The Role of Teachers' Perceptions of the Educational Environment on Latinx and

Multilingual Children's Development

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Melissa Lucas, B.S.

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Melissa Lucas

Department of Leadership, Foundations, and Policy (EDLF)

School of Education and Human Development

University of Virginia

Charlottesville, Virginia

APPROVAL OF THE DISSERTATION

This dissertation, "The Role of Teachers' Perceptions of the Educational Environment on Latinx and Multilingual Children's Development" has been approved by the Graduate Faculty of the School of Education and Human Development in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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Natalia Palacios (Chair)

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Luke Miller

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Judy Paulick

_____

Sara Rimm-Kaufman

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Dedication

This dissertation is dedicated to mí ángel querida, *la Aurora Pacora Vicuña*. Mi tía guerrera. la quien siempre me engreaba y apoyaba desde niña. Siguire bailando por tí y seguirás siendo testigo de mis victorías.

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¡Salud!

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Problem Statement

In early childhood, socioemotional competencies are a vital component of developing children's emotional awareness and social competence, as well as establishing positive interpersonal relationships that support children's school readiness and later success (Durlak et al., 2011; Jones & Bouffard, 2012; Jones & Doolittle, 2017). Schools play an important role in developing healthy children by fostering not only their academic development, but also their socioemotional learning (SEL; Greenberg et al., 2017). Current literature on early SEL and schooling focus on developmentally appropriate techniques and intervention programs, the teachers who deliver them, and the influence of both the classroom and school context (Jones & Doolittle, 2017). However, the current understanding of SEL does not account for power, privilege, and culture, despite the evidence that individual beliefs and bias may lead educators to react harshly to behaviors that are not aligned with dominant cultural frames (Gregory & Fergus, 2017), disproportionally impacting culturally and linguistically minoritized (CLM) learners.

Furthermore, schools have consistently failed to provide CLM learners with an equitable and high-quality education (Han, 2008; Wright, 2011). The education and SEL outcomes of CLM populations typically seek to compare minoritized learners' educational trajectories and development to that of their white peers, highlighting consistently worse outcomes for CLM learners compared to their white peers (Mckown & Weinstein, 2008; Miranda et al., 2007; Musu-Gillette et al., 2017). For example, despite being one of the fastest growing populations in the U.S. (Guzman-Orth et al., 2017), we would not expect that English Learner (EL) students are disproportionately at higher risk for socioemotional/internalizing issues compared to mainstream populations (Albeg, 2010). Rather, we would anticipate that educational communities would

understand and adequately address the struggles of CLM students and ensure that teachers receive the best training possible for supporting this growing segment of the population. However, as a result of between-group comparisons, we fail to see and study the unique heterogeneity of CLM students and socialization processes of teacher-child interactions are not well identified among CLM children, limiting our ability to promote cultural and linguistic expressions of SEL that reflect CLM children's specific needs. Therefore, to account for variability in development, it is necessary to also examine within-group differences among CLM populations, especially Latinx populations, as Latinx students are a large and growing population (U.S. Department of Education, 2018a), and about 77% of ELs identify as Latinx (U.S. Department of Education, 2018b). Furthermore, approximately 52% of school-aged Latinx students are navigating the education system with foreign-born parents (Lopez et al., 2017), whose primary language is Spanish (Parra-Cardona et al., 2008). This demonstrates the diversity and unique supports that are needed by Latinx children within the school setting, such as effective dual language and cultural programming to support both Latinx students and parental involvement.

What are Socioemotional Skills?

Socioemotional skills consist of five main competencies that support children's ability to manage and learn about their own emotions and social interactions. These competencies include self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (Jones & Doolittle, 2017; Weissberg et al., 2015). Self-awareness includes understanding one's own emotions, thoughts, values, and limitations, while understanding how they guide one's behavior (Jones & Doolittle, 2017). Self-management involves one's ability to regulate one's emotions, behaviors, and thoughts in various situations in support of achieving personal and

educational goals (Weissberg et al., 2015). Social awareness involves one's ability to understand the emotions of others so as to empathize and take other's perspectives (Weissberg et al., 2015). Relationship skills involve one's ability to positively interact and communicate with others by accurately interpreting other people's behavior and effectively navigating social situations (Jones & Doolittle, 2017). Responsible decision-making involves one's ability to make constructive choices about personal behavior and social interactions while considering ethical standards, safety concerns, and social norms (Jones & Doolittle, 2017; Weissberg et al., 2015). Jointly, these competencies establish the foundation for positive school and interpersonal adjustments, as well as better academic performance and health promoting behaviors (Greenberg et al., 2017). At the same time, socioemotional skills have been found to reduce the effects of risk factors and foster protective mechanisms for positive adjustments (Benson, 2006; Guerra & Bradshaw, 2008).

Student-teacher relationships and student's socioemotional development

One important adjustment is the ability to get along with others when children enter school. In early childhood, socioemotional skills prepare children to meet the behavioral and social demands of the classroom (Rimm-Kaufman et al., 2009). Student-teacher relationships are important because they help develop student's self-regulation and learn appropriate social rules and self-management strategies. When students demonstrate prosocial skills, are able to work independently, and exhibit high levels of self-regulation, teachers report more positive and close relationships with those students (Birch & Ladd, 1998; Capara et al., 2000). In turn, when student-teacher relationships are positive, students are more likely to receive teacher supports, feel a sense of security that supports their engagement in the classroom, and develop positive socioemotional skills (Merritt et al., 2012; Myers & Pianta, 2008; Pianta et al., 2002). As such,

these students are more likely to have opportunities for positive SEL and have more incentive to behave in socially and emotionally appropriate ways. Theory posits that the association between student-teacher relationships and children's socioemotional development is bidirectional; students influence teachers, and teachers influence students (Jennings & Greenberg, 2009).

In the current dissertation, I examine student's socioemotional skills in a complex way, with multiple measures of student's relational skills. In manuscripts 1 and 3, socioemotional competencies are estimated by student's relationship quality with teachers, using the Student-Teacher Relationship Scale (STRS; Pianta & Steinberg, 1992). This measure assesses a partial understanding of student's relationship skills with teachers, as perceived by teachers. In paper 2, socioemotional skills are assessed via the Social Skills Rating System (SSRS; Gresham & Elliot, 1990). This measure provides ratings on students' general self-control, interpersonal skills, internalizing problem behaviors, and externalizing problem behaviors as perceived by teachers.

Influence of Teachers' Perceptions of the Educational Environment on Student Development

Figure 1 illustrates a model in which teachers' perceptions of the educational environment influences student development. First, I view teachers' perceptions of school- and classroom-level climate (e.g., academic environment factors such as teaching efficacy with CLM populations and job satisfaction, or engagement factors such as staff relationships and school leadership; Schweig et al., 2019; Wang & Degol, 2016) as an important contributor to the development of supportive student-teacher relationships. Teachers' beliefs and expectations about teaching and learning may relate to the degree to which teachers positively connect and interact with their students (Zee & Koomen, 2016). However, work-related stress, involving job dissatisfaction, low teaching efficacy, teacher burnout, and limited training and resources, results

in negative interactions, perceptions, and responses to students (Herman et al., 2018; Herman et al., 2020; Pas & Bradshaw, 2014; Zee & Koomen, 2016).

Second, teachers' views of climate directly contribute to students' socioemotional outcomes. Improvements in climate may reinforce a teachers' enjoyment of teaching, efficacy and job retention, which in turn may prevent burnout and stress related to challenging student behavior (Collie et al., 2012; Pas et al., 2010; Pas et al., 2012; Zinsser, et al., 2016). These findings suggest teacher's perceptions of climate will likely impact teacher's wellbeing, teaching practices in the classroom, and how they view students' behavior.

Third, as established, student-teacher relationships support the development of student's SEL. Furthermore, student-teacher relationships provide a critical foundation for learning and set the tone for classroom-level climate (Hughes, 2011). As such, not only is a transactional relationship between these three aspects of the model shown here, but I situate student-teacher relationships as not only an outcome but also as a part of the educational environment students are exposed to in the classroom.

[INSERT FIGURE 1 AROUND HERE]

Lastly, I recognize that various contextual factors, inside and outside the school building, may influence teacher's perceptions of their students and the educational environment, and the degree to which they create nurturing classroom environments that impact student SEL. These factors include sociocultural factors, such as federal and local policies, individual teacher characteristics, such as teaching experiences and training, their biases, assumptions, and prejudices, or personal life stress (Schonert-Reichl, 2017), and individual student and family factors, such as students' social positioning or individual characteristics, or socio-economic status. Furthermore, it is also possible that teachers' perceptions and expectations of the

educational environment and students change across time, as the school year progresses, students grow older, and as differences in student behavior become entrenched.

Teacher's Cultivating Promoting and Inhibiting Educational Environments

School contextual factors impact teachers' perspectives and experiences, which in turn indirectly affect students. The most visible and potentially most meaningful factors are indicators of climate, including teachers' ability to provide developmentally, contextually, and culturally relevant instructional practices and to create positive interactions with students, along with their relationships with staff and school leadership (Durlak et al., 2011; Roeser et al., 2012; Thapa et al., 2013). These factors set the tone for relationships and interactions between leaders, staff, and students, along with overall approaches to teaching and learning.

Specifically, teachers who report having supportive, trusting, and cooperative relationships with staff and school leaders have been associated with positive perceptions of student behavior and wellbeing, (Capp et al., 2020; O'Brennan et al., 2014; Pas et al., 2010). Moreover, positive staff relationships appear to be more important in schools with low-income, CLM student populations (Brown & Medway, 2007). Furthermore, when teachers feel supported by staff and school leaders, they are more likely to have more positive classroom climates and higher quality student-teacher interactions (Henry et al., 2021). Similarly, when school leaders consistently try to build caring relationships between staff members, and staff and students, student engagement and school climate is likely to improve (Ryu et al., 2020; Spillane & Sun, 2020). These findings highlight the importance of school-level climate in creating positive classroom-level climate where student-teacher relationships may flourish.

Simultaneously, when teachers have more positive student-teacher relationships, they create a healthier and more positive classroom climate (Poulou, 2016; Pas et al., 2010; Zee &

Koomen, 2016). In turn, this contributes to positive student outcomes, and results in more positive teacher socioemotional competence and student-teacher relationships (Capp et al., 2020; Collie et al., 2012; Moen et al., 2019). One factor of classroom climate, job satisfaction, is a critical factor associated with teachers' relationships with students (Kelly, 2004), teachers' enthusiasm (Chen, 2007) as well as teacher retention (Ingersoll, 2001). Furthermore, teachers' teaching-efficacy, particularly low teaching-efficacy has been linked to negative teaching behaviors and less effective teaching practices (Skaalvik & Skaalvik, 2007), resulting in negative student-teacher relationships and student behaviors (McClowry et al., 2013; Poulou, 2016; Pas et al., 2010; Zee & Koomen, 2016). Zee and Koomen (2016) found that teachers with higher self-efficacy are more likely to employ proactive behavioral management strategies, create more supportive environments, and appear to have less conflictual relationships with students. Similarly, when teachers feel more efficacious in teaching EL students, they reported more favorable attitudes toward CLM students than those with weaker pedagogical knowledge (Durgunoğlu & Hughes, 2010). However, when teachers are less efficacious, they likely have lower expectations of their students they teach (Tournaki & Podell, 2005). Teachers' low self-efficacy is particularly concerning for CLM student populations, as some evidence suggests that teachers of CLM students hold deficit-oriented perspectives related to CLM students' socioemotional skills and student-teacher relationships (Cherng, 2017; Cho et al., 2019; Ho et al., 2012). In turn, when teachers perceive students to have disruptive behaviors, they are more likely to provide negative feedback and have more conflictual relationships with their students (McClowry et al., 2013); also, disproportionately impacting Latinx and Black students (Tenenbaum & Ruck, 2007). These differences may reflect negative relationships between teachers and CLM students; relationships that are important for SEL. These findings suggest the

need for research to consider teacher's perceptions of teaching/learning, aspects of classroom-level climate, as it relates to teachers' interactions with students in the classroom.

Teacher Perceptions and Sociocultural Factors

Lastly, schoolwide expectations for appropriate behaviors and teaching practices can powerfully alter school culture (Thapa et al., 2012). One way is through social norms that are created and reinforced by social networks within the school system; they convey what is deemed as (in)appropriate or inappropriate behavior (Henry, 2008), and therefore establishing expectations for staff and children. These behaviors may involve acceptable practices and implementation related to teaching and learning, such as SEL practices or school language policies. Teachers are often more likely to be able to change norms within the school and manage norms in their classroom (Henry, 2008), but are inevitably influenced by staff, school leaders, and the broader socio-political context. For example, language policies in schools tend to focus on influencing students' academic development, possibly neglecting their SEL (Castro-Olivo et al., 2011). Students who are provided language support services are expected to make English language proficiency gains, to eventually be integrated into regular English classes. As such, EL students are more likely to have to cope with feelings of alienation for not speaking the mainstream language proficiently and often face discrimination due to language barriers and EL-classification status (Blanco-Vega et al., 2008). This policy-related practice may perpetuate deficit ideologies with regards to CLM students. As such, teacher's (mis)aligned beliefs related to school policies and practices may impact teachers and their interactions with students.

Teachers' Perceptions and Student Social Positioning: A Within Group Approach

Systemic oppression experienced by those in minoritized social positions impacts the distribution of resources and supports that make an environment promoting or inhibiting for the

development of competencies, such as socioemotional skills (García Coll et al., 1996). For example, teachers' racial-ethnic bias toward Latinx children may contribute to teacher's engaging in warm and supportive interactions with students or how teachers perceive students' early socioemotional skills and knowledge. In fact, children from CLM backgrounds have a higher likelihood of being negatively perceived by teachers and tend to experience harsher treatment from them than their white counterparts (Gansen, 2020; Martinez, 2020; Rasheed et al., 2020; Tenebaum & Rauk, 2007). Studies have found that teachers rate their student's social skills more positively when students and teachers share a similar ethnic-racial background (Bates & Glick, 2013; Cherng, 2017; Downer et al., 2016; Lindsay & Hart, 2017). Unfortunately, EL students are less likely to share the same ethnic-racial background as their teachers (Han & Bridglall, 2009) and face the potential additional barrier of not being able to rely on a common language to build trust and understanding. These barriers may be exacerbated by teachers' expressed lack of training and experience for working with Latinx-multilingual student populations (Farr & Song, 2011). Evidence also suggests that Latinx students are likely to experience less qualified teachers (Jimenez-Castellanos, 2010) in contexts that may perpetuate deficit-views of CLM students (Gregory & Fergus, 2017; Castro-Olivo et al., 2011). Differences between teachers serving Latinx students and the Latinx students in their classroom may increase the risk of teacher's developing and expressing negative perceptions and beliefs about their Latinx students. In fact, white teachers compared to Latinx teachers, have been found to have lower expectations of their EL students (Marx, 2000). These findings highlight the impact of cultural and linguistic biases that may contribute to teachers' perceptions of students as well as their effectiveness at supporting students' development of social and emotional skills.

Furthermore, the integrative model for the study of developmental competencies in minoritized children posits the importance of culture and context in the development of CLM children, calls attention to focusing on within-group variations among CLM populations, and encourages the examination of processes over outcomes (García Coll et al., 1996). For example, CLM children experience unique pathways of development (compared to their white counterparts) through their social positioning (e.g., ethnic identity, multilingual background) and social stratification (e.g., exposure to prejudice or discrimination) within society. This includes children's race/ethnicity and the discriminatory mechanisms and segregated environments that children and their families are subjected to (such as the pervasive deficit ideologies that follow CLM students). At the same time, the school and classroom climate that teachers experience and cultivate for CLM learners constitutes a potentially promoting or inhibiting environment that children experience. It is then, only through varying adaptive cultures, family contexts, or individual child factors, that CLM children develop socioemotional skills. As such, to more fully understand the cultural and linguistic factors that intersect with the educational environment to influence Latinx children's socioemotional development, research must examine within-group differences of Latinx populations. Examining within-group differences allows research to further understand the unique variability among the Latinx population, identify opportunities and assets that some students may have that act as protective factors, and how multiple aspects of the educational environment may differentially impact students who do/do not have protective mechanisms.

Dissertation Aims

My dissertation aimed to identify strength-based approaches that support the development of Latinx and multilingual children in school contexts. My three-paper dissertation

explored within-group differences among Latinx and English Learner (EL) populations, to examine different ways in which teachers experience and create supportive educational environments in their classrooms for student development—with particular focus on teachers' perceptions of climate and their relationships with students.

In Manuscript 1, we examined the educational environment and investigated the relevance of unique climate profiles (as perceived by teachers) for cultivating positive student-teacher relationships with Latinx first graders. Rather than comparing multiple racial/ethnic background differences in student-teacher relationships, we specifically examined differences in Latinx children's relational experiences with their teachers. Furthermore, we examined the variability of the broader educational environment (as perceived by teachers) that students are exposed to and how that related to the relationships they built with teachers. Specifically, this study examined (1) profiles of teacher's perceptions on school climate, and (2) the association of profile membership with teacher-rated closeness and conflict with Latinx students.

In Manuscript 2, we took a within-group approach to examine multilingual learners and leveraged quasi-experimental methods to estimate the causal effect of the deficit-framed, policy-driven EL classification label in third grade on teachers' perceptions of student social skills. In this study we assessed how multilingual students' EL classification status affected their teachers' ratings of their social skills. We hypothesized that teacher's perceptions, and the potential for biases related to language proficiency or deficit ideologies, may be a mechanism by which students are rated on their social skills. Using the ECLS-K:2011, we used propensity score matching to estimate the causal effect of EL classification in third grade (among approximately 1,110 multilingual students) on teachers' perceptions of students' social skills.

Finally, in Manuscript 3, I utilized a person-centered approach to examine changes in the quality of Latinx students' relationships with their teachers as they transitioned from first to third grade. This paper aimed to provide a better understanding of the educational environment that Latinx students experience (as perceived by their teachers), and how this may change over time. Additionally, I reviewed which students belonged to different relationship quality patterns in order to identify those children who are most vulnerable to experiencing lower quality relationships. Specifically, this paper used latent transition analysis to examine the following research questions: 1) what are statuses (i.e., patterns) of student-teacher relationship quality among Latinx students; 2) what is the likelihood of transitioning from one status to another over time, from first to third grade; 3) What individual and family characteristics are associated with belonging to different statuses across time? I used longitudinal data from the ECLS-K:2011, drawing from a sample of approximately 4,590 Latinx first graders and 1,460 teachers.

