,j}(\text{Student Teacher Relationships}) + \beta_{i,j}(\text{Institutional Environment}) + r_{i,j}$$

$$(10) \text{ Postsecondary}_{i,j} = \beta_{i,j} + \beta_{i,j}(\text{SEX}) + \beta_{i,j}(\text{RACE}) + \beta_{i,j}(\text{SES}) + \beta_{i,j}(\text{ELL}) + \beta_{i,j}(\text{SPED}) +$$

$$\beta_{11}(\text{GPA}) + \beta_{12}(\text{Teaching and Learning}) + \beta_{13}(\text{Student Teacher Relationships}) + \beta_{14}(\text{Institutional Environment}) + r_{1t}$$

CHAPTER 4

RESULTS

Student Engagement and School Climate Model

Without a student engagement model, it was deemed inappropriate to conduct further analysis with those data, and, therefore, no results can be reported for this question. Subsequent discussions of these results will address prior studies using these data, shortcomings associated with this project's approach, suggestions for future investigations of these constructs, and other related topics. Please see the Discussion chapter for a detailed review of these results.

Dropout Models

Table 5 displays results for odds ratios and overall fit statistics for the models predicting dropout. The Akaike Information Criteria (AIC) and the Bayesian Information Criterion (BIC) are reported to compare models to one another and demonstrate goodness of fit within each model. Lower values indicate a better fit to the data (Garson, 2013).

Table 5. *Models for High School Dropout*

	Demographic	Academic	Teaching and Learning	Student Teacher Relationships	Institutional Environment
(Intercept)	-1.67***	-2.14**	-2.40**	-2.44**	-2.44**
Female	-0.28***	-0.17**	-0.17***	-0.18***	-0.17***
American Indian/Alaskan Native...	0.46	0.28	0.27	0.27	0.27
Asian	-0.36***	-0.04**	-0.05***	-0.05***	-0.05***

Black/African	0.35***	0.15***	0.15**	0.14**	0.14**
Hispanic, no race specified a	-0.08	-0.25	-0.26	-0.25	-0.25
Multiracial	0.04	-0.16	-0.16	-0.27	-0.27
SES	-0.81***	-0.37***	-0.37***	-0.38***	-0.38***
Special Education	0.45***	0.16***	0.16***	0.16***	0.17***
ELL Now	0.28	0.19	0.15	0.15	0.15
ELL Ever	-0.09	-0.20	-0.20	-0.18317	-0.18
Academic GPA		0.06***	0.058***	0.06***	0.06***
Total GPA		-1.59***	-1.58***	-1.62***	-1.62***
Teaching and Learning			-0.04	-0.04	-0.04
Student Teacher Relationships				-0.04	-0.043
Institutional Environment					0.18
Akaike (AIC)	14927.24	13797.43	13790.34	13525.47	13502.56
Bayesian (BIC)	14029.44	13915.35	13916.13	13836.44	13868.84

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Postsecondary Models

Model 1: Demographic Model

The first model included student-level demographic variables including student socio-economic status, racial/ethnic status, and sex as well as English language learner status now or ever and special education services. Black students ($p < 0.001$) and students in special education ($p < 0.001$) were significantly more likely to drop out of high school. Females ($p < 0.001$), students from higher SES backgrounds ($p < 0.001$), and Asian students ($p < 0.001$) were the least likely to dropout.

Model 2: Academic model

The second model retained the demographic variables from the first model and included overall grade point average and academic grade point average across core classes. As found in the previous model, Black students ($p < 0.001$), students receiving special education services ($p < 0.001$) were the most likely to drop out. However, this model revealed students with higher GPAs in core classes ($p < 0.001$) as compared to overall GPA were also among those most likely to dropout. Similarly, females ($p < 0.01$), students from a higher SES background ($p < 0.001$), students with a higher overall GPA ($p < 0.001$), and Asian students ($p < 0.01$) were the least likely to dropout.