Overall, this dissertation contributed to a clearer understanding of how (un)supportive school contexts and teacher perceptions are associated with the socioemotional outcomes of Latinx and multilingual children. Findings from this dissertation contradict prior research and messaging related to deficit views and outcomes experienced by Latinx students by showcasing the educational spaces in which Latinx children are thriving and how we may identify those spaces when taking a within-group approach to examining variability amongst Latinx children. These findings may provide a better understanding of the educational environment that Latinx and multilingual children experience in the United States. Aspects included the variability of perceived climate experienced by teachers serving Latinx students, the relationship quality that Latinx students and teachers share, and the impact of federal policies on teacher's perceptions of students' social skills. As such, findings may guide future efforts to mitigate the factors that

hinder students' socioemotional outcomes and highlight supportive factors that may encourage culturally resilient academic identities among Latinx and multilingual students.

In the sections that follow, I introduce the three dissertation manuscripts in which I pursued an examination of the influence of teachers' perceptions of the educational environment on student development.

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┌─────────────────────────────────────────────────────────────────┐
│        Sociocultural, Teacher, Student, & Family Contextual Factors │
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Teachers' Perceptions of Student-Teacher Relationships

Teachers Perceptions of Climate

Student Socioemotional Skills

Time
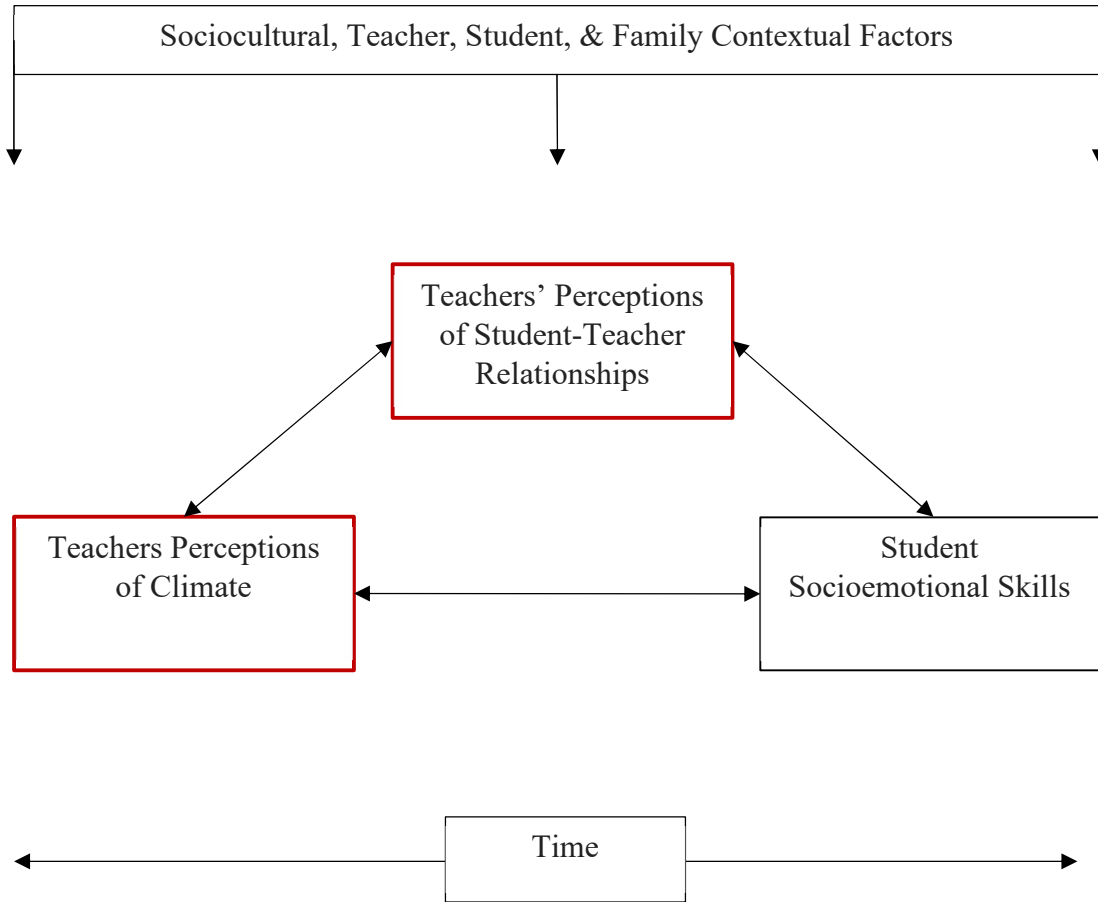
Figure 1. The influence of teachers' perceptions of the educational environment (in red) on student development.

Manuscript 1: Profiles of Teachers' Perceptions of School Climate: Associations with Student-Teacher Closeness and Conflict with Latinx First Graders

Melissa Lucas and Natalia Palacios

(under review)

Abstract

The current study examined (1) profiles of teacher's perceptions on school climate, and (2) the association of profile membership with teacher-rated closeness and conflict with Latinx students. Using the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K:2011), we drew on a sample of 1,460 teachers and 4,050 Latinx first-grade students. LPA yielded four profiles: (1) Striving, (2) Thriving, (3) Managing, and (4) Struggling. SEM findings suggest higher levels of closeness and lower conflict for teachers in the Thriving profile compared to teachers in other profiles. Our findings point to the variability of perceived climate experiences of teachers serving Latinx students and highlight the implications of those climate perceptions for building student-teacher relationships.

Despite a lack of consensus on the definition of school climate, scholars have agreed on a broad definition of school climate as the "personality" or "character" of school life (Cohen et al., 2009). This involves the social relationships (between students, teachers, and administration), teaching and learning practices, and the values, norms, and goals of the school (Cohen et al., 2009, Thapa et al., 2013). A positive school climate serves as a protective factor for students (Astor & Benbenishty, 2019). The effects of climate and the conditions that give rise to them are deeply interconnected, as they are influenced by various interdependent factors, including school-level cooperation among colleagues, school leadership, and classroom-level teacher's efficacy and student-teacher relationships (Bronfenbrenner, 2005; Thapa et al., 2013). Given this complexity, it is necessary for research to elucidate the multiple classroom and school-level factors that may influence climate, as these factors may affect teachers' ability to establish supportive relationships with students in diverse classrooms, across cultures, and among different age groups.

These teacher and school-level factors may be especially salient for Latinx students, as Latinx children are an often underserved yet growing segment of the population. The sociocultural and linguistic differences between Latinx students and their teachers in the early academic years (Han & Bridglall, 2009), and their teachers' lack of efficacy for working with these populations highlight the need to understand the relationships between Latinx students and their teachers (Farr & Song, 2011). Given that Latinx students are more likely to attend under-resourced schools with less-experienced teachers (Jiménez-Castellanos, 2010; U.S. Commission on Civil Rights, 2018) in contexts with high teacher burnout (Bottiani et al., 2019), understanding the potential impact of classroom- and school-level climate is necessary to identify supportive environments for Latinx children. To address this need, the current study

examined profiles of teachers' perceptions of school climate and explored which profiles were associated with teachers' perceptions of closeness and conflict with their Latinx students in first grade. Findings from this study can guide future efforts to foster more supportive classroom and school climates for young Latinx students.

Conceptual Framework

Existing Domains of School Climate

Recent conceptualizations define school climate as a comprehensive and multidimensional construct with four distinct domains—academic environment, engagement, safety, and institutional environment (Schweig et al., 2019; Wang & Degol, 2016). This inclusion of multiple dimensions of school climate is supported by Bronfenbrenner's (1979) bio-ecological framework that emphasizes the multiple contexts and proximal processes that influence individuals within the school environment. The present study focused on two domains, academic environment and engagement.

Academic environment refers to the quality of teaching and learning present in the school. This domain involves the instructional practices teachers employ in the classroom (including the use of culturally responsive and sustaining pedagogy), teachers' beliefs about teaching and learning, their expectations and encouragement of students, teachers' job satisfaction, and opportunities for teachers to participate in professional development. The second domain, *engagement*, refers to the quality of interpersonal relationships among individuals in the school—involving connectedness, respect for diversity, and sense of belonging (Wang & Degol, 2016). Engagement at the school level includes staff relationships (e.g., teacher respect and collaboration with other teachers) and school leadership (e.g., the role of principals and administrators play in supporting teachers and executing the school's vision; Schweig et al.,

2019). At the classroom level, engagement also involves student-peer relationships and student-teacher relationships (Schweig et al., 2019). In this study, we focused on the school-level engagement factors (staff relationships and school leadership), as these were the indicators captured in the dataset, and refer to these as the *professional engagement* domain moving forward. It should be noted that despite some climate factors being heavily aligned with factors related to teacher working conditions (such as professional support), the current conceptualization of school climate is consistent with definitions suggesting that climate refers to the comprehensive social and physical conditions at a school (Thapa et al., 2013).

Capturing Teachers' Experiences of Climate

Given that teachers engage in interpersonal relationships with other professionals in the broader school contexts and with students in the classroom contexts, it is important for the school climate literature to include the views and processes of teachers (Capp et al., 2018; Maxwell, 2017). Teacher views may capture processes that do not directly include the student but inevitably impact students (Capp et al., 2020b), such as staff relationships, school leadership, job satisfaction, and teaching efficacy and burdens (Hirsch et al., 2006; O'Brennan et al., 2014), which may contribute to the overall school climate (Astor & Benbenishty, 2019; Capp et al., 2018; Marks & Printy, 2003). The *engagement* and *academic environment* domains are perhaps the most salient facets of school climate research given that they directly involve the teacher and in turn impact students and the classroom.

Within the *academic environment* domain, teachers demonstrate their expectations by challenging students academically, maintaining academic rigor and performance, and supporting student progress and improvement (Hoy et al., 2006). Teachers' perceptions of teaching burdens also have been found to be significantly associated with overall school climate and student

outcomes (Collie et al., 2012; Grayson & Alvarez, 2008; Herman et al., 2018). Within the *professional engagement* domain, teachers' perceptions of professional relationships with staff and leadership at the school level provide an understanding of the supportive relationships that may prevent teacher burnout and encourage supportive social and instructional classroom contexts (Aldridge & Fraser, 2016; O'Brennan et al., 2014; Skaalvik & Skaalvik, 2010). The extent to which teachers and staff effectively communicate, collaborate, and support each other is important for establishing positive interactions and interpersonal relationships. Additionally, effective leaders guide and inspire both students and teachers toward a shared school vision and common goals, while showing respect for all members of their staff and encouraging staff collaboration (Grayson & Alvarez, 2008). Interactions between teachers and their colleagues may impact what happens in the classroom and teachers' relationships with students. However, most research related to teacher perceptions of school-level climate focus on its effects on staff functioning (Heck, 2000), teacher well-being (Boyd et al., 2005; Grayson and Alvarez, 2008), and job satisfaction (Collie et al., 2012), without considering its effects on student outcomes.

In contrast to existing research on school-level climate, most elementary school studies of climate have examined classroom-level processes--including emotional support, classroom organization, instructional support, aspects of the physical environment, teachers' orientation toward learning, as well as peer relationships and student-teacher interactions (Moen et al., 2019; Pianta et al., 2008). Though these factors are important to conceptualizing classroom climate and capture key aspects of both the academic environment and engagement domains of climate, they do not consider other aspects of the *academic environment* or *professional engagement* domains. For example, they do not consider teacher's job satisfaction or professional development opportunities conceptualized in the *academic environment* domain, nor do they include teachers'

professional relationships with staff or school leaders conceptualized in the *professional engagement* domain. This suggests that studies of climate in elementary school must not only consider classroom-level interactional factors but also individual teacher and school level factors that are conceptualized as part of the *academic environment* and *professional engagement* domains.

Teachers' Perceptions of Climate & Student-Teacher Relationships

Given the importance of teachers' perceptions of climate, including both the academic and professional engagement domains, it is necessary to consider the ways in which teachers engage and perceive relationships with their elementary-age students. Teachers who experience negative professional relationships (i.e., *professional engagement* domain factors such as low administrative support or limited communication/collaboration with staff at the school level) may report increased burnout that impacts aspects of the *academic environment* domain, including lower feelings of teaching-efficacy (Pas & Bradshaw, 2014; Reaves & Cozzens, 2018) or job satisfaction (Aldridge & Fraser, 2016; Canrinus et al., 2012; Skaalvik & Skaalvik, 2010; Williams et al., 2019). Moreover, teachers' efficacy has been linked to classroom-based teaching behaviors and teachers' expectations of students (Zee & Koomen, 2016).

In contrast, when teachers are part of a supportive school climate characterized by strong professional support from staff and leadership in ways that foster nurturing academic environments--characterized by positive instructional and emotional climate--children are likely to develop closer and less conflicted relationships with their teachers over time (Cadima et al., 2016; Decker-Woodrow, 2018; Lowenstein et al., 2015; Moen et al., 2019; Ryu et al., 2020; Spillane & Sun, 2020). It may be especially important to consider the association between climate and student-teacher relationship quality in contexts with high populations of culturally

and linguistically minoritized (CLM) students. School environments with high CLM student populations tend to have high teacher attrition, fewer resources, and larger percentages of new or uncertified teachers (Jiménez-Castellanos, 2010), all factors known to decrease positive classroom (Vanderslice, 2010; Wei et al., 2021) and school climate (Djonko-Moore, 2016; Gregory et al., 2010; La Salle et al., 2015).

Significance of the Current Study

To understand the relation between climate and student-teacher relationships, we examined teachers' perceptions of *academic environment* and *professional engagement*. In this study, we focused on teachers serving Latinx students to develop a better understanding of the variations in teachers' perceptions of these two climate domains, as these perceptions may influence the way that teachers engage with Latinx students. A positive academic environment (including teacher's high expectations, positive perceptions, and encouragement) is important for motivating Latinx students academically, having Latinx students feel safe, supported, and cared for at school, and fostering positive relationships between Latinx students and teachers (Cherng, 2017; Cooper & Miness, 2014). We explored how different patterns of climate are associated with teachers' perceptions of positive student-teacher relationships early in students' academic trajectories. These results can help inform interventions that target structural factors at the school and classroom level in ways that provide better support for teachers of Latinx students, and ultimately to improve the relational experiences between teachers and their students. Hence, our findings may highlight how supportive facets of the school environment are linked to positive adjustments for Latinx students.

Literature Review

Academic Environment & Student-Teacher Relationships

Teachers have the ability to create supportive classroom environments characterized by closer and less conflicted relationships with teachers over time, resulting in positive socioemotional and academic outcomes for students (Jennings & Greenberg, 2009; Moen et al., 2019). Highly effective teachers build relationships with their students by recognizing the importance of students' knowledge and experiences and creating opportunities for student learning (Sorhagen, 2013). However, teachers' negative perceptions or low expectations of students can limit teacher-student interactions and in turn may impact how supported students feel by adults at their school (Hallinan, 2008), whether or not they believe their learning matters (Rubie-Davies, 2006), and students' academic performance (Sorhagen, 2013). Unfortunately, teachers' expectations have been found to have a disproportionate impact on students from lower-income families, and Black and Latinx students, particularly when students' race/ethnicity differs from their teachers' (Sorhagen, 2013; Tenenbaum & Ruck, 2007).

The negative impact of low expectations is exacerbated by teachers' low efficacy beliefs for successfully teaching children who are at risk for school failure because of their behavior, family background, or other external factors (Gibson & Dembo, 1984). Additionally, teachers' efficacy is influenced by teacher's locus of control (Tschannen-Moran & Woolfolk Hoy, 2001), defined as the extent to which students' learning-related successes or failures are within or outside the teacher's control (Rotter, 1966). Teacher efficacy has been linked to teaching behaviors, student-teacher relationships, and lower expectations of students (Poulou, 2017; Tournaki & Podell, 2005; Zee & Koomen, 2016). For example, Zee and Koomen (2016) synthesized over 165 studies, finding that teachers across grade levels with higher self-efficacy are more likely to employ proactive behavioral management strategies, create more supportive classroom environments, and appear to have less conflictual relationships with students

compared to teachers with lower self-efficacy. Similarly, when teachers had strong knowledge about concepts and techniques for teaching English Learners (ELs), they reported more favorable attitudes toward EL students than teachers with weaker pedagogical knowledge (Durgunoğlu & Hughes, 2010). This suggests that teachers' general instructional efficacy, their perceived locus of control for affecting student academic growth, and their efficacy for working specifically with EL students are contributing factors for the development of supportive classroom contexts and quality student-teacher relationships with CLM students.

High levels of teacher self-efficacy are also associated with higher levels of job satisfaction, lower levels of job-related stress, and fewer difficulties with student misbehavior (Caprara et al., 2003), all factors associated with positive student-teacher relationships (Lavy & Bocker, 2018; Veldman et al., 2013). However, teacher's ethno-racial identification and the ethno-racial composition of the students in classrooms and schools have both been shown to influence teacher's job satisfaction (Mueller et al., 1999; Renzulli et al., 2011; Stearns et al., 2014). At the classroom level, when teachers and student's ethnic-racial background do not match, white teachers tend to report lower levels of job satisfaction than non-white teachers (Stearns et al., 2014). This suggests that both self-efficacy and job satisfaction are key factors that must be considered in understanding the academic environment faced by CLM students.

Moreover, Stearns et al., (2014) found that positive leadership and staff relationships mediate the negative effects of ethno-racial mismatch on teachers' job satisfaction. This finding highlights the importance of a strong professional climate, as it can promote a shared sense of understanding and professional community among teachers and with leadership, in turn, mitigating the potentially negative effects of teacher-student ethno-racial mismatch.

Professional Engagement Factors & Student-Teacher Relationships

Teachers who characterize their school as having trust, cooperation, and openness among staff and leadership are more likely to have more positive classroom climates and higher quality student-teacher interactions (Henry et al., 2021; Thapa et al., 2013). School leaders are essential for cultivating norms of trust and creating opportunities for regular interaction among teachers (Ryu et al., 2020; Spillane & Sun, 2019; Thapa et al., 2013). These positive staff relationships may contribute to teachers sharing knowledge and ideas, that in turn may contribute to improvement in interactions between teachers and their students (Ryu et al., 2020; Spillane & Sun, 2019). Positive staff relationships are perhaps more important in schools with low-income, minoritized populations (Brown & Medway, 2007), as these relationships may promote a safe and supportive school environment in which teachers can learn from each other and strive to improve their skills related to teaching and working with diverse groups of children.

Most research that examines teachers' perceptions of supportive school leadership or positive staff relationships typically explores the association with teacher-level outcomes – such as work-related stressors and job attitudes—with few examining other outcomes such as teacher-child interactions. A recent exception explored how job strain and teachers' professional relationships in early childhood education interacted to promote the quality of teacher-child interactions (Henry et al., 2021). The study found that supportive professional relationships did not significantly moderate the association between teacher job strain on classroom quality. Furthermore, a direct effect of leadership and staff support on classroom quality emerged; teachers who rated high on supportive professional relationships were more likely to have higher quality classrooms (Henry et al., 2021). These findings suggest that positive professional relationships impact student-teacher processes in ways that are not necessarily dependent on teacher-level factors (such as job strain). Additionally, the findings suggest the need to examine

the unique characteristics of professional relationships as experienced by teachers and how they are associated with classroom-level factors and student-teacher interactions. The current study examined this question by exploring the variations in teachers' perceptions of climate at multiple levels, including at the school (i.e., staff relationships, school leadership), classroom (i.e., teaching efficacy and locus of control), and teacher (i.e., job satisfaction), to obtain a more comprehensive understanding of the way climate is related to student-teacher processes.

School Climate & Latinx Students

Prior school climate studies have shown that CLM children experience school climate differently than their white counterparts (La Salle et al., 2017; Voight et al., 2015). CLM students are more likely to benefit from a positive school climate and to experience disproportionate deleterious effects associated with negative school climate (e.g., Hopson & Lee, 2011). Furthermore, most studies have found that Latinx middle and high school students perceive their school climate less favorably than their white peers (Berkowitz et al., 2016; Bottiani et al., 2019; De Pedro et al., 2016; Voight et al., 2015; for exception see Parris et al., 2018). These differences in Latinx students' perceptions of school climate may be partly associated with the ways in which Latinx students conceptualize school climate (Schneider & Duran, 2010; Slaughter-Defoe & Carlson, 1996). For example, compared to white and Asian students, Latinx middle schoolers considered personal relationships with teachers as more important than modeling of positive behaviors (Schneider & Duran, 2010). Additionally, compared to African American students, Latinx third graders emphasized teacher fairness, caring, praise of effort, and the importance of moral order as the most important dimension of school climate (Slaughter-Defoe & Carlson, 1996). These conceptual differences in how Latinx students define school climate may be further magnified by school conditions, including limited

access to high-resource neighborhoods and schools (Galster et al., 2015; Jiménez-Castellanos, 2010; Wei et al., 2021), higher concentration of CLM students (Parris et al., 2018), higher rates of teacher attrition (Djonko-Moore, 2016; Vanderslice, 2010), less qualified teachers (Jiménez-Castellanos, 2010; U.S. Commission on Civil Rights, 2018), and limited access to college-bound course trajectories (Umansky, 2016). Romero and O'Malley (2020) found five distinct profiles of school climate experienced by Latinx middle schoolers, one of which highlighted school connectedness, and the other which emphasized supportive relationships with school adults (Romero & O'Malley, 2020). These findings emphasize the heterogeneity of climate perceptions that Latinx youth experience and the importance of positive relationships within the school context for developing nurturing school experiences for Latinx youth.

Profiles of Teachers' Perceptions of School Climate

Prior studies have focused on variable-centered associations among school climate variables (e.g., mean scores on individual variables considered in isolation). However, Latent Profile Analysis (LPA) as a person-centered approach enables the identification of latent profiles, or subpopulations of respondents, who share similar patterns of responses to multiple variables (Laursen & Hoff, 2006). Person-centered approaches assume population heterogeneity and consider the multiple sources of variability related to teachers' perceptions of climate to reveal distinct profiles. Identifying profiles of teachers' perceptions of climate and their association with student-teacher relationships may help identify teacher- and school-level points of intervention for teachers serving Latinx students. With the exception of Capp et al. (2020a), Duff & Bowers (2021), and Pas & Bradshaw (2014), few studies using latent profile analysis have examined teachers' perceptions of climate comprehensively in ways that incorporate both school-level and classroom and teacher-level indicators of climate. Most latent profile studies

focus on classroom and teacher-level indicators such as personal well-being, job attitudes, and teaching efficacy (Collie et al., 2012; Decker-Woodrow, 2018; Fettig et al., 2021; Herman et al., 2018, 2020). Even fewer latent profile studies of climate have examined the relation between these profiles and student-teacher outcomes, with the majority focused on student behavioral outcomes (Herman et al., 2018, 2020; Pas & Bradshaw, 2014). The one study that has examined climate profiles in relation to student-teacher processes focused on classroom quality (Decker-Woodrow, 2018) rather than student-teacher relationships. In contrast, the current study used LPA to consider the multiple school-, classroom- and teacher-level sources of variability related to teachers' perceptions of climate. Furthermore, this paper leveraged these comprehensive climate profiles to predict the quality of student-teacher relationships among Latinx students.

The Current Study

The current study sought to broaden current models of climate by engaging in a comprehensive examination that considers multiple levels, including school-, classroom-, and individual teacher level factors. We relied on an LPA approach that leverages variability in teachers' perceptions of climate across these levels to characterize their perceptions of *academic environment* and *engagement* domains of climate. Given the lack of efficacy for teachers serving Latinx youth (Farr & Song, 2011), the increased likelihood that Latinx youth experience school and classroom environments that are under-resourced, and the ways in which such opportunities may uniquely influence both teacher perceptions of climate and their relationships with students, our study focuses specifically on teachers serving Latinx students. The purpose of the study was to examine the profiles of teachers' perceptions of climate and whether particular profiles are supportive of student-teacher relationships with Latinx first graders. Using the Early Childhood Longitudinal Study-Kindergarten: 2011 (ECLS-K:2011), we investigated: RQ1) What are the

profiles of teachers' perceptions of school climate? and RQ2) What is the association of these profiles with ratings of student-teacher closeness and conflict with Latinx students?

The dearth of prior work considering teachers' perceptions of comprehensive climate (Grazia & Molinari, 2020) limits our ability to hypothesize the number of profiles. However, based on limited existing studies of climate profiles (Capp et al., 2020a; Duff & Bowers, 2021; Pas & Bradshaw, 2014), we expected there would be a heterogeneity of climate profiles marked by variations in average scores of *academic environment* domain and *engagement* domain indicators. Once profiles of climate were identified for teachers of Latinx students, it was possible to assess the relevance of climate profiles for student-teacher relationship quality. We expected profiles related to more negative views of climate would be negatively associated with student-teacher closeness and positively associated with student-teacher conflict. Conversely, profiles characterized by positive views of the climate would be associated with higher levels of student-teacher closeness and lower levels of student-teacher conflict.

Method

Study & Sample

We used data from the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K:2011; National Center for Education Statistics). The ECLS-K:2011 is a longitudinal study that followed a cohort of children from their Kindergarten year (fall 2010) through their elementary school years. During the kindergarten year, approximately 18,000 children from 970 schools participated. Data collected included information from parents and teachers pertaining to student experiences, and their cognitive, socioemotional, and physical development (Tourangeau et al., 2015).

Analytic Sample

We conducted analyses using restricted data from the spring of first grade, including 1,460 teachers and 4,050 Latinx students (*N* rounded to the nearest tens place as required by the restricted data agreement). We identified Latinx students as those listed as Hispanic of any race, including those identified as multiracial. We used the first-grade data because this was the first year that survey questions related to teachers' perceptions of climate, including teachers' views of working with and providing inclusive classroom environments for their EL students. This was particularly meaningful, given that Latinx students are more likely to have home languages other than English and/or be classified as ELs (U.S. Department of Education, 2018).

Children whose ethnicity identifier data was missing were not included in the sample. Fifty-one percent of the children in the sample were boys. About half of the sample (49.5%) were below the poverty threshold, 25.5% were at or above poverty threshold but below 200 percent, and 25.1% of the sample was at or above 200 percent of the poverty threshold. A little less than half of the sample's primary home language was English (47.9%). Most teachers in the sample (68%) identified as white non-Hispanic, 22% identified as Latinx (race specified or unspecified), and 9% as another race or multiracial, non-Hispanic. About 49% of teachers held a master's degree or beyond, with 14.34 years of teaching experience, on average. See Table 1 for demographics on the student and teacher sample, student-teacher closeness and conflict scores, and descriptive statistics on climate profile indicators.

Variables

Student-Teacher Relationship Quality

Student-teacher relationship quality is measured along two teacher-reported scales of Closeness and Conflict between the teacher and an individual child. These scales were adopted by the ECLS-K:2011 from the *Student-Teacher Relationship Scale* (STRS; Pianta & Steinberg,

1992). Closeness reflects the degree of affection, warmth, and open communication that a teacher experiences with the student using the average rating of seven items. Conflict is a measure of the negative and conflictual aspects of the teacher's relationship with the student using the average rating of eight items. Each item was rated using a 5-point scale, ranging from "definitely does not apply" to "definitely applies." High Closeness scale scores indicate that the teacher perceived they had a close relationship with the child and high Conflict scale scores indicate that the teacher perceived his or her relationship with the child to be characterized by conflict. Cronbach's alpha reliability coefficient for the Closeness scale was 0.86 and for the Conflict scale was 0.89 (Tourangeau et al., 2015). Teacher responses to individual items on the STRS were not available on the ECLS-K:2011 (due to copyright restrictions), and therefore reliability analyses were not conducted for the specific subsample in the current study. Considering these variables had skewed distributions, no more than 3% of a distribution's tail was winsorized in attempts to normalize their distribution. In the spring of first grade, average Closeness scores were 4.22 (SD= 0.68) and Conflict scores were 1.58 (SD= 0.70; as shown in Table 1).

Indicators for Latent Profiles

Teacher's views of school climate and school environment were captured in section G of the Spring 2012 general classroom Teacher Questionnaire (National Center for Education Statistics, 2012). The teacher-level questionnaire was used to obtain information regarding the classroom and instructional practices, as well as teacher characteristics, such as their background, experience, school climate, and attitude toward teaching. We used items from subsections G1-G3 of the survey (32 items; Appendix A), which asked teachers about their attitudes or beliefs toward teaching and learning generally.

The 32 items were included in an exploratory factor analysis (EFA) as an initial factor extraction tool in order to identify the presence of underlying constructs among the variables and to determine the extent to which the identified underlying constructs accounted for the majority of variability among the components (Brown, 2009; Stata, n.d.a). An orthogonal (varimax) rotation was performed on responses to the 32 items, given that this method's results provide an uncorrelated factor solution that tends to identify the unique aspects of the underlying structure of the dataset. Due to the large dataset ($N = 1,460$), factor loadings of .31 were considered acceptable, though higher loadings were considered optimal. As a result of the EFA, three items were dropped because their loadings were smaller than .30 and were considered to be not meaningful. Additionally, items loading as one-factor solutions were not viable and were excluded from the analysis (Costello & Osborne, 2005). The remaining 27 items loaded on seven components. Appendix B displays the 27 items that loaded on the seven components.

Lastly, a reliability analysis (Cronbach's alpha) was preformed to assess the internal consistency reliability of the seven constructs. The Cronbach's alpha for each construct is displayed in Appendix B. According to Hair, Jr. et al. (2010), Cronbach's alpha should, at a minimum, measure .70 (or .60 for exploratory research); all seven construct variables had acceptable levels of reliability. As a result of this variable selection process, seven climate variables were obtained and included in this study: *Staff Relationships, School Leadership, External Locus of Control, Internal Locus of Control, Job Satisfaction, Inclusion of Children with Disabilities,* and *Inclusion of English Learners*.

Professional engagement indicators.

Staff Relationships. Three items from the Teacher level Questionnaire were used to develop a scale reflecting teacher perceptions of staff cooperation as shown in Appendix B.

Example items included, "I feel accepted and respected as a colleague by most staff members," and "there is a great deal of cooperation effort among the staff members." The response scale ranged from 1 (strongly disagree) to 5 (strongly agree). High scores reflect teachers' perceptions that there is a high level of cooperation and support among teachers at the school. The composite scale was created by totaling the sum of responses and computing the average of all items. Considering this composite had a skewed distribution, the original composite was winsorized at 0.72% from the bottom tail in attempts to normalize its distribution. Average scores were 4.16 (SD= 0.65) in the spring of first grade (as shown in Table 1).

School Leadership. Five items from the Teacher-level Questionnaire were used to develop a scale reflecting teacher perceptions of the school administration as shown in Appendix B. Example items included, "there is broad agreement among the entire school faculty about the central mission of the school" and "the school administration's behavior toward the staff is supportive and encouraging." The response scale ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). High scores reflect teachers' perceptions that there is a high level of cohesion and a supportive professional climate among teachers and administration at the school. Our item-test correlation revealed one variable (Survey # - G1I) to be negatively valenced for inter item correlations and thus this variable was reversed coded before being combined in the composite score with other *School Leadership* construct variables. The composite scale was created by totaling the sum of responses and computing the average of all items. Considering this composite had a skewed distribution, the original composite was winsorized at 1.10% from the bottom tail in attempts to normalize its distribution. Average scores were 3.89 (*SD*= 0.68) in the spring of first grade (as shown in Table 1).

Academic Environment Indicators.

External Locus of Control. Five items from the Teacher-level Questionnaire were used to develop a scale reflecting teacher perceptions of difficulties in teaching as shown in Appendix B. Example items included, "many of the children I teach are not capable of learning the material I am supposed to teach them" and "the amount a student can learn is primarily related to family background." The response scale ranged from 1 (strongly disagree) to 5 (strongly agree). High scores reflect teachers' perceptions that students' learning and abilities are highly fixed traits or inherent to the student; that little to no impact can be made by the teacher to change/support students. The composite scale was created by totaling the sum of responses and computing the average of all items. Considering this composite had a skewed distribution, the original composite was winsorized at 1.59% from the top tail in attempts to normalize its distribution. Average scores were 2.20 (SD= 0.64) in the spring of first grade (as shown in Table 1).

Internal Locus of Control. Four items from the Teacher-level Questionnaire were used to develop a scale reflecting teacher perceptions of teaching efficacy as shown in Appendix B. Example items included, "if I try really hard, I can get through even to the most difficult or unmotivated students" and "by trying a different teaching method, I can significantly affect a student's achievement." The response scale ranged from 1 (strongly disagree) to 5 (strongly agree). High scores reflect teachers' perceptions that their teaching can make an impact on their students' learning and abilities; students' learning and abilities are based on learning and persistence. The composite scale was created by totaling the sum of responses and computing the average of all items. Considering this composite had a skewed distribution, the original composite was winsorized at 0.22% from the bottom tail in attempts to normalize its distribution. Average scores were 4.20 (SD= 0.46) in the spring of first grade (as shown in Table 1).

Job Satisfaction. Four items from the Teacher-level Questionnaire were used to develop a scale reflecting teachers' job satisfaction, as shown in Appendix B. Example items included, "I really enjoy my present teaching job" and "if I could start over, I would choose teaching again as my career." The response scale ranged from 1 (strongly disagree) to 5 (strongly agree). High scores reflect teachers' perceptions that they are committed and passionate about teaching as their profession. Our item-test correlation revealed one variable (Survey # - G3F) to be negatively valenced for interitem correlations and thus this variable was reversed coded before being combined in the composite score with other Job Satisfaction construct variables. The composite scale was created by totaling the sum of responses and computing the average of all items. Considering this composite had a skewed distribution, the original composite was winsorized at 0.88% from the bottom tail in attempts to normalize its distribution. Average scores were 4.35 (SD= 0.61) in the spring of first grade (as shown in Table 1).

Inclusion of Children with Disabilities. Three items from the Teacher-level Questionnaire were used to develop a scale reflecting teacher perceptions of teaching students with disabilities as shown in Appendix B. Example items included, "inclusion of children with disabilities in my class has worked well" and "I am adequately trained to teach the children with disabilities who are in my class." The response scale ranged from 1 (strongly disagree) to 5 (strongly agree). High scores reflect teachers' perceptions that they are capable of teaching and working with students with disabilities. The composite scale was created by totaling the sum of responses and computing the average of all items. Considering this composite had a skewed distribution, the original composite was winsorized at 1.59% from the bottom tail in attempts to normalize its distribution. Average scores were 3.43 (SD= 0.91) in the spring of first grade (as shown in Table 1).

Inclusion of English Learners. Three items from the Teacher-level Questionnaire were used to develop a scale reflecting teacher perceptions of teaching English language learners as shown in Appendix B. Example items included, "inclusion of English language learners in my class has worked well" and "I am adequately trained to teach English language learners in my class." The response scale ranged from 1 (strongly disagree) to 5 (strongly agree). High scores reflect teachers' perceptions that they are capable of teaching and working with English learners. The composite scale was created by totaling the sum of responses and computing the average of all items. Considering this composite had a skewed distribution, the original composite was winsorized at 2.13% from the bottom tail in attempts to normalize its distribution. Average scores were 3.88 ($SD= 0.87$) in the spring of first grade (as shown in Table 1).

Control Variables

Child covariates included, gender (0= female, 1= male), student economic indicator (1 = below the poverty level; 2 = student at or above the poverty threshold; 3 = student at or above 200% of the poverty threshold [omitted for comparison]), Parent 1's education (1 = less than a high school diploma; 2 = high school diploma/equivalent; 3 = some college; 4 = bachelor's degree or higher [omitted for comparison]), Parent 2's education (1 = less than a high school diploma; 2 = high school diploma/equivalent; 3 = some college; 4 = bachelor's degree or higher [omitted for comparison]), and student's home language (1 = English [omitted for comparison]; 2 = non-English; 3 = student's speaks two languages equally). We also included covariates for teacher gender (0= female, 1= male), teacher's highest level of education (0= bachelor's degree or less, 1= master's degree or beyond), years of teaching experience (1 = 0-6 years; 2 = more than 6 but less than 13 years; 3 = more than 13 but less than 21 years; 4 = more than 21 years [omitted for comparison]), teacher race/ethnicity (1 = teacher identifies as white non-Hispanic

[omitted for comparison]; 2 = teacher identifies as Latinx; 3 = teacher identifies as Black non-Hispanic; 4 = teacher identifies as other race non-Hispanic), and teacher has an English as a Second Language certification. Classroom and school covariates included percentage of English Learners in the classroom, percentage of Hispanic students in the classroom, teacher and/or teacher aid speaks Spanish (0 = no; 1 = yes), percentage of nonwhite students at the school, school type (0 = private; 1 = public), percentage of English Learners in the school, and percentage of free or reduced priced lunch in the school. In summary, covariates included in the RQ1 latent profile classification model were: teacher gender, teacher's highest level of education, years of teaching experience, and teacher race/ethnicity. The covariates included in the RQ2 structural equation model are: student's home language, parents' education, student gender, student economic indicator , teacher gender, teacher's highest level of education, years of teaching experience, teacher race/ethnicity, teacher has an English as a Second Language certification, percentage of English Learners in the classroom, percentage of Hispanic students in the classroom, teacher and/or teacher aid speaks Spanish, percentage of nonwhite students at the school, school type, percentage of English Learners in the school, and percentage of free or reduced priced lunch in the school.