Model 3: Teaching and Learning model

The third model retained the demographic and academic variables from the preceding two models and added Teaching and Learning variables. Consistent with previous models, this model further indicated that Black students ($p < 0.01$), students receiving special education services ($p < 0.001$), and students with higher GPAs overall and in core classes ($p < 0.001$) were the most likely to dropout. In addition, females ($p < 0.001$), students from a higher SES background ($p < 0.001$), students with a higher overall GPA ($p < 0.001$), and Asian students ($p < 0.01$) were the least likely to dropout. Teach and Learning variables were nonsignificant in this model.

Model 4: Relationships model

Consistent with previous models, the fourth model retained demographic, academic, and Teaching and Learning variables in addition to Student Teacher Relationship variables. As with

previous models, this model indicated Black students ($p < 0.01$), students receiving special education services ($p < 0.001$), and students with higher GPAs in core classes ($p < 0.001$) as compared to overall GPA were the most likely to dropout. In addition, females ($p < 0.001$), students from a higher SES background ($p < 0.001$), students with a higher overall GPA ($p < 0.001$), and Asian students ($p < 0.01$) were the least likely to dropout. Student Teacher Relationships were nonsignificant within this model of dropout.

Model 5: Final model

The final model contained all demographic, academic, Teaching and Learning, and Student Teacher Relationships variable from previous models and included Institutional Environment. Black students ($p < 0.01$), students receiving special education services ($p < 0.001$), and students with higher GPAs in core classes ($p < 0.001$) as compared to overall GPA were the most likely to dropout. In addition, females ($p < 0.001$), students from a higher SES background ($p < 0.001$), students with a higher overall GPA ($p < 0.001$), and Asian students ($p < 0.01$) were the least likely to dropout. The AIC for the final model decreased, indicating the final model has the best fit. However, the BIC increased compared to the fourth model, suggesting a worse fit. A similar discrepancy in these data was reported by Fraysier & Reschly (2022) as the BIC penalizes for the inclusion of additional variables.

Table 6. *Models for Postsecondary Enrollment*

	Demographic	Academic	Teaching and Learning	Student Teacher Relationships	Institutional Environment
(Intercept)	1.00922**	2.015013723***	2.21352***	2.439008***	2.425311***
Female	0.574439***	0.231714586***	0.232261***	0.184689***	0.195955***
American Indian/Alaskan Native...	0.161128	0.419745003	0.420261	0.398317	0.397238
Asian	0.892802***	0.617494111***	0.612929***	0.6105138***	0.5997081***
Black/African	0.145463***	0.616740959***	0.618279***	0.614382***	0.610775**
Hispanic, no race specified	0.226022*	0.457256242*	0.460786***	0.42378***	0.415274**
Multiracial	0.047692	0.203232014	0.20305	0.27062	0.171702
SES	0.949441***	0.67739911***	0.634572***	0.618087***	0.603342***
Special Education	-0.35917***	-0.107188198***	-0.10878***	-0.172525***	-0.170384
ELL Now	-0.37062	-0.301105833	-0.29733	-0.289048	-0.286433
ELL Ever	-0.13723	-0.078565549	-0.08009	-0.08317	-0.080344
Academic GPA		0.579659007***	0.582237***	0.060699***	0.527479***
Total GPA		0.609343185***	0.605049***	0.61564***	0.684044***
Teaching and Learning			0.128564*	0.116282*	0.114532*
Student Teacher Relationships				0.24358	0.246282

Institutional Environment					0.018784
Akaike (AIC)	20258.45	17747.12	17043.22	17304.64	17285.972
Bayesian (BIC)	20360.65	17865.05	17365.05	17465.05	17344.36

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Model 1: Demographic Model

As with the dropout models described above, the first model included student-level demographic variables including student socio-economic status, racial/ethnic status, and sex as well as English language learner status now or ever and special education services. Females ($p < 0.001$), students from higher SES backgrounds ($p < 0.001$), Black and Asian students ($p < 0.001$) with Hispanic students and those who did not indicate a race ($p < 0.05$) also being more likely to enroll than their peers. Students receiving special education services were the least likely to pursue postsecondary schooling ($p < 0.001$).