Analytic Strategy

Latent Profile Analysis

To address RQ1, we conducted LPA, a person-centered approach (Collins & Lanza, 2010) to obtain the profiles of teachers' perceptions of climate. We performed analyses using multinomial logistic regression performed via the gsem, lclass command in Stata 15 (StataCorp, 2017), clustering standard errors for teacher ID. The indicators for latent profiles of teachers' perceptions of climate were school- and classroom-level climate. In the process of model

identification, we raised the number of classes until model fit no longer optimized. we ran the

model with 50 random starts and 50 iterations (Ansari, 2017; Collins & Lanza, 2010; Doyle et

al., 2017). We also examined the log-likelihood values generated by 10 sets of random starts, and

they generated the same maximum likelihood value, suggesting that the model did not converge

at a local maxima solution.

Model fit was assessed using the following model identification criteria: class

proportions, the Bayesian Information Criterion (BIC), the Akaike Information Criterion (AIC),

and entropy values (Bauer & Steinley, 2020; Collins & Lanza, 2010). Indicators of good model

fit are lower BIC and AIC, while entropy levels greater than or equal to .7 and approaching 1.0

indicate better fit than the prior model (Bauer & Steinley, 2020; Collins & Lanza, 2010).

Information criterion statistics, entropy values, and profile sizes in each model, indicated that the

best fit model for our analytic purposes was four subgroups. See Table 2 for a comparison of

model fit. After selecting the best fitting model for identification of latent profiles, the covariates,

teacher sex, teacher's highest level of education, years of teaching experience, teacher

race/ethnicity, were entered simultaneously into the model as predictors of class membership. Fit

statistics were also assessed for the model including covariates.

Missing data. On latent profile indicators such as School Leadership, Internal Locus of

Control, and Job Satisfaction, 17.1% of observations were incomplete. On External Locus of

Control, 16.9% of observations were incomplete. On the Staff Relationships indicator, 17.2% of

observations were incomplete. On the Inclusion of children with disabilities indicator, 28.1% of

observations were incomplete. Lastly, on the Inclusion of English Learners indicator, 25.2% of

observations were incomplete. The latent profile classification model handles missing data with

equation-wise deletion, which allows for gsem to use observations containing missing values for

fitting parts of the model (Stata, n.d.b), and a maximum likelihood algorithm which often allows

for greater use of observations than structural equation modeling in Stata (Stata, n.d.c).

Structural Equation Modeling

For RQ2, we tested the degree to which the profiles predicted teachers' perceptions of

their relationship quality (i.e., closeness and conflict) with their Latinx first graders. The profile

membership variables were incorporated as predictors in a structural equation model (SEM)

predicting student-teacher relationship quality. SEM was run with clustered standard errors for

teacher ID. In order to compare the associations with teachers' perceptions of closeness and

conflict, we ran an SEM model, with the optimal profile (*Thriving*) as the omitted group, to

which the other teacher profile groups were compared (*Striving, Managing, Struggling*). A

covariance term was included for closeness and conflict outcomes. Covariates (teacher gender,

teacher's highest level of education, years of teaching experience, teacher race/ethnicity,

student's home language, parent's highest level of education, student gender, student poverty

level, percentage of English Learners in the classroom, percentage of Hispanic students in the

classroom, teacher and/or teacher aid speaks Spanish, teacher has an English as a Second

Language certification, percentage of nonwhite students at the school, school type, percentage of

English Learners in the school, and percentage of free or reduced priced lunch in the school)

were also entered into the structural equation model.

Missing data. On the both student-teacher relationship quality outcomes of closeness and

conflict, 25.13% of observations were missing. Missing data were addressed using full

information maximum likelihood, which relies on available observations to estimate parameters

based on the assumption that data is missing at random (Enders & Bandalos, 2001).

Results

What are the Profiles of Teachers' Perceptions of Climate?

The first aim of this study was to determine the patterns of teachers' perceptions of climate using LPA for teachers serving Latinx students. We found four profiles: (1) Struggling, (2) Managing, (3) Striving, and (4) Thriving. See Table 3 for marginal predicted means of indicators for each profile and pairwise comparisons of mean indicator levels between profiles. See Figure 1 for a graph of mean indicator levels across profiles.

Profile 1- *Striving*. The *Striving* profile consisted of 7% of the sample. This group of teachers rated the lowest below average (over one standard deviation) on both *professional engagement* indicators (Staff Relationships and School Leadership). These teachers were slightly below average on their External Locus of Control and Inclusion of children with disabilities, and average on their Internal Locus of Control, Job Satisfaction, and Inclusion of English Learners.

Profile 2- *Thriving*. About a third of the sample (34%) comprised the second profile, *Thriving*. Teachers in this profile rated the lowest below average (over half a standard deviation) on External Locus of Control, while having the highest above average ratings on all other *academic environment* indicators: Staff Relationships, School Leadership, Internal Locus of Control, Job Satisfaction, Inclusion of children with disabilities, Inclusion of English Learners.

Profile 3- *Managing*. The third profile, *Managing*, included almost half of the sample (46%). This group was average on Staff Relationships, School Leadership, Job Satisfaction, Inclusion of children with disabilities, and Inclusion of English Learners, slight above average on their External Locus of Control and slightly below average on their Internal Locus of Control.

Profile 4- *Struggling*. The *Struggling* profile consisted of 13% of the sample. This group of teachers was over half a standard deviation below average on both *professional engagement* indicators: Staff Relationships and School Leadership. These teachers rated the highest above

average scores (over one standard deviation from the mean) on their External Locus of Control, while rating the lowest below average on all other *academic environment* indicators (Internal Locus of Control, Job Satisfaction, Inclusion of children with disabilities, Inclusion of English Learners) compared to the other profiles.

Association of Climate Profiles with Ratings of Student-Teacher Closeness and Conflict

We utilized SEM to determine whether there were differences in teachers' perceptions of student-teacher closeness and conflict with Latinx students by profile membership (see Table 4).

Closeness

Compared to teachers in the *Thriving* profile, teachers in the *Striving* profile, *Managing* profile, and *Struggling* profile, had lower levels of closeness, (β = -0.04, S.E. = .02, $p < .05$; β = -0.11, S.E. = .26, $p < .001$; β = -0.12, S.E. = .03, $p < .001$, respectively). Therefore, relative to the other profiles, the *Thriving* profile was positively associated with teacher's ratings of closeness with Latinx students.

Conflict

Compared to teachers in the *Thriving* profile, teachers in the *Managing* profile and *Struggling* profile, reported having higher levels of conflict with Latinx students, (β = 0.09, S.E. = .02, $p < .001$; β = 0.10, S.E. = .02, $p < .001$, respectively). Therefore, relative to these two profiles, the *Thriving* profile was negatively associated with teacher's ratings of conflict with Latinx students. There was no difference between the *Thriving* profile and the *Striving* profile in their association with conflict scores in first grade.

Discussion

The main purpose of the present study was to identify underlying patterns of teachers' perceptions of the school climate and to examine the extent to which these profiles related to

student-teacher closeness and conflict with Latinx first-graders. Two key findings were evident. First, we identified four climate profiles among teachers serving Latinx students—*Thriving, Managing, Striving,* and *Struggling*. Second, membership in the *Thriving* profile was associated with higher levels of closeness and lower levels of conflict as reported by the teacher. The current findings suggest teachers' perceptions of climate profiles are predictive of the closeness and conflict Latinx students experience with their teachers. This specific focus on perceptions of climate experienced by teacher's serving Latinx students is especially important given the potential for shaping the educational experiences of Latinx youth during a critical period when they are first developing relationships with teachers and formal educational institutions.

Variability in Teachers' Perceptions of Climate

This study is one of the few to consider a conceptual model of school climate in the elementary years that incorporates teachers' perceptions of climate at the school and classroom level. It is also one of the few to empirically evaluate teachers' perceptions of climate, including school-, classroom-, and teacher-level factors, within both the academic and engagement domains simultaneously. This study explored within-group differences in the climate experienced by teachers serving Latinx first graders. Results from this study provide further support for a conceptual model of teacher-focused school and classroom climate dimensions (Capp et al., 2018), and support the hypothesis that heterogeneity exists in teachers' perceptions of climate. Four distinct latent profiles were enumerated: *Thriving, Managing, Striving,* and *Struggling*. These four profiles offer a holistic depiction of how groups of teachers serving Latinx children are meaningfully different in their experience of school climate (Capp et al., 2018). As school climate is increasingly intertwined with socioemotional learning, and there are increasing expectations to improve climate (Jones & Doolittle, 2017; Schweig et al., 2019), it is

necessary to assess teachers' perceptions of climate (not just students' perceptions) at both the

school- and classroom-level, especially when teachers serve CLM student populations.

It is promising that about a third of teachers in this sample were likely to fall in the

Thriving profile, the most positive climate profile, despite national concerns about burnout,

attrition, and high stress for teachers (Steiner & Woo, 2021). Future research should identify

malleable contextual factors associated with positive climate, as this can clarify possible points

of intervention at the school and classroom level that can support Latinx children's academic and

emotional success (Astor & Benbenishty, 2019). For example, should EL-certified teachers

(compared to uncertified teachers) be less likely to be in the *Struggling* profile over the *Thriving*

profile, this may signal for schools and teachers to prioritize requiring/receiving these

trainings/certifications. Given that these climate perceptions are relative to teachers serving

Latinx students, it would suggest that teacher's EL-certification (and all the knowledge, training,

and practices this exposes teachers to) may be beneficial for improving teachers' perceptions of

academic environment domain indicators (e.g., teachers' inclusion of ELs, or their internal locus

of control).

Conversely, we find that 13% of the sample belonged to the most negative climate profile

(i.e., *Struggling*). Given that teachers in the *Struggling* profile scored below average across all

climate indicators, this points to an accumulation of risks at the teacher, classroom and school

level. If this accumulated risk is associated with Latinx student outcomes, identifying teachers

who are *Struggling* is necessary to foster more nurturing classroom and school environments for

Latinx students making the transition into formal schooling.

It is notable that the remaining profiles, *Managing and Striving*, are marked by both risk

and resilience with regards to teachers' perception of climate at the classroom and school level.

The *Striving* profile is characterized by the lowest average scores for staff relationships and school leadership, two indicators of the professional engagement domain. This type of profile may point to the need for school-level interventions that target leadership, organizational coherence, and teacher collaboration to improve teachers' perceptions of climate. These factors have been linked to improved teacher efficacy and preventing teacher burnout (Pas & Bradshaw, 2014). The *Managing* profile, which represents 46% of the teachers in the study, is characterized by indicators at or around the average. It is possible that with additional school and classroom supports, teachers in this group could shift into a *Thriving* profile. However, teachers in this profile may also be vulnerable to slipping into the *Striving* or *Struggling* profiles if conditions were to deteriorate at their schools.

These findings highlight the variability of perceived climate experiences of teachers serving Latinx students. Specifically, this research points to school-, classroom-, and teacher-level climate factors as important intervention points for teachers, which have possible implications for the social and emotional development and support experienced by Latinx students in the early elementary period.

Profiles of Teachers' Perceptions of Climate & Student-Teacher Relationships

The current study also examined the association between teachers' perceptions of climate profiles and their perceptions of student-teacher closeness and conflict with Latinx first-graders. This study builds on past research that has explored associations between profiles of teachers' perception of climate and teacher-child interactions in the elementary period (Capp et al., 2020a; Decker-Woodrow, 2018), and contributes unique insights to these processes among teachers who serve Latinx youth. Exploring questions of student-teacher relationship in the early elementary period, especially during the transition to formal schooling, is important because it is a period in

which children are establishing models of how to engage with teachers and establishing trust in academic environments (Rimm-Kaufman & Pianta, 2000). Understanding the mechanisms and environments that support the early socioemotional development of CLM students is especially important given their likelihood to attend schools with limited resources (Galster et al., 2015; Jiménez-Castellanos, 2010; Wei et al., 2021), higher concentration of CLM students (Parris et al., 2018), higher rates of teacher attrition (Djonko-Moore, 2016; Vanderslice, 2010), and less qualified teachers (Jiménez-Castellanos, 2010; U.S. Commission on Civil Rights, 2018) with higher rates of teacher-burnout (Bottiani et al., 2019).

As hypothesized, the *Thriving* profile, characterized by an overall positive climate, was positively associated with teacher's ratings of closeness with Latinx students. Specifically, teachers in the *Thriving* profile rated closeness with their Latinx students significantly higher than did teachers in the *Managing*, *Striving*, and *Struggling* profiles. These patterns suggest that both professional engagement and academic environment indicators are important factors to consider when examining closeness between students and teachers. As such, early childhood research should consider aspects of the broader school climate (not just classroom climate) as meaningful contributors for the development of positive child-teacher socialization processes.

A similar pattern emerged when we examine conflict between teachers in the *Thriving* profile to those in the *Managing* and *Struggling* profiles, indicating that both professional engagement and academic environment climate factors are important considerations in developing supportive low conflict environments. However, the pattern does not hold, as there were no significant differences in teacher reported perceptions of conflict between teachers in the *Thriving* profile and those in the *Striving* profile. When we examined differences between these two profiles, we noted that the main difference was characterized by higher than average ratings

of professional engagement, specifically staff relationships, among those in the *Thriving* profile, while those in the *Striving* profiles were characterized by the lowest ratings of staff relationships. This pattern suggests that staff relationships, as a component of professional engagement, is an important climate factor that distinguishes student-teacher closeness but does not appear to be associated with student-teacher conflict.

Overall, teachers who hold more positive perceptions of academic environment indicators may be more likely to demonstrate high expectations for their students, provide encouragement for motivating Latinx students academically, and create a classroom environment where students feel supported and cared for (Hoy et al., 2016; Cherng, 2017; Cooper & Miness, 2014). At the same time, it is possible that the reciprocal is occuring and that teachers who experience an overly positive relationship with their students are more likely to perceive climate in a positive way (Jennings & Greenberg, 2009). Our findings suggest that teachers who hold positive perceptions of climate associated with the academic environment domain—including teaching efficacy and teacher's job satisfaction—and the engagement domain—including school leadership and staff relationships—may develop warmer, closer, and less conflictual relationships with their Latinx students. In other words, when teachers experience an overall positive climate, they in turn create a climate in the classroom that acts a protective factor for student-teacher interactions with their Latinx students. These results may help inform interventions that target structural factors at the school, classroom, and teacher level in ways that support teachers of Latinx students, and ultimately improve the relational experiences between teachers and their students.

Limitations and Future Directions

The study makes an important contribution to our understanding of climate by (1) employing a comprehensive person-centered approach that considers multiple domains, (2) exploring the association of these domains to student-teacher closeness and conflict, and (3) taking a within-group approach to exploring these processes specifically with Latinx youth. However, there are several important limitations to consider. The analysis used teacher-reports of both perceived climate and of student-teacher relationship quality. Using only teacher-reported measures for both predictors and outcomes has the potential to bias results and future efforts should consider using observational measures of similar constructs. Prior research has expressed concerns about the accuracy of teacher surveys and the validity of inferences about the classroom-level climate that are based on teachers' perceptions of their own instruction or relationships with students (e.g., Mayer, 1999). Given that our data are limited solely to teacher ratings, future research must consider additional sources of data, such as direct observations.

Furthermore, items on teacher's views of school climate and school environment from the Spring 2012 general classroom Teacher Questionnaire (National Center for Education Statistics, 2012) provided a preliminary foundation for examining some aspects of school climate. However, the items on this survey may not comprehensively capture engagement and academic environment domain indicators. For example, the present study did not assess teachers' perceptions of the school physical environment (Capp et al., 2018; Schweig et al., 2019) nor how teachers perceive safety at the school and classroom level (Capp et al., 2020b). Thus, we are limited in capturing a full breath of the concept of school climate to the current measurement used from only a teacher's perspective (a mono-method bias concern). Future climate research may necessitate the development of more comprehensive measures that holistically captures teachers' perceptions of school climate (Capp et al., 2018), inclusive of teacher-level (e.g., job

satisfaction), classroom-level (e.g., self-efficacy working with specific subpopulations, and locus of control), and school level factors (e.g., school, leadership, staff relationships).

Additionally, more recent literature surrounding climate research suggests examining community partnerships (e.g., family-teacher relationships) as an indicator of climate (Wang & Degol, 2016). Given the importance of family involvement and positive family-teacher relationships for students' development (Delgado-Gaitan, 2012), future research may require incorporating this type of indicator, which may be particularly important for CLM students. Furthermore, given our assessment of teachers serving Latinx students and the issues facing schools with high proportions of CLM students, continued work is needed to assess how schools address diversity, inclusion, and encourage respect for all professionals, students, and parents.

We identify the focus on teachers of Latinx students as a strength of the present study, however, the exclusive focus on first grade elementary teachers may limit the generalizability of the findings. Elementary school teachers spend nearly the entire day with their students. In contrast, middle and high school students experience many teachers and classroom environments. This difference highlights both the importance of examining climate among elementary teachers given the time they have with their students and the complexity of taking a holistic approach to the study of climate in the middle and high school grades.

Lastly, the scope of this analysis does not capture contextual factors impacting teachers' perception of climate and student-teacher relationships. Future research could explore the extent to which contextual factors predict the likelihood of being in a particular profile. This could deepen our understanding of individual, classroom, and school level factors associated with teachers' experiences and perceptions of school climate.

Conclusion

The current study sought to use LPA to understand the variability in teachers' perceptions of climate that considered school-, classroom-, and individual teacher-level factors for teachers serving Latinx students. Given the importance of climate to teacher-child interactions, this study also sought to examine how teachers' perceptions of climate were associated with teachers' relationships with their Latinx students. Specifically, this study focused on two research questions: (1) what are the profiles of teachers' perceptions of school climate, and (2) what is the association of these profiles with ratings of teacher-student closeness and conflict with Latinx students? We identified four (*Thriving, Managing, Striving, and Struggling*) climate profiles experienced by teachers serving Latinx students, each characterized by unique patterns of the academic environment and professional engagement domains. We also found associations between teachers' climate profiles and their perceptions of closeness and conflict. Teachers who have positive climate perceptions (i.e., *Thriving* profile) report having closer and less conflictual relationships with their Latinx students, compared to teachers in other profiles. By taking a within-group approach that focuses on teachers serving Latinx students, our study contributes to a deeper understanding of the teacher-level and contextual factors faced by Latinx youth. Further, our research points to both classroom- and school-level climate as meaningful contributors to supporting and improving student outcomes and the socioemotional environments experienced by Latinx children in the early elementary period.

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Table 1
Descriptive statistics of demographics and latent profile indicator variables

Demographics	%	Range
Child sex	51	(0= female, 1= male)
Below poverty threshold	49	(0= at or above poverty threshold, 1= below poverty threshold
Parent 1 has some college or more	38	(0= holds a high school diploma or less, 1= has some college or more)
Parent 2 has some college or more	32	(0= holds a high school diploma or less, 1= has some college or more)
Teacher's highest level of education	49	(0= bachelor's degree or less, 1= master's degree or beyond)
Teacher identifies as white*	68	(0= other race or multiracial*, 1= white*)
Teacher identifies as Latinx	22	(0= other race or multiracial*, 1= Latinx)
Teacher identifies as other race*	9	(0= white* or Latinx, 1= other race or multiracial*)
	M(SD)	
Years of teaching experience	14.34 (9.90)	1-50
Professional Engagement Indicators		
Staff Relationships	4.16(.65)	(1) Strongly disagree- (5) Strongly agree
School Leadership	3.89(.68)	(1) Strongly disagree- (5) Strongly agree
Academic Environment Indicators		(1) Strongly disagree- (5) Strongly agree
External Locus of Control	2.20(.64)	(1) Strongly disagree- (5) Strongly agree
Internal Locus of Control	4.20(.46)	(1) Strongly disagree- (5) Strongly agree
Job Satisfaction	4.35(.61)	(1) Strongly disagree- (5) Strongly agree
Inclusion of Children with Disabilities	3.43(.91)	(1) Strongly disagree- (5) Strongly agree
Inclusion of English Learners	3.88(.87)	(1) Strongly disagree- (5) Strongly agree
Teacher-Student Relationship Quality		
Closeness	4.22(.68)	(1) Definitely does not apply- (5) Definitely applies
Conflict	1.58(.70)	(1) Definitely does not apply- (5) Definitely applies

Source: ECLS-K: 2011 kindergarten-first grade restricted-use data from the National Center for Education Statistics.
Note. Means rounded to hundredth place. * = non-Hispanic.

Table 2

Comparison of model fit (without covariates)

	1 Class	2 Class	3 Class	4 Class	5 Class	6 Class
AIC	20851.63	19528.79	19266.31	19057.41	18896.91	18795.37
BIC	20925.59	19645.01	19424.79	19258.15	19139.92	19080.63
Log Likelihood	-10411.82	-9742.40	-9603.16	-9490.70	-9402.46	-9343.68
Entropy		.71	.73	.76	.75	.78
% Class 1	100%	53%	49%	12%	15%	4%
% Class 2	-	47%	39%	6%	6%	41%
% Class 3	-	-	12%	46%	41%	12%
% Class 4	-	-	-	36%	8%	30%
% Class 5	-	-	-	-	30%	7%
% Class 6	-	-	-	-	-	5%

Source: ECLS-K: 2011 kindergarten-first grade restricted-use data from the National Center for Education Statistics.

Note. Fit statistics have been rounded to two decimal places. *N*= 1,450, rounded to nearest tens place.

Table 3
Marginal predicted means of latent profile indicators

	Profile 1-Striving (7%)	Profile 2-Thriving (34%)	Profile 3-Managing (46%)	Profile 4-Struggling (13%)	Pairwise Test
Professional Engagement					
Staff Relationships	2.95 (.32)	4.58 (.06)	4.13 (.07)	3.62 (.15)	2***>1,3,4 3>1**, 4* 4*>1
School Leadership	3.03 (.59)	4.36 (.05)	3.80 (.06)	3.37 (.19)	2***>3,4
Academic Environment					
External Locus of Control	2.02 (.38)	1.83 (.05)	2.39 (.06)	2.88 (.14)	3>2*** 4>1**, 2***, 3**
Internal Locus of Control	4.27 (.13)	4.55 (.05)	4.02 (.05)	3.82 (.08)	1***>4 2***>3,4 3*>4
Job Satisfaction	4.47 (.38)	4.79 (.02)	4.27 (.08)	3.35 (.26)	1***>4 2***>3,4 3***>4
Inclusion of children with Disabilities	3.18 (.70)	3.88 (.08)	3.25 (.07)	2.84 (.13)	2***>3,4 3*>4
Inclusion of English Learners	3.80 (.36)	4.14 (.07)	3.74 (.05)	3.48 (.08)	2***>3,4

Source: ECLS-K: 2011 kindergarten-first grade restricted-use data from the National Center for Education Statistics.
Note. Standard errors are presented in parenthesis. Means and standard errors rounded to hundredth place. *N*= 1,420, rounded to nearest tens place.
****p<=.001*
***p<=.01*
**p<=.05*

Table Legend

Highest Above Average
Above Average
Average
Below Average
Lowest Below Average

Table 4
Associations between teacher profiles of school environment and teacher-student relationship quality

	Closeness		Conflict	
	β	SE	*β*	SE
Profile 1: Striving	-.04*	.02	.03	.02
Profile 3: Managing	-.11***	.26	.09***	.02
Profile 4: Struggling	-.12***	.03	.10***	.02
Covariates				
Teacher sex	-.10***	.03	.04*	.02
Teacher's highest level of education	.01	.02	.00	.02
Years of teaching experience				
0-6 years	.02	.03	-.00	.02
>6-13 years	.01	.03	-.03	.02
>13-21 years	.00	.03	-.01	.02
Teacher identifies as Black	.01	.02	-.00	.02
Teacher identifies as Latinx	-.04	.03	-.04	.03
Teacher identifies as other race	-.02	.02	.04	.02
_cons	6.99***	.15	2.14***	.12

Source: ECLS-K: 2011 kindergarten-first grade restricted-use data from the National Center for Education Statistics.
Note. *N*= 4,050, rounded to nearest tens place; Profile 2--Thriving is the omitted comparison group. Means and standard errors rounded to hundredth place.
***$p<=.001$
*$p<=.05$
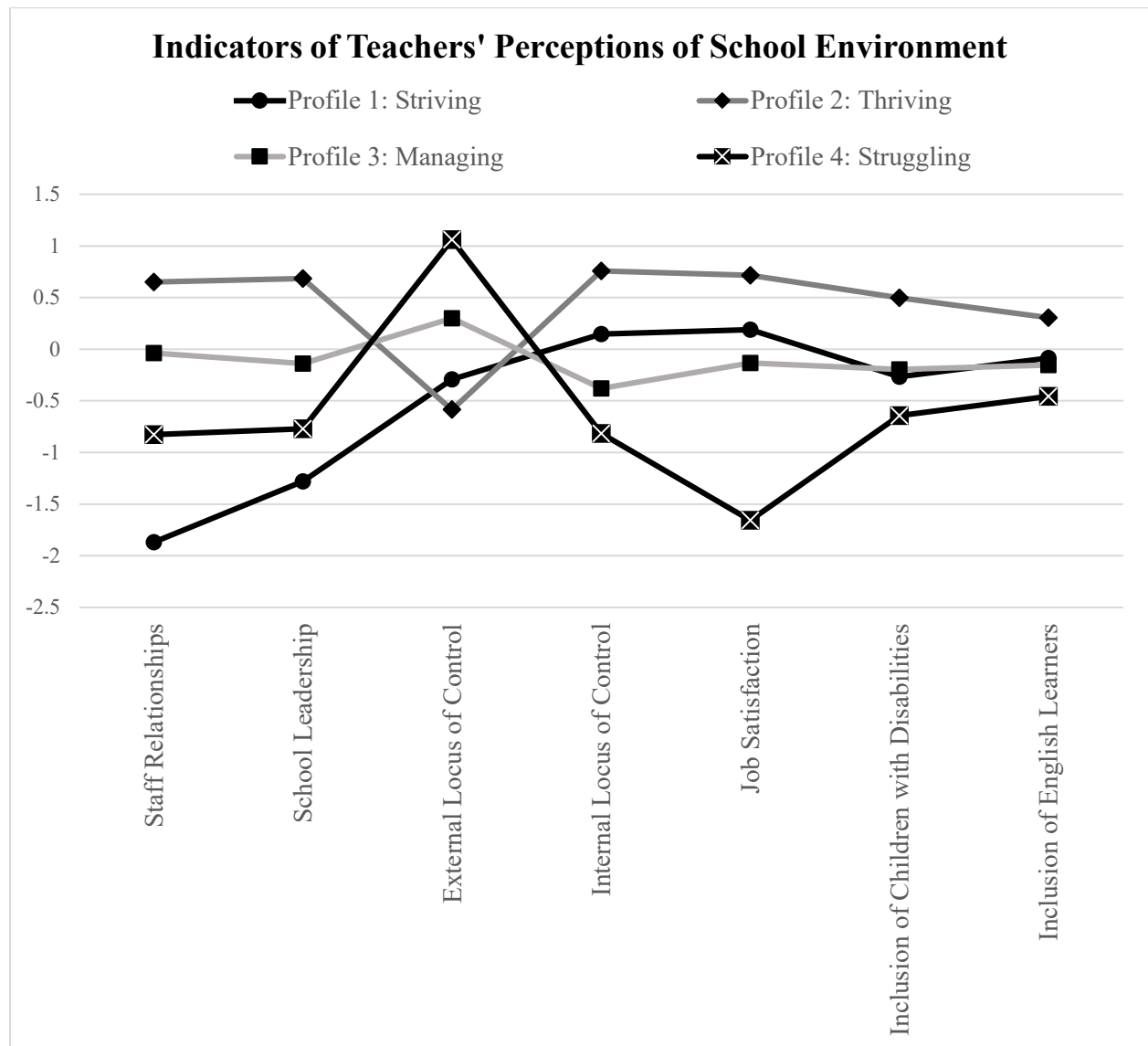
Figure 1. Predicted profile indicator means for each teacher perception of school environment profiles.
Source: ECLS-K: 2011 kindergarten-first grade restricted-use data from the National Center for Education Statistics.
Note. Profile indicator measures have been standardized to be compared in the same figure. *N*= 1,420, rounded to nearest tens place.

Appendix A.

Source: ECLS-K: 2011 kindergarten-first grade public-use data from the National Center for Education Statistics. Spring 2012 Teacher Questionnaire; Section G. Views on school climate and the school environment. Note. * indicates that survey question was dropped after factor analysis.

Survey #	Question	Response Scale
G1A*	The level of child misbehavior (for example, noise, horseplay, or fighting in the halls or cafeteria) in this school interferes with my teaching.	(1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly Agree
G1B	Many of the children I teach are not capable of learning the material I am supposed to teach them.	
G1C	I feel accepted and respected as a colleague by most staff members.	
G1D	Teachers in this school are continually learning and seeking new ideas.	
G1E*	Routine administrative duties and paperwork interfere with my job of teaching.	
G1F*	Parents are supportive of school staff.	
G1G	There is a great deal of cooperative effort among the staff members.	
G1H	In this school, staff members are recognized for a job well done.	
G1I	The academic standards at this school are too low.	
G1J	There is broad agreement among the entire school faculty about the central mission of the school.	
G1K	The school administrator sets priorities, makes plans and sees that they are carried out.	
G1L	The school administration's behavior toward the staff is supportive and encouraging.	
G2A	I am adequately trained to teach the children with disabilities who are in my class.	(1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly Agree
G2B	Inclusion of children with disabilities in my class has worked well.	
G2C	I am adequately trained to teach English language learners in my class.	
G2D	Inclusion of English language learners in my class has worked well.	
G2E	I have the resources I need to teach the children in my class who have disabilities	
G2F	I have the resources I need to teach the children in my class who are English language learners.	
G3A	If I try really hard, I can get through even to the most difficult or unmotivated students.	(1) Strongly disagree

G3B	If some students in my class are not doing well, I feel that I should change my approach to the subject.	(2) Disagree
G3C	By trying a different teaching method, I can significantly affect a student's achievement.	(3) Neither agree nor disagree
G3D	There is really very little I can do to ensure that most of my students achieve at a high level.	(4) Agree
G3E	I work to create lessons so my students will enjoy learning and become independent thinkers.	(5) Strongly Agree
G3F	I feel sometimes it is a waste of my time to try to do my best as a teacher.	
G3G	The attitudes and habits students bring to my class greatly reduce their chances for academic success.	
G3H	My success or failure in teaching is due primarily to factors beyond my control rather than to my own effort or ability.	
G3I	The amount a student can learn is primarily related to family background.	
G3J*	If a student did not remember information I gave in a previous lesson, I would know how to increase his/her retention in the next lesson.	
G3K*	If a student in my class becomes disruptive and noisy, I feel assured that I know some techniques to redirect him/her quickly.	
G3L	I really enjoy my present teaching job.	
G3M	I am certain I am making a difference in the lives of the children I teach.	
G3N	If I could start over, I would choose teaching again as my career.	

Appendix B.

Source: ECLS-K: 2011 kindergarten-first grade public-use data from the National Center for Education Statistics. Exploratory factor analysis of teacher's views on school climate and the school environment. Cronbach's alphas and factor loadings rounded to hundredth place.

Indicator Name (Cronbach's Alpha)	Survey #	Question	Factor Loadings
Professional Engagement			
Staff Relationships (0.74)	G1C	I feel accepted and respected as a colleague by most staff members.	0.55
	G1D	Teachers in this school are continually learning and seeking new ideas.	0.63
	G1G	There is a great deal of cooperative effort among the staff members.	0.58
School Leadership (0.80)	G1H	In this school, staff members are recognized for a job well done.	0.70
	G1I	The academic standards at this school are too low.	-0.35
	G1J	There is broad agreement among the entire school faculty about the central mission of the school.	0.48
	G1K	The school administrator sets priorities, makes plans and sees that they are carried out.	0.76
	G1L	The school administration's behavior toward the staff is supportive and encouraging.	0.79
Academic Environment			
External Locus of Control (0.70)	G1B	Many of the children I teach are not capable of learning the material I am supposed to teach them.	0.47
	G3D	There is really very little I can do to ensure that most of my students achieve at a high level.	0.49
	G3G	The attitudes and habits students bring to my class greatly reduce their chances for academic success.	0.43
	G3H	My success or failure in teaching is due primarily to factors beyond my control rather than to my own effort or ability.	0.61
	G3I	The amount a student can learn is primarily related to family background.	0.53
Internal Locus of Control (0.68)	G3A	If I try really hard, I can get through even to the most difficult or unmotivated students.	0.41
	G3B	If some students in my class are not doing well, I feel that I should change my approach to the subject.	0.62
	G3C	By trying a different teaching method, I can significantly affect a student's achievement.	0.64
	G3E	I work to create lessons so my students will enjoy learning and become independent thinkers.	0.39

Job Satisfaction (0.76)	G3F	I feel sometimes it is a waste of my time to try to do my best as a teacher.	-0.42
	G3L	I really enjoy my present teaching job.	0.73
	G3M	I am certain I am making a difference in the lives of the children I teach.	0.61
	G3N	If I could start over, I would choose teaching again as my career.	0.67
Inclusion of Students with Disabilities (0.81)	G2A	I am adequately trained to teach the children with disabilities who are in my class.	0.67
	G2B	Inclusion of children with disabilities in my class has worked well.	0.70
	G2E	I have the resources I need to teach the children in my class who have disabilities	0.72
Inclusion of English Learners (0.85)	G2C	I am adequately trained to teach English language learners in my class.	0.80
	G2D	Inclusion of English language learners in my class has worked well.	0.76
	G2F	I have the resources I need to teach the children in my class who are English language learners.	0.72

Manuscript 2: The Effect of English Learner Status on Teachers' Perceptions of Student Social Skill Development

Melissa Lucas, Natalia Palacios, & Bethany Bell

Lucas, M., Palacios, N., & Bell, B. (under review). The effect of English Learner status on

teachers' perceptions of student social skill development.

Abstract

Prior research has shown that English Learner (EL) classification has meaningful impacts for students, however limited work has focused on non-academic outcomes. Given the limited psychological research which suggests an important nexus between socioemotional development and academic outcomes for EL populations, it is especially important to understand the effect of EL classification on outcomes beyond academic achievement and extend the focus of study to socioemotional skills. In this study, we examined one hypothesized mechanism: teacher perceptions. Using the ECLS-K:2010, we used propensity score matching to estimate the effect of EL classification in third grade (among approximately 1,110 multilingual students) on teachers' perceptions of students' social skills. We found evidence that EL classification results in lower teacher perceptions of students' interpersonal skills. This study adds to research on teacher perceptions and the effects of EL classification.

Teachers play an important role in shaping students' self-efficacy and academic identity (Booth et al., 2017; Matthews 2014). Negative teacher perceptions, beliefs, and expectations about students from culturally and linguistically minoritized backgrounds have been found to widen the academic achievement gap and negatively impact students' socioemotional outcomes (Cho et al., 2019; Wilson et al., 2014). This is further exacerbated when teachers lack knowledge and efficacy for working with English Learner (EL) populations (Farr & Song, 2011). Considering the importance of teacher perceptions of culturally and linguistically minoritized students, alongside teacher's limited knowledge of working with ELs, the current study examined the extent to which multilingual students' EL classification predicts teacher's perceptions of students' social skills.