Model 2: Academic model

The second postsecondary model retained demographic variables and included overall grade point average and academic grade point average across core classes. Consistent with the previous model, females ($p < 0.001$), students from higher SES backgrounds ($p < 0.001$), Black and Asian students ($p < 0.001$), students with higher overall and academic GPAs ($p < 0.001$), and students self-reported being Hispanic or did not indicate a race ($p < 0.05$) were the most likely to enroll. Students receiving special education services were found to be the least likely to pursue postsecondary schooling ($p < 0.001$).

Model 3: Teaching and Learning model

The third model retained the demographic and academic variables from the preceding two models and added Teaching and Learning variables. In addition to the findings from previous models, those that reported positive Teaching and Learning experiences ($p < 0.05$) were among the groups most likely to enroll in postsecondary schooling. Students receiving special education services were found to be the least likely to pursue postsecondary schooling ($p < 0.001$). The AIC for this model indicates the best fit to the data.

Model 4: Relationships model

Consistent with previous models, the fourth model retained demographic, academic, and Teaching and Learning variables in addition to Student Teacher Relationship variables. Relationship variables were nonsignificant in this model, and students receiving special education services were the least likely to pursue postsecondary schooling ($p < 0.001$).

Model 5: Final model

The final model contained all demographic, academic, Teaching and Learning, and Student Teacher Relationships variable from previous models and included Institutional Environment. Females ($p < 0.001$), students from higher SES backgrounds ($p < 0.001$), Black students ($p < 0.01$), Asian students ($p < 0.001$), students with higher overall and academic GPAs ($p < 0.001$), students self-reported being Hispanic or did not indicate a race ($p < 0.01$), and those that reported strong teaching and learning practices ($p < 0.05$) were the most likely to enroll. Relationships and Institutional Environment variables were nonsignificant. As discussed above,

the discrepancy in AIC and BIC for the final model may be due to the inclusion of additional variables.

CHAPTER 5

DISCUSSION

The purpose of this study was to examine the extent to which school climate and student engagement across time contribute to high school dropout and postsecondary enrollment.

Emerging research indicates school climate and student engagement are both important factors for student outcomes (Konold, Cornell, & Malone, 2018; Wang & Degol, 2016). Models that combine school climate and student engagement better capture the role of larger school practices in student engagement behaviors and ultimate student outcomes (Fatou & Kubiszewski, 2018; Janosz & Bouthillier, 2007; Lee et al. 2017; Loukas et al. 2006). This study attempted to further investigate how these larger malleable factors work in concert over time.

Some of our findings are consistent with ongoing research around the populations and experiences believed to be key in understanding these complex processes. Specifically, Black students and students receiving special education services were the most likely to drop out across models. Similarly, females, students from a higher SES background, students with a higher overall GPA, and Asian students were the least likely to drop out. Females, students from higher SES backgrounds, Black students, Asian students, students with higher academic and overall GPAs, students self-reported being Hispanic or did not indicate a race, and those that reported strong teaching and learning practices were the most likely to enroll in postsecondary schooling.

This study also found associations that beg further investigation. Most notably, without a cohesive student engagement model, we were unable to determine how school climate (SC) related to student engagement in this sample. Based on the work of Fraysier and Reschly (2022),

we predicted that school climate and student engagement would be highly correlated, and student reports of school climate throughout secondary school will predict student engagement and student outcomes. We further expected to observe this relationship specifically in high risk (HR) and minority status groups with school climate serving as a moderator between student engagement and student outcomes. However, Fraysier and Reschly (2022) used school and student level data, had less missing data, and utilized a cross-sectional design as compared to our longitudinal design. These important differences contributed to our difficulties creating a good model for student engagement as student level data has more variance. Attempts to better the fit by eliminating items from the model would have degraded the integrity of the Student Engagement construct too seriously and risked overfitting our final model. To avoid overfitting the data, the relation between student engagement and school climate in high risk students was not further explored within this dissertation.