There have been numerous studies about teacher perceptions and expectations on minoritized/stigmatized groups, especially focused on their perceptions of Black students in the elementary grades (for examples over the past 24 years see Ferguson, 1998 and Gilliam et al., 2016). It is important to document whether similar patterns of negative teacher perceptions and expectations hold for students from linguistically minoritized backgrounds, given the substantial rise in the number of students from households that speak a language other than English at home (Musu-Gillette et al., 2016). This paper aimed to fill this gap by analyzing a nationally representative dataset, the Early Childhood Longitudinal Study—Kindergarten Cohort of 2010-2011 (ECLS-K:2011), which includes data on teachers' perceptions of individual student social skills. Specifically, we questioned the causal effect of EL classification on teachers' perceptions of students' social skills. Direct comparison of teacher's perceptions of students by EL classification status, without considering confounding factors that may underlie the EL classification, may yield potentially biased results. To address this causal limitation of prior

work, we utilized propensity score matching (PSM) to account for the fact that EL classification

is not randomly assigned to students. This technique matches multilingual students who are

classified as ELs with those who are observable similar but not labeled ELs by using a

propensity score of being EL-classified. In this case, the propensity score serves as a proxy

variable that incorporates multiple confounding factors into a single dimension and strengthens

our ability to draw causal inference when comparing teacher's perceptions of EL and non-EL

multilingual students. The matching process has the potential to mimic random assignment, thus

producing two groups whose social skill ratings can then be compared, having accounted for

observable early childhood experiences and characteristics. Hence, this study leveraged causal

inference to gain a baseline understanding of how EL classification status in the elementary

grades may impact teachers' perceptions of students. Findings may have important implications

for educators and education policy related to interventions that attempt to reduce teacher bias,

which may be especially relevant for pre-service and in-service elementary teachers serving EL

populations.

Conceptual Framework

Teachers' perceptions of students' skills and knowledge are susceptible to teacher racial-

ethnic bias. Teacher perceptions and expectations have been found to be systematically lower for

minoritized groups of students, including African American and Latinx students (Tenebaum &

Ruck, 2007). Some of this may be attributed to a lack of sociolinguistic awareness (Lucas et al.,

2008), and deficit ideological orientations (Johnson, Avineri, and Johnson 2017). Studies have

found that when teachers and students share similar ethnic-racial backgrounds, teachers rate their

students' social skills more positively than when student-teacher backgrounds differ (Bates &

Glick, 2013; Cherng, 2017; Downer et al., 2016; Lindsay & Hart, 2017). Similarly, EL students

and their teachers are less likely to share ethnic-racial backgrounds (Han & Bridglall, 2009) and face the potential additional barrier of not being able to rely on a common language to build trust and understanding. These barriers may be exacerbated by teachers' expressed lack of training and experience for working with EL student populations (Farr & Song, 2011). Differences between teachers serving EL populations and the EL students in their classroom may increase the risk of teacher's developing and expressing negative perceptions and beliefs about their EL students. In fact, studies find that mainstream classroom teachers may blame EL students for a lack of academic achievement (Walker et al., 2004) and attribute the academic difficulties of ELs to "the use of students' first language at school and home" and their "parent's inability to see the value in their children's education" (Shim & Shur, 2018, pp. 28-29). Furthermore, white teachers compared to Hispanic teachers have been found to have lower expectations of their EL students (Marx, 2000). These patterns suggest that students' EL classification may shape teachers' perceptions of students' academic and socioemotional skills. Teachers' perceptions of students' academic and socioemotional skills in the early elementary context are particularly salient, as teacher's perceptions of student's socioemotional skills are predictive of various future outcomes, such as achievement in later grades (Chetty et al., 2011), educational attainment (Lleras, 2008), and future income (Hall & Farkas, 2011).

Teacher's negative perceptions of EL students may be further exacerbated by the social and policy context. The term "Limited English Proficient" is still used widely in government discourse, which simultaneously essentializes ELs as linguistically deficient and disregards their proficiencies in languages other than English. This deficit ideology with regards to EL students is also perpetuated through educational policies that focus on "fixing" students' linguistic limitations, rather than on building their linguistic repertoires (Menken & Kleyn, 2010).

Gutiérrez and Orellana (2006) have claimed that the construction of ELs as a "problem" is so pervasive that it is an expected "genre" feature for EL-focused literacy research (p. 505). The EL label itself denotes the perception of difference or otherness that is socially stigmatizing for linguistically minoritized students. Given the negative socio-political impact of being EL-classified, the importance of teachers' perceptions of EL students' social skill development in early elementary settings, and the increase of EL populations, it is necessary to examine whether the EL classification itself has an impact on teachers' socioemotional ratings. It is especially critical to examine this effect while using rigorous methods that increase the possibility of drawing causal inference between EL classification and teachers' rating of students. Hence, this study builds on prior studies that have used matching techniques to examine the association between EL classification and teacher's perceptions of student academic skills (Umansky & Dumont, 2019), by using PSM to examine the relationship between EL classification and teacher's perceptions of students' social skills.

Literature Review

EL Classification & Mixed Findings Related to Academic Outcomes

Quasi-experimental studies on the effects of initial EL classification at school entry on later academic achievement have come to varied conclusions. Some studies have found positive effects (Shin, 2018), and others negative effects (Umansky, 2016; Umansky & Dumont, 2019) of early EL classification on academic outcomes. Given these recent but contradictory findings about the association between EL classification and achievement outcomes, it is clear there is a need to further understand the mechanisms that drive the educational effects of EL classification. Some work has started to examine this question. For example, one study concentrated on how bilingual settings mediated the effect of EL status on teachers' perceptions of students' academic

skills. Umansky and Dumont (2019) found that when in bilingual settings, teachers do not have systematically different perceptions of their EL students compared to their non-EL multilingual peers. This finding highlights that bilingual instructional environments may counteract the negative effect of EL classification on teachers' perceptions of their students' academic skill levels. Other studies have focused on examining the effects of remaining EL-classified as compared to exiting EL classification. These studies have demonstrated varied results on achievement, course placement and enrollment, behavioral outcomes, graduation, and post-secondary enrollment: these include neutral (Johnson, 2019), mixed (Cimpian et al., 2017; Robinson-Cimpian & Thompson, 2016; Umansky, 2018), and negative (Carlson & Knowles, 2016) effects of EL classification. These studies suggest that EL classification has varied educational ramifications that have tangible effects on students' experiences and opportunities in school, in both the short and long term, and lead us to examine the methodological approaches of prior research in this area.

Limitations to Past Research & Methodology

Studies have utilized different analytic approaches, such as regression discontinuity (Carlson & Knowles, 2016; Cimpian et al., 2017; Johnson, 2019; Shin, 2018; Robinson-Cimpian & Thompson, 2016; Umansky, 2016; Umansky, 2018), and coarsened exact matching (Umansky & Dumont, 2019). These regression discontinuity studies have all used district level data, limiting the analysis and generalizability of the results to students at or near the English-cut point in a given district. These approaches highlight the impact of EL classification by emphasizing differences related to supportive services (i.e., instructional services) between those receiving and not receiving the services. As such, this approach does not assess the effect of the label; rather, it identifies receipts of EL services for children around the cut point. An alternate

methodological approach is necessary to examine the direct effect of EL classification that is not focused on a cut-point upon which EL services are based.

By utilizing PSM with the ECLS-K:2011, this study leveraged a pseudo-experimental design that is generalizable at the national level and allows us to measure the effect of the EL classification label in a given classroom environment. In an experimental study, to test the idea that EL classification negatively impacts teachers' expectations of their students, one would randomly assign students to EL and non-EL status and then measure any subsequent differences in their teachers' expectations. However, as is generally the case in education, such an experimental design would be neither ethical nor practical. This study took advantage of the idiosyncrasy of the EL identification policy across localities to estimate the causal effect of EL classification on teachers' perceptions of students' social skills. We matched multilingual students who are EL-classified (treatment group) with multilingual students who are not (control group), using the propensity score as a proxy variable that accounts for early childhood experiences and characteristics, and thus allowed us to compare teachers' perceptions of student social skills by students' treatment status.

Importance of Students' Social Skills

Prior quasi-experimental studies have focused on student academic outcomes or academic skills, rather than examining EL students' socioemotional development. EL-focused research primarily examines students' linguistic and academic development and the classroom and instructional contexts that support such development. However, research on non-EL populations increasingly focuses on the importance of children's socioemotional development, particularly in the early elementary period (Halle et al., 2011). Given the limited psychological research which suggests an important nexus between socioemotional development and academic

outcomes for EL populations (Benson, 2006; Bohlmann et al., 2015; Greenfader, 2019; Palacios & Bohlmann, 2020), it is especially important to understand the effect of EL classification on outcomes beyond academic achievement and extend the focus of study to include EL students' socioemotional skills. For example, Albeg (2013) and Castro-Olivo (2006) found significant negative correlations between ELs' socioemotional outcomes and academic performance. Moreover, teachers are critical in facilitating EL student socialization by supporting students' socioemotional needs as they interact in the school setting (Brenner & Kia-Keating, 2016). Yet the research in this area is also inconclusive, with some qualitative evidence suggesting that teachers of EL students hold deficit-oriented perspectives related to EL students' socioemotional skills (Cho et al., 2019), while other quantitative work has found that teachers with strong knowledge about concepts and techniques in teaching ELs reported more favorable attitudes toward EL students than those with weaker pedagogical knowledge (Durgunoğlu & Hughes, 2010). These findings highlight the impact of cultural and linguistic biases, along with pedagogical knowledge, that may shape how teachers perceive students' achievement and social skills. Given the importance of socioemotional learning for long-term outcomes, there is a need for rigorous methods that examine the effects of EL classification on students' socioemotional skills. This study contributes to a richer and rigorous understanding of the impact of EL classification on teacher perceptions of students' socioemotional skills. Findings from this project may also inform policy and practice related to EL classification of students and teacher training in the United States.

The Current Study

The current study sought to address an important gap in the literature: what is the causal effect of EL classification on teacher perceptions? Most EL classification research has not

focused on measures of student socioemotional skill level and therefore has not been able to identify teacher bias or measure negative effects of EL classification on teacher perceptions, particularly related to student socioemotional skills and behaviors. Using PSM, this study drew on data from a nationally representative sample of third graders who spoke a primary language other than English at home, a group of students we will also refer to as multilingual students. Outcomes include teacher perceptions of students' social skill ratings at the end of third grade. The primary research question and hypothesis is as follows: *What is the effect of EL classification in third grade (among multilingual students) on teachers' perceptions of students' social skills?* Based on prior research of teachers' perception of racial/ethnic minorities, we hypothesized that teachers would perceive EL-classified multilingual students' behaviors as more problematic (i.e., exhibiting lower rating of prosocial skills in the classroom) than their non-EL-classified multilingual students with the same set of measured skills and characteristics.

PSM is a quasi-experimental approach that addresses the causal challenges that have impacted prior research on the effects that EL classification has on teacher's perceptions of EL students. Prior work on teacher perceptions have been largely qualitative and ethnographic, so there is a need for large-scale quantitative research that may be generalizable at the national level. Additionally, causal work on the impact of EL classification has mostly focused on academic outcomes, which may speak more to the effects of EL-related services on student academic achievement than the direct effect of the EL classification label. Given that the EL population continues to grow, and on average, teachers have low or negative perceptions of EL-classified students, it is essential to better understand the effects that teacher perceptions have on the development of EL student socioemotional skills.

Methodology

Data and Participants

This study used the U.S. dataset, Early Childhood Longitudinal Study, Kindergarten Class of 2010-2011 (ECLS-K:2011). This observational dataset draws on parent interviews, teacher/school administrator questionnaires, and directly administered assessments of a nationally representative sample of children from kindergarten (2010-2011 school year) through 5th grade. The analysis included data collected from Fall 2010 (when most children were in kindergarten) to Spring 2014 (when the sample is in third grade). Fall and spring data collections were conducted for all kindergarten through second grade students in the sample, and only spring data collection was collected for third graders. The study sampled approximately 18,200 kindergarteners, 3,000 kindergarten teachers, and 1,000 schools (due to the restrictive nature of this dataset, counts are rounded to the nearest 100th). The data contains teacher evaluations of individual students' social behaviors and skills and detailed demographic information reported by teachers and parents about students, including race, ethnicity, gender, primary language, SES, and disability/accommodations.

Initial Classification Sample

The analytic sample included students who spoke a primary language other than English at home based on either parent or teacher reports in third grade (*N*=1,990, rounded to the nearest tens place as required by data use agreement). Information from K-third is used to maximize the matching criteria and to differentiate between those multilingual students identified as EL and multilingual students identified as non-EL (Appendix A). We further limited the sample to students attending public school where identification of English learner students is mandated in order to ensure the possibility of multilingual children being either identified as an English Learner (i.e., treated) or testing-out of receiving EL services (as aligned with the common

support condition described below). We assessed outcomes at third grade in order to maximize

the amount of data for both treatment and control groups upon which we can rely on for

matching.

Children whose EL-status identifier data was missing, were not included in the sample.

Of the approximately 1,990 multilingual students in public schools, thirty-nine percent of the

children were non-ELs and fifty percent of the children in the sample were boys. Most children

in the sample (73%) identified as Latinx (race specified or unspecified), 19% as Asian non-

Hispanic, 4% as white non-Hispanic, and 4% as another race or multiracial, non-Hispanic. Forty-

one percent the sample (41%) were below the poverty threshold. About 53% of teachers held a

master's degree or beyond, with 13.63 years of teaching experience, on average. See Table 1 for

demographics on the overall student and teacher sample, and teachers' ratings of student's social

skills in third grade.

[INSERT TABLE 1 AROUND HERE]

Measures

Student Social Skills

The assessments that make up the four dependent variables of interest come from the

Social Skills Rating System (SSRS; Gresham & Elliot, 1990) to assess the frequency of

children's behaviors in the past three months, ranging from never (1) to very often (4). Collected

in the spring of third grade, teachers reported how they perceived students' social skills on four

social skills scales. These four social skill ratings include self-control (4 items), interpersonal

skills (5 items), internalizing problem behaviors (5 items), and externalizing problem behaviors

(5 items). Cronbach's alpha reliability coefficient for self-control is 0.80, for interpersonal skills

is 0.86, for internalizing problem behaviors is 0.87, and for externalizing problem behaviors is

0.78 (Tourangeau et al., 2018). Teacher responses to individual items on the SSRS were not available on the ECLS-K:2011 (due to copyright restrictions), and therefore reliability analyses were not conducted for the specific subsample in the current study. Considering these variables had skewed distributions, no more than 3% of a distribution's tail was winsorized in attempts to normalize their distribution. In the spring of third grade, average self-control scores were 3.33 (SD= 0.57), interpersonal skill scores were 3.16 (SD= 0.61), internalizing problem behavior scores were 1.55 (SD= 0.46), and externalizing problem behavior scores were 1.57 (SD= 0.54; as shown in Table 1).

EL Status

The primary predictor variable of interest is EL status. This variable is derived from a single question on the teacher questionnaire in the spring of third grade. For study participants whose primary language is not English, teachers were asked, "Does this child participate in an instructional program designed to teach English language skills to children with limited English proficiency?" Although this question did not ask directly about whether a student was classified as an EL in school, it did ask whether the student was in an EL program. Thus, this measure may not have been a completely accurate measure of EL status, as some EL-classified students may not have been, in practice, receiving EL services. This would bias how we interpret our findings, as those designated in the control group, may actually be classified as EL students, despite not receiving services. However, prior data suggests that the vast majority of EL-classified students are in some form of EL program ("D.J. et. al. v. State of California," 2015).

Matching variables

As supported by theory and existing empirical research, a total of 16 child- and family-level matching variables that are known to be associated with both EL status and teacher

perceptions were included in the propensity score model. These variables are either time invariant or were measured prior to the third grade. A list of all matching variables is provided in Appendix B. Matching variables included student and family demographics, such as the child's age, race, gender, immigration status, disability status, socioeconomic status, and parent education. Additionally, second grade assessments of students' reading, math, and executive functioning skills (i.e., working memory and cognitive flexibility), and 1st grade parent-reported scores of student social skills (i.e., approaches to learning, self-control, social interaction, sad/lonely, impulsive/overactive) were included in the PSM model. Detailed information about the coding and source of each variable are provided in Appendix B.

Covariates

We include various teacher-, classroom-, and school level variables as covariates in the effect estimation model to improve precision, as these variables have been known to be associated with the outcomes of interest, and control for variables that contextualize the educational environment and may be different for EL versus non-EL students. Teacher/classroom variables included: teacher gender, teacher's years of teaching experience, teacher's experience with bilingual education, the proportion of EL students in the class, and teachers' perceptions of closeness and conflict with a student. School level variables included: school district urbanicity, the proportion EL students in the school, and the proportion of non-white students in the school.

Analytic Strategy

The causal inference challenge encountered is that a simple comparison of students identified as EL and those identified as non-EL is likely confounded by selection factors associated with both the treatment and outcome(s). In order to overcome this methodological

challenge, and identify a robust control group, we leveraged PSM using 1-nearest neighbor

matching, with replacement, and with a caliper. This strategy focused on multilingual students,

drawing on a region of common support where third grade ELs and non-ELs have similar

characteristics. Therefore, to answer the research question—*what is the effect of EL classification*

in third grade (among multilingual students) on teachers' perceptions of students' social

skills?—we used the matched sample (as indicated by the PSM analysis) and conducted path

analysis (see Figure 1) to estimate the average treatment effect among treated and analyzed the

effect of multilingual student's EL-status on teacher's perceptions of students' social skill

development (i.e., self-control, interpersonal skills, and internalizing and externalizing problem

behaviors). More details on each of these is provided below. All analyses were performed in

Stata 14 (StataCorp, 2015). Statistical significance was set at $\alpha = .05$. Because of the 1:3 ratio of

control students to treatment students, we conducted a sensitivity check in which we matched the

treatment group to the control group in order to limit the number of replacements in the matching

process and thus measured the average treatment effect among the controlled. We also presented

results for estimating the association between EL status and teacher's perceptions of student

social skills, using the full sample without matching, and controlling for all our matching and

control variables.

Propensity Score Matching

The goal of PSM is to leverage students' observable characteristics related to both the

treatment and outcome in order to find students with similar characteristics to those in the

treatment group, but which are known to have not received treatment (Caliendo & Kopeinig,

2008). In this case, the treatment is being classified as an EL in the third grade. Matching in third

grade may pose a threat to external validity. One weakness of this is that the generalizability of

the results from this study may not extend to other grades because the sample of multilingual EL and non-EL students changes in the ECLS-K:2011 as the students move from K-third grade. Nonetheless, utilizing third grade data allowed us to leverage students' abundant pre-test measures (observable characteristics) from K-third grade for the PSM approach. In other words, PSM allowed us to isolate the effect of the treatment on the outcome, having matched on observable characteristics from K-third grade known to drive selection related to EL classification.

The rich set of covariates used from kindergarten to third grade allowed us to identify observably similar students. However, an internally valid treatment effect still needed to account for differences in the schools, classrooms, and teachers the students are assigned to. As such, we included these covariates in our final estimation model. Should we have been matching within schools, the average difference between matched treatment and control students would have been much larger than it is when we allowed matching across schools. As such, had we held school-level factors constant between the treatment and control group, we would have allowed much larger differences in student-level characteristics. However, with the treatment variable at the student-level, and the outcomes measured at the school- and student-level (i.e., the teacher-level), it benefitted our model to be able to account for student-level covariates as they explain more of the difference in teacher ratings than school-level factors. As such, it was best to match on the student-level and control for school-level characteristics.

In this matching strategy, we used 1-nearest neighbor matching, with replacement, and with a caliper. Nearest- neighbor matching takes an individual from the control group to match with a treatment individual that is closest in terms of the propensity score. Matching with replacement allows the control individual to be used more than once as a match, increasing the

average quality of matching and the variance of the estimator, and reducing the bias (Caliendo &

Kopeinig, 2008). However, if the closest neighbor is far away, we face the risk of bad matches.

In order to avoid this, we imposed a caliper, a tolerance level on the maximum propensity score

distance (Caliendo & Kopeinig, 2008), which matches a control individual to a treated individual

that lies within the caliper ('propensity range') and is closest in terms of propensity score.

Additionally, several steps are required in order to perform a robust PSM analysis.

Outcome data must not be included in the matching process, and appropriate covariates must be

selected to form the bases for PSM. Additionally, the selected matches need to be checked for

balance across both groups for all covariates. Finally, the iterative process requires redefining the

model if balance is not achieved. Each of these steps is discussed in more detail below.

Matching covariates. Student-level data are needed for matching the treatment to a

comparison sample. As such, we used the ECLS-K:2011 to match treatment to control students.

The ECLS-K:2011 includes rich student-level data including student demographics, achievement

scores, and parent perceptions of students' social skills. We matched on the matching variables

denoted above.

Estimating p-score and matching. Using the pre-treatment covariates, a logistic

regression was modeled to estimate the p-score (see equation 1).

$$(1) \qquad ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_{k-1} X_{k-1,i} + \beta_k X_{ki}$$

The resulting p-score represents the probability of a student being assigned to treatment

(e.g., EL classification in third grade) based on the set of pre-treatment covariates included in the

model (Dehejia & Wahba, 2002). Once a p-score was calculated, we preformed nearest neighbor

matching with replacement. Though other methods such as stratification matching are available,

we chose 1-nearest neighbor with replacement and a caliper for three reasons. First, nearest

neighbor matching increases the likelihood that a treatment student will be matched to a comparison student that looks most like them based on covariates included in the model. For this reason, we wanted to ensure that treatment students are matched to a comparison student that most resembles them based on what we are able to observe and thus matched with replacement. This means that one comparison student can be matched on multiple treatment students (Caliendo & Kopeinig, 2008). This process defined the region of common support (ROCS) where students were observed in both treatment and control. Second, because we used nearest neighbor matching with replacement, it is possible that the ROCS would be restricted more than if we had matched without replacement but kept the caliper, as an example. This limits the generalizability of the findings but decreases the bias of the estimate. And third, imposing a caliper of 0.2 of the SD removes about 99% of bias due to measured covariates while increasing the variance, and thus is one way of imposing a common support condition (Caliendo & Kopeinig, 2008).

Checking Balance. After a matched sample had been selected, we checked for balance on all observed covariates. Three methods were used to do this. We compared means by way of t-tests and Cohen's d (see equation 2). We also compared distributions using the variance ratio v (see equation 3).

(2) $d = (\underline{X}_t - \underline{X}_c)/\sqrt{(S_t^2 + S_c^2)/2}$

(3) $v = S_t^2/S_c^2$

Thresholds of $p < .05$, $d = [-1, 1]$, and $v = [.8, 1.25]$ were considered to assess balance (Steiner, Cook, Shadish, & Clark, 2010). Balance on all covariates is not usually likely, but it was important to achieve balance on the majority of covariates, and key covariates. In the present dissertation, key covariates are race, gender, socioeconomic status, and reading and executive

functioning scores. Reiteration of balance checks were conducted until acceptable balance is achieved. Additionally, given matching with replacement, we applied weights when assessing balance because some control cases were the match for more than one treatment case.

Assumptions

PSM analyses must meet certain assumptions in order for the causal inferences about estimated effect to be unbiased. These assumptions include: the stable unit treatment value assumption, common support condition, and the condition independence criteria. We engaged in various checks, to ensure that our analyses meet the proper conditions and assumptions.

Stable unit treatment value assumption. This assumption states that potential outcomes do not depend on the treatment assignment of other individuals (i.e., there are not spillover or peer effects; treatment is context free). Given that we matched students within public schools, and public schools are required to test for English proficiency if students speak a language other than English at home, we defined the treatment (i.e., EL assignment) as "treatment as typically implemented" across the nation.

Common support condition. Here, we assume that units with the same pre-treatment covariates have a positive probability of being treated and of being not-treated (e.g., all units not always or never treated). This assumption likely held at both a theoretical and empirical level given that we restricted the dataset to public schools. On a theoretical level, public schools are required by law to test students on their level of English proficiency if they speak a language other than English at home. Therefore, it is possible that multilingual children were identified as English Learners (i.e., treated) or tested-out of receiving EL services. On an empirical level, we dropped any treatment or control students with an estimated p-score of 0 or 1 given we were using the nearest neighbor approach with a caliper. In this way, we limited the tolerance level on

the maximum propensity score distance for which a control individual and treatment individual could be matched together.

      Conditional independence assumption. Although this is the tough assumption to maintain, given that it operates at the student-, teacher-, and school-level, as currently presented, using and matching on student-level covariates from kindergarten through the start of third grade support this strongly held. Given we did not include classroom- or school-level variables in our matching model, nor were we able to match within classrooms or within schools, we were unable to hold such factors constant between those classified as EL students and those not classified. However, matching on prior years' student and family data, made it more likely that assignment to treatment is ignorable at the student-level. In other words, we assumed that the average potential outcomes under those EL-classified and those not EL-classified were uncorrelated with treatment assignment conditional on all relevant pre-treatment covariates. Matching at the child-level allowed us to identify observably similar students, and thus reduced the range of difference between treatment and control students, to which we would then assume little difference in teacher's ratings of student's social skills between the treatment and control group. At the same time there was the issue of unobservable characteristics like a student's actual EL status classification, neighborhood residence, or motivation confounders, as we did not observe some important pre-treatment covariates known to be correlated with both EL assignment and teacher's perceptions of student's social skill ratings. As such, we included other observable covariates at the teacher- and school-level in the final estimation model to try and account for the potential variability/impact on teacher's ratings of student's social skills.

Treatment Effect Model

The magnitude and statistical significance of the group mean differences in the social skills scores outcomes before and after matching were estimated according to Equation 4:

(4) $SocialSkills_i = \alpha + \delta EnglishLearner_i + \beta \hat{p}_i + W_i \theta + \varepsilon_i$

where $SocialSkills_i$ {teachers' perceptions of self-control, interpersonal skills, and internalizing and externalizing problem behaviors} are the four outcomes that were modeled simultaneously via path modeling (using the sem command in Stata 14; Stata Corp, 2015) to account for the correlation among the outcome variables, and the four residuals were assumed to be normally distributed and allowed to covary. When estimated on the matched sample and incorporated sample matching weights (W_i) due to repeat individuals used to match from the control group. δ represents the population average controlled difference among the treated—that is, the expected difference in teacher's perceptions of student social skills outcomes between multilingual EL-classified and multilingual non-EL-classified students among children whose experiences and demographic characteristics resemble each other's. The estimation model was run with clustered standard errors for teacher ID. Teacher-, classroom-, and school level covariates, along with unbalanced matching variables ($\beta \hat{p}_i$) were also included in the model. A robust single-level approach was preferred for estimating the treatment effect model.

Sensitivity Analysis

As noted, we conducted a few sensitivity checks, by running our analysis on the full sample without matching, and by using the treatment cases as a match for control cases. Running analysis using the full sample (approximately 1990 students) and controlling for all matching and control variables allowed us to examine the association between teacher's scores and student's EL status among multilingual students who may vary on an array of factors. Compared to non-EL multilingual children, for EL classified children there were no differences in teachers' ratings

of student's social skills. Interpersonal skills (β = -0.04, S.E. = .04, p > .05), self-control (β = -0.02, S.E. = .04, p > .05), externalizing problem behavior (β = 0.01, S.E. = .03, p > .05), nor internalizing problem behavior ratings (β = -0.03, S.E. = .05, p > .05) resulted in significant differences. This would suggest the need to examine if similar findings are true when we compare differences in teacher's rating among students who are similar across various associated variables.

Matching treatment to control cases served to increase the number of control cases used in the analysis and allowed for fewer treatment cases to be needed for matching with multiple control cases. This reduced the variance relative to matching each unit only once (Abadie & Imbens, 2006). See Table 2 in the Appendix for a distribution of the number of treatment cases matched to control cases. Relatively good balance was achieved, with all t-tests resulting in p< .001, and most key matching variables being within appropriate range. Most of the other matching variables were well balanced, except for child's immigration status (d= -.1112; v= .7412) and cognitive flexibility (v = .7360). The ROC totaled about 720 students (rounded to the nearest tens), with 480 in the control group (non-EL students) and 240 in the treatment group (EL-classified students). The average treatment on the control group showed a similar difference in teachers' ratings for non-EL students if they had been classified as ELs. Compared to non-EL multilingual children, EL classified children would have been rated lower on interpersonal skills (β = -0.11, S.E. = .05, p < .05). There were no differences between non-ELs and EL classified multilingual children with regards to self-control (β = -0.02, S.E. = .05, p > .05), externalizing problem behavior (β = 0.07, S.E. = .05, p > .05), or internalizing problem behavior ratings in third grade (β = -0.02, S.E. = .07, p > .05). Given the results were very similar to those reported from the main analysis, these sensitivity checks indicate the relative robustness of the main

results presented next. Furthermore, given these sensitivity check results, and the larger sample size in the main analysis, we proceeded to measure the average treatment on treated effect.

Results

Propensity Score Model

Estimates from the propensity score model (Equation 1), in which all 16 child- and family-level covariates were used to predict the probability that a child was EL-classified, are shown in Table 2. Four of the variables uniquely predicted child EL classification status ($p <$ .05). The goals of the propensity score analysis was to produce p-scores that achieve balance between the treatment and matched control groups on covariates that are particularly likely to be related to teacher's perceptions of student social skills. This balance then allowed us to identify the region of common support (for whom in the population of interest and within the dataset, the statistical technique provided an unbiased treatment effect; in this case, also known as the population of causal inference). Specifically, those who fall into the treatment group (students who are multilingual and given English-Learner Status) and the comparison students (multilingual students classified as non-EL) that were identified via PSM, thus creating the analytic sample.

[INSERT TABLE 2 AROUND HERE]

Table 3 shows t-test, Cohen's D, and v-ratio results indicative of the balance between the pre-matched sample and the post-matched sample on the matching variables. Matching achieved good overall balance between the treatment and control groups. After adjusting the logistic regression (Equation 1) to include interactions between parent-reported approaches to learning in first grade and children's gender, along with parents' highest level of education and children's age, and squaring the direct assessments of children's cognitive flexibility, we determined our

matched sample. Acceptable balance was achieved on all key matching variables, along with

most other matching variables, excluding children's age (d= .1165; v= .6771) and parent

education (d= -.1007). Similarly, t-test results for children's age were significantly different (p<

.05) between the treatment and control group, as was the social skill indicator of

impulsive/overreactive (p< .05).

The matched sample and ROCS covered 50% of the initial classification sample.

Differences between the full and matched samples were that the matched sample had a slightly

larger proportion of Latinx students (80.34%) compared to the full sample (73.32%). The

matched sample also had a slightly smaller proportion of students who had at least one parent

with some college education or higher (23.03%) compared to the full sample (29.51%).

[INSERT TABLE 3 AROUND HERE]

Path Model

To address the research question, we used the matched sample identified by the PSM

analysis and conducted path analysis (an analysis used to describe direct dependencies among a

set of variables—such as the relation between an independent variable and multiple dependent

variables) to analyze the effect of multilingual student's EL-status on students' social skill

development (i.e., self-control, interpersonal skills, and internalizing and externalizing problem

behaviors; see Table 4). Frequency weights were included in order for a single child to represent

observations for multiple observations, as is necessary for matching with replacement so as to

assign some control cases as the match for more than one treatment case. See Table 5 for a

distribution of control to treatment cases. Compared to non-EL multilingual children, EL

classified children were rated lower on interpersonal skills (β = -0.10, S.E. = .05, p < .05). There

were no differences between non-ELs and EL classified multilingual children with regards to

self-control (β = -0.05, S.E. = .05, p > .05), externalizing problem behavior (β = 0.03, S.E. = .04, p > .05), or internalizing problem behavior ratings in third grade (β = -0.04, S.E. = .06, p > .05).

[INSERT TABLE 4 & 5 AROUND HERE]

Discussion

This study sought to explore the effects of EL classification on teacher perceptions of student social skill development. While EL classification is intended to ensure the rights of a potentially vulnerable group of students by providing students with extra support and services to meet their linguistic needs and demands of the education system, scholars have highlighted how the classification is oriented around deficits (English proficiency) rather than assets (multilingualism, etc.; Gutiérrez & Orellana, 2006). As such, prior work has documented how EL classification can have a direct negative effect on students' opportunities and outcomes in school (Carlson & Knowles, 2016; Cimpian et al., 2017). One possible reason for this negative EL classification effect is systematic differences in teacher perceptions of students identified as linguistically minoritized students (Menken & Kleyn, 2010).

Using a rigorous analytic approach that allows for comparison between EL and non-EL students in ways that account for potential sources of bias in the estimation method, we only find partial evidence in support of this hypothesis. We found, as theorized, that EL status in third grade has a direct and negative effect on teacher's perceptions of students' interpersonal skills. However, we did not find evidence that EL classification status was associated with other teacher ratings of children's socioemotional skills, including rating of self-control, externalizing problem behaviors, or internalizing problem behaviors.

Perhaps, one reason for differences in ratings of interpersonal skills is the barrier of not being able to rely on a common language to build trust and understanding. It is possible that

teachers of EL-classified students may perceive a larger communication barrier that in turn limits how they perceive EL children's communicative abilities. Negative perceptions of children's communicative abilities may impact how teachers view children's interpersonal skills, such as children's willingness to initiate activities with peers and others in the classroom, join activities, or maintain active conversations with others. Of the four outcomes we examined (self-control, interpersonal skills, internalizing problem behaviors, and externalizing problem behaviors), interpersonal skills are necessary for social engagement and interactions, which heavily depend on using language to communicate with others. Prior literature has often noted that teachers perceived multilingual children as shyer and more reserved (Ash et al., 2014). If teachers are aware of difference in English proficiency, as that identified by the EL classification label, this could further limit how teachers engage with or perceive students' engagement and interactions with others. This may indicate the need for teachers to work to dispel their own assumptions regarding the social interactions of EL-classified students. It may also call the need for teachers to proactively work toward helping their EL students become more integrated in the classroom social structure, such as through social activities.

It should be noted that we acknowledge language is a contributing factor for children's development and expressions of all social skills. However, it may be that teachers see language as more essential for EL student's interpersonal skills and social processes as opposed to seeing the language proficiency label as influential for student's self-control, internalizing problem behaviors, and externalizing problem behaviors. Findings that there is no difference in these teacher ratings between EL multilingual and non-EL multilingual students is a positive sign of the training teachers receive for working with ELs. Teachers may not ordinarily attribute deficit-views toward EL students. However, for students in the ROCS, EL students compared to non-

ELs were rated below average (among the matched sample) on both self-control and interpersonal skills, and were rated higher than average on both externalizing and internalizing problem behaviors, indicating more negative views of EL students' social skills compared to no-ELs. As such, findings would support not only the need for awareness around the potential impact of the EL classification label as stigmatizing, but also urge to change the current label used by local authorities-- "English Learners" or "English Language Learners"—to "emergent bilinguals, as suggested by García and Kleifgen (2018). Rather than being regarded as a mere "learner of English" or "limited" in some way, students may be seen instead for their potential to become bi/multilingual and thus their emergent bi/multilingualism may begin to be recognized as a cognitive, social, and educational resource to be leveraged (García & Kleifgen, 2018). With this reframing, teachers may start holding higher expectations of these students rather than simply remediating their limitations and focusing solely on their English learning. At the same time, teachers may then draw on these students' strengths and make positive use of students' home language and bi/multilingual practices.

These findings are only a snapshot of third grade and do not tell us how these ratings/perceptions build over time, or how past perceptions influence future teachers' ratings. While this study contributes to prior literature using causal inference among culturally and linguistically minoritized students by examining socioemotional outcomes as perceived by teachers, it may not account for the socioemotional skills that are unique to the Latinx and Asian populations. Questions posed to teachers in relation to student's social skills may not reflect the distinct ways Latinx or Asian students (as they are the majority of the final estimation sample) exhibit such skills or capture the values and expectations of such skills as are common among these cultural groups. This certainly limits the ways in which teachers may rate students' skills

and continues to amplify the current dominant cultural norms. However, given the importance of student's social skills (typically as perceived by teachers) on future development, understanding the impact of the English Learner status on teacher's perceptions of student's social skills allows us to identify a contributing factor (i.e., teacher's perceptions) on the success of EL classified students in general. This study did not, however, look at longitudinal trends or effects. Different teachers may have different biases, resulting in differing impacts of EL classification across different grade levels, which are not examined for in this study. Additionally, different developmental periods may have different demands in the classroom. Furthermore, given the importance of positive student-teacher relationships, future research should consider examining mediating effects of student-teacher relationships, as these ratings may provide an added view of student's relationship skills.

The findings from our research question contributes to theory on and understandings of teachers' perceptions and the experiences and opportunities of EL-classified students. Findings for this study are complex for ELs. We found that teachers may have an added potential bias toward EL students' interpersonal skills that depend on teachers' perceptions of linguistic processes. With regard to the research on teacher perceptions of student social skills, this study adds to existing work that finds that teachers are more likely to hold negatively biased assessments of the interpersonal skills of students who already face societal and educational discrimination and unequal opportunity. Therefore, it is important to conduct research that examines how being labeled as an English Learner in the elementary grades may impact teachers' perceptions of students. This provides a clearer understanding of the ways in which EL classification impacts teacher perceptions of students' socioemotional skills and is a first step in understanding how these perceptions limit or enhance the classroom and school-based

opportunities available to EL students. Moreover, the results of the current study suggest important implications for educators, education leaders, and education policy related to interventions that attempt to reduce teacher bias. Acknowledging and tackling bias related to language proficiency and students' social processes may help teachers better understand, acknowledge, and ideally avoid bias against EL-classified students in their schools and classrooms.

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Table 1
Descriptive statistics of analytic sample prior to matching

	Full Sample	Non-EL	EL
3rd gr. teacher-reported student social skills			
Self-control	3.33	3.40	3.29
Interpersonal skills	3.16	3.25	3.10
Externalizing problem behaviors	1.57	1.52	1.60
Internalizing problem behaviors	1.55	1.50	1.58
2nd gr. student skill measures			
English reading	95.92	102.62	91.80
Math	80.99	87.60	76.99
Working memory	6.43	6.74	6.25
Cognitive flexibility	476.30	482.27	472.65
1st gr. parent-reported student skill measures			
Approaches to learning	2.87	2.98	2.80
Self-control	2.96	3.03	2.92
Social interaction	3.15	3.23	3.10
Sad/lonely	1.43	1.42	1.44
Impulsive/overactive	1.77	1.73	1.80
Student & family characteristics			
Male	49.5%	47.4%	52.4%
Age (in months)	108.15	108.54	107.91
Latinx	73.3%	60.7%	81.3%
Asian*	19.5%	27.6%	14.3%
White*	4.4%	7.4%	2.5%
Immigrant	9.3%	10.8%	8.4%
Has a disability	8.7%	6.2%	10.4%
Below poverty threshold	52.3%	38.6%	61.0%
At least one parent has some college education or higher	29.5%	44.8%	19.8%
3rd gr. teacher & classroom characteristics			
Teacher has a master's degree or higher	53.3%	56.1%	50.0%
Years of teaching experience	13.63	13.75	13.63
Teacher has taught ESL/BE/DL	37.5%	18.9%	37.5%
Percent EL students in class	43.09	21.58	56.91
3rd gr. school characteristics			
Percent EL students in school	34.72	26.20	40.05
Percent non-white students in school	76.18	68.74	79.85
Percent free/reduced priced lunch eligible students	73.71	65.16	79.05
Rural location	8.6%	9.8%	7.9%
N	1,990	770	1,220

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.
Note. *N* rounded to the nearest tens place. ESL= English as a Second Language, BE= Bilingual Education, DL= Dual Language. Means rounded to hundredth place. * = non-Hispanic.

Table 2
Propensity score model estimates: Predicting the probability that a child is an EL-classified student

	Logit (95% CI)	*p*
2nd gr. student skill measures		
English reading	-0.06 (-0.07, -0.04)	.000
Math	-0.01 (-0.02, 0.00)	.159
Working memory	0.01 (-0.09, 0.12)	.788
Cognitive flexibility	0.00 (-0.00, 0.01)	.563
1st gr. parent-reported student skill measures		
Approaches to learning	-0.10 (-0.39, 0.20)	.517
Self-control	-0.13 (-0.43, 0.17)	.398
Social interaction	-0.23 (-0.48, 0.02)	.077
Sad/lonely	-0.22 (-0.57, 0.14)	.240
Impulsive/overactive	0.21 (-0.03, 0.44)	.081
Student & family characteristics		
Male	0.09 (-0.18, 0.36)	.535
Age (in months)	-0.04 (-0.07, 0.00)	.026
Latinx	0.98 (0.30, 1.69)	.006
Asian*	0.93 (0.22, 1.64)	.011
Other*	-0.17 (-1.28, 0.95)	.771
Immigrant	-0.06 (-0.51, 0.40)	.827
Has a disability	0.39 (-0.18, 0.96)	.184
Below poverty threshold	0.35 (0.06, .64)	.016
At least one parent has some college education or higher	-0.44 (-0.76, -0.12)	.007

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.
Note. *N*= 1,230, rounded to the nearest tens place. Logit and 95% confidence interval (CI) rounded to hundredth place. * = non-Hispanic.

Table 3
Descriptive statistics on matching variables, pre-matching & post-matching

	Pre-matched full sample			Post-matched full sample				
	Non-EL	EL	TT	Non-EL	EL	TT	D	V
2nd gr. student skill measures								
English reading	102.62	91.80	***	98.96	92.55			
Math	87.60	76.99	***	84.51	78.13			
Working memory	6.74	6.25	***	6.54	6.29			
Cognitive flexibility	482.27	472.65	***	477.71	473.63			
1st gr. parent-reported student skill measures								
Approaches to learning	2.98	2.80	***	2.90	2.82			
Self-control	3.03	2.92	***	2.96	2.92			
Social interaction	3.23	3.10	***	3.21	3.11			
Sad/lonely	1.42	1.44		1.42	1.44			
Impulsive/overactive	1.73	1.80		1.79	1.83	*		
Student & family characteristics								
Male	47.4%	52.4%	*	48.2%	53.3%			
Age (in months)	108.54	107.91	**	108.20	108.05	*	0.1165	0.6857
Latinx	60.7%	81.3%	***	74.7%	82.3%			
Asian*	27.6%	14.3%	***	20.6%	14.4%			
White*	7.4%	2.5%	***	3.6%	2.1%			
Immigrant	10.8%	8.4%		10.3%	7.9%			
Has a disability	6.2%	10.4%	**	5.5%	10.0%			
Below poverty threshold	38.6%	61.0%	***	49.4%	60.1%			
At least one parent has some college education or higher	44.8%	19.8%	***	28.1%	21.3%			-0.1007
N	770	1,220		250	750			

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.
Note. *N* rounded to the nearest tens place. Means rounded to hundredth place. Non-EL group weighted in balance checks (TT, D, V). TT = t-test. D = Cohen's D. V= variance ratio. D and V scores left blank if within the appropriate range—D [-0.1 – 0.1] and V [0.8 – 1.25].
***p<=.001, **p<=.01, *p<=.05

Table 4

Estimates of effect of EL status on teacher perceptions of student social skills, among third grade multilingual students

	Self-control	Interpersonal skills	Externalizing problem behaviors	Internalizing problem behaviors
EL status	-.05	-.10*	.03	-.04
Child age	.01	.02	-.01	-.04
Parent education	-.05	-.04	.10**	-.04
STR-Closeness	.08	.29***	.09*	-.09
STR-Conflict	-.64***	-.52***	.74***	.39***
Teacher gender	.00	-.03	.00	-.03
Years of teaching experience	-.03	.02	-.08*	-.10*
Teacher has taught ESL/BE/DL	.12**	.11*	-.14**	.04
Percent EL students in class	-.06	.04	.00	.05
Percent EL students in school	-.03	-.05	.03	.01
Percent non-white students in school	-.08	-.01	.11*	-.03
Rural location	-.06	-.03	.10	.05
cons	6.95***	4.22**	.68	4.13***

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. N= 810, rounded to the nearest tens place. STR = Student-teacher relationship. ESL= English as a Second Language, BE= Bilingual Education, DL= Dual Language. Means and standard errors rounded to hundredth place. Non-EL group weighted.

  ***p<=.001, **p<=.01, *p<=.05

Table 5

Distribution of Control cases matched to Treatment cases

N Treatment Cases	% of Total Matched Control Cases (% of total)
1	85.8%
2	4.9%
3	2.5%
4	2.4%
5	1.3%
6	0.5%
7	0.9%
8	0.4%
9	0.2%
10	0.2%
11	0.1%
12	0.1%
13	0.2%
15	0.1%
16	0.1%
19	0.2%
24	0.1%
Total	**1,000**

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. Total *N* rounded to the nearest tens place. % of total matched control cases rounded to nearest tenths place.

| Multilingual Student's English Learner Status Spring Third Grade | → | Teacher Perceptions of Student Social Skills Spring Third Grade |

Figure 1. The association of EL-status and student social skills scores.

Appendix A.
Figure 1.

The population of interest, the population of study, and the population of causal inference.

Population of Interest: All multilingual students in the United States

Population of Study: Third grade Multilingual students in the ECLS-K:2010; identified using grade level data (i.e. primary language, EL status, public school status)

Population of Causal Inference (Region of Common Support): Third grade multilingual classified as EL who match with Third grade multilingual students not classified as EL; identified through propensity scoring matching

Appendix B.

Table 1. Matching variables, sources, and coding information.

Variable	Source	Coding
English reading scores	Direct assessment (spring 2nd grade)	Continuous
Mathematics scores	Direct assessment (spring 2nd grade)	Continuous
Working memory	Direct assessment (spring 2nd grade)	Continuous
Cognitive flexibility	Direct assessment (spring 2nd grade)	Continuous
Approaches to learning	Parent Interview (spring 1st grade)	Continuous
Self-control	Parent Interview (spring 1st grade)	Continuous
Social interaction	Parent Interview (spring 1st grade)	Continuous
Sad/lonely	Parent Interview (spring 1st grade)	Continuous
Impulsive/overactive	Parent Interview (spring 1st grade)	Continuous
Child age in months	Parent Interview (spring 3rd grade)	Continuous
Child sex	Parent Interview (fall kindergarten)	0=Female, 1=Male
Child race/ethnicity	Parent Interview (fall kindergarten)	*White*: 0=other race & non-Hispanic, 1= White *Hispanic*: 0=non-Hispanic-any race/multiracial, 1=Hispanic-any race/multiracial *Asian*: 0= other race & non-Hispanic, 1=Asian *Other*: 0= White/Asian-non-Hispanic, 1=Black/American Indian/Alaskan Native/ Hawaiian/Pacific Islander/multiracial & non-Hispanic
Disability status	Parent Interview (spring 3rd grade)	0=none identified, 1= one/more disabilities identified
Immigrant status	Parent Interview (fall kindergarten-spring 3rd grade)	0= not an immigrant, 1=immigrant
Below poverty threshold	Parent Interview (spring 3rd grade)	0= above the poverty threshold, 1=below the poverty threshold
At least one parent has some college education or higher	Parent Interview (spring 3rd grade)	0= at least one parent has some college education or higher, 1= neither parent has a college education or higher

Table 2

Distribution of Treament cases matched to Control cases

N Control Cases	*N* Matched Treatment Cases (% of total)
1	86.2%
2	6.4%
3	3.3%
4	1.7%
5	0.7%
6	0.3%
7	0.7%
8	0.4%
9	0.3%
10	0.1%
Total	**720**

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. Total *N* rounded to the nearest tens place. % of total matched control cases rounded to nearest tenths place.

Manuscript 3: Transitions in Student-Teacher Relationship Quality among Latinx children: A Latent Transition Analysis from First to Third Grade

Melissa Lucas

Lucas, M. (in progress). Transitions in student-teacher relationship quality among Latinx

children: A latent transition analysis from first to third grade.

Abstract

It is well established that student-teacher relationships within each academic year are vital in helping children make the adjustment through the first few years of school. Attention to changes or stability in relationship quality over the school years seems to be warranted, as continued exposure to interpersonal adversity appears to be an important predictor of children's maladjustment. Given that children from minoritized backgrounds have different trajectories of student-teacher relationship quality, and that student-teacher relationship quality may be a key protective mechanism for Latinx students, it necessary to explore the within group variability of student-teacher relationship trajectories within Latinx populations. Hence, to better support Latinx children's development through the early elementary years, this paper uses latent transition analysis to examine the following research questions: 1) what are statuses (i.e., patterns) of student-teacher relationship quality among Latinx students; 2) what is the likelihood of transitioning from one status to another over time, from first to third grade; 3) What individual child factors are associated with belonging to different statuses across time? I use longitudinal data from the ECLS-K:2011, drawing from a sample of approximately 4,590 Latinx first graders and 1,460 teachers. Findings from this study illustrate which Latinx students are most vulnerable to experiencing inhibiting educational environments and thus can guide future efforts to mitigate hindering factors associated to Latinx students' transition from first to third grade and their educational outcomes.

Positive student-teacher relationships, typically characterized by high closeness and low conflict, are important interpersonal processes for children's early academic development that are associated with lower levels of externalizing problem behaviors (Paes et al., 2021), a greater sense of school belonging (Hughes & Kwok, 2007; Wong et al., 2019), and higher academic achievement (Bosman et al., 2018; Pianta & Stuhlman, 2004; Split et al., 2012; Valiente et al., 2019). These relationships are important in third grade, a period in which children encounter new academic demands and expectations (Felton & Akos, 2011). In fact, positive student-teacher relationships (STRs) are vital in helping children make the adjustment to elementary school (Pianta et al., 1995), through the first few years of school (Hamre & Pianta, 2001), and through high school (Ettekal & Shi, 2020; McGrathy & Van Bergen, 2015). Unfortunately, all children do not have access to positive student-teacher relationships in the early elementary period, and children from culturally and linguistically minoritized (CLM) backgrounds are less likely to have access to positive student-teacher relationships (Cherng, 2017; Goldberg & Iruka, 2021). Risk and resilience perspectives suggest that it is the cumulative effect of risk and protective factors that can have long lasting impacts on children's academic and social development (Masten & Gewirtz, 2006). Thus, understanding the cumulative risk and protection conferred by STRs between CLM children and their teachers over the course of the early elementary is vital, because it is in this period of development that children are internalizing the academic and social norms that will establish their success in third grade and beyond.

Research shows that STR quality typically declines across the school years (Jerome, Hamre, & Pianta, 2009), with different trajectories and fluctuations for minoritized and socioeconomically disadvantaged students compared to white students (Ettekal & Ski, 2020; Lee & Bierman, 2018; Spilt, Hughes, Wu, & Kwok, 2012). Latinx children, whose cultural and

linguistic backgrounds are more likely to differ from those of their teacher, may experience

lower-quality relationships with their teachers compared to white students or when their teachers

do not share the same racial background (Goldberg & Iruka, 2021; Murray et al., 2008).

Continuous teacher support could counteract or neutralize risk factors, leading to lasting positive

effects on children's development that cannot be attained by one or two years of a supportive

relationship. Current research suggests that close, trusting, and caring student-teacher

relationships are an important contributor to Latinx students' functioning in school (Newcomer,

2018; Smith, 2008) and may account for significant variance in Latinx students' perceptions of

school engagement, their social development, and their academic achievement (Ettekal & Ski,

2020; Garner & Mahatmya, 2015; Goldberg & Iruka, 2021; Murray, 2009). Attention to changes

or stability in relationship quality over the school years seems to be warranted, as continued

exposure to interpersonal adversity appears to be an important predictor of children's

maladjustment (Bosman et al., 2018; Ladd et al., 2008). Given that children from minoritized

backgrounds have different trajectories of STR quality, and that STR quality may be a key

protective mechanism for Latinx students, it necessary to explore the within group variability of

STR trajectories within Latinx populations, as this may provide insights for the development of

interventions at the student-, and teacher-level. Hence, to better support Latinx children's

development through the early elementary years, it is vital to understand what patterns of STR

quality exist across early elementary periods, and to examine what child-level characteristics are

associated with belonging in optimal STR quality patterns. In this paper we examined the

following research questions: 1) what are statuses (i.e., patterns) of student-teacher relationship

quality among Latinx students; 2) what is the likelihood of transitioning from one status to

another over time, from first to third grade; 3) What individual child factors are associated with belonging to different statuses across time?

Conceptual Framework

Extended reconceptualization of attachment theory has often been proposed to explain the nature of STR quality and its impact on children's socioemotional development and adjustment within school contexts (Pianta, 1992, 1999; Sabol & Pianta, 2012). Researchers have primarily assessed this perspective across two dimensions of STRs, student-teacher closeness and conflict. Closeness is characterized by supportive and mutually responsive relationships, high in positive affect and emotional closeness. In contrast, student-teacher conflict reflects relationships that are discordant, unresponsive, and high in negative affect and hostility (O'Connor, Collins, & Supplee, 2012). This perspective suggests that relationships characterized by closeness may promote feelings of belonging, emotional security, and support children in developing prosocial skills (Baker et al., 2008; Bosman et al., 2018; Hughes & Cao, 2018; Myers & Pianta, 2008); while conflictual relationships with teachers may lead and reinforce oppositional, hostile reactions, and amplify aggression (Hamre & Pianta, 2001; Pianta & Stuhlman, 2004). These dimensions are interrelated and reflect distinct facets of STRs. Positive relationships consist of high closeness and low conflict, although it is possible for students and teachers to share high closeness and high conflict (Split & Koomen, 2009). In fact, McGrath and Van Bergen (2017, 2019) suggest that teachers and researchers broaden their understanding of STR quality beyond the positive-negative dichotomy to consider atypical STR types. In addition to the positive STRs (high closeness and low conflict) and negative STRs (low closeness and high conflict), they propose two additional types: Complicated STRs (high closeness and high conflict) and Reserved STRs (low closeness and low conflict; McGrath & Van Bergen, 2017,

2019; Van Bergen et al., 2019). This suggests the importance of taking a person-centered approach that allows for different patterns of STR quality that consider both closeness and conflict.

[INSERT FIGURE 1 AROUND HERE]

Furthermore, a positive relationship with one's teacher may be especially important to the school adjustment of students from CLM backgrounds (Burchinal et al., 2002; Cherng et al., 2017; Goldberg & Iruka, 2021; Newcomer, 2018). Children from CLM backgrounds have a higher likelihood of being negatively perceived by teachers and tend to experience harsher treatment from them than their white counterparts (Gansen, 2020; Martinez, 2020; Rasheed et al., 2020; Tenebaum & Rauk, 2007). This is often attributed to ethnic-racial differences, cultural biases, and linguistic barriers that impact building trust and understanding between teachers and CLM students. As framed by García Coll and colleagues' (1996) integrative model for the study of developmental competencies in minority children, students' ethnicity serves as a marker of social positioning