Furthermore, this study found nonsignificant results with regard to Student Teacher Relationships and Institutional Environment and student outcomes. Although there are many reasons why nonsignificant results might be reported, it is likely that these constructs play a more complex role in student experiences than we could capture in this study. Specifically, the shift in significance for special education students in the final dropout model suggests there are additional components and populations to consider in a school. Without the inclusion of school level data in our analyses, the inclusion of additional variables, high missingness, and increased variance likely contributed to the nonsignificant results found during this investigation. However, it is also important to consider additional factors within a student's daily experience

that may also contribute to these findings. Perhaps the areas and resources, such as access to and quality of physical materials, regularity of maintenance and upkeep of additional spaces and areas within the school, and available teachers or staff with whom to develop supportive relationships differ in meaningful unexplored ways between subsets of students. Special education services are often housed and provided in ancillary spaces within a school, such as resource rooms, unused classrooms, or other available areas. Although all students receiving these services will have the same experiences, it is important to consider these additional factors when conceptualizing school climate and student engagement across all students.

In contrast, students who reported currently or ever having been an English Language Learner (ELL) were not significantly impacted by any factor in our model, suggesting additional factors are at play. Further, students with higher GPAs in core classes were more likely to drop out as compared to overall GPA. Further, teaching and learning and institutional environment did not result in significant findings in any model. As the importance of positive relationships within the school are well documented (Dynarski et al., 2008; Ekstrom et al., 1986; Rumberger, et al., 2017), these differences underscore the lack of clarity in who positive relationships impact most and why.

With regard to postsecondary enrollment, students are more likely to pursue postsecondary education when exposed to high expectations from teachers. Further, students receiving special education services were less likely to dropout before institutional environment was added to the model, suggesting some groups may be more sensitive to specific factors within school climate. This might be due to how resources are allocated within a school, as special

education services are often regulated and conducted in separate spaces from general education. It is also notable that the significance fluctuated across models and outcomes for some populations. In concert, the findings reported by this study suggest a number of unexplored avenues exist for future research and intervention.

Limitations

The current study had a number of limitations. First, all factors were created using pre-collected data. Survey questions were not specifically written to assess engagement and climate factors which might impact how representative responses are of respondents' experiences. In addition, using survey items also limits available data, such as responses regarding previous school experiences which could further conceptualizations. Further, all responses used were self-report items which can be confounded by bias. Second, due to the amount and nature of the data utilized, several analytic approaches might be deemed suitable but, as each approach has benefits and weaknesses, it is important to make sure the data are treated appropriately to avoid cherry picking and manipulating meaningful results. Finally, the failure to create a good model of student engagement leaves conceptualizations of student engagement and school climate incomplete. Despite having nonsignificant results regarding specific aspects of school climate, this study identified a number of questions yet to be answered regarding student outcomes, vulnerable populations, and effective school practices.

Directions for Future Research

The current study resulted in interesting findings that contribute to conceptualizations of the complex factors at play in student outcomes, namely those associated with student dropout

and postsecondary enrollment. However, further investigations of this complex process are vital to creating lasting changes in policy and school practices to encourage widespread retention and postsecondary enrollment. First, clarifying definitions of school climate and associated factors should be a priority for future examinations of these constructs as conceptual haziness contributes to incomplete models of student experiences that may exclude important facets for intervention and support. In addition, strong empirical support for student engagement as an avenue for retention and achievement can be further bolstered by examining the contexts in which students engage or disengage from school. Further examinations should be used to inform national- and district-level policy around school funding allocation, school disciplinary practices, staff and administrative training, and many other multilevel changes most likely to encourage retention and student success.

Future research should seek to incorporate additional factors and considerations, such as school safety and controlling for previous school climate and engagement before entering high school. Improving understanding of the role school-wide practices have on student engagement over time can further highlight specific areas to target to decrease dropout rates and encourage postsecondary schooling.

Future research further investigating how school climate impacts student engagement in specific high risk populations. It is possible that while all students benefit from a positive school climate, high risk students may be even more sensitive to these factors. As high risk students might be more easily identified through their engagement, their inclusion in positive, connected,

and well-maintained settings within the school may serve to protect them from the additional stressors pushing or pulling them to dropout.

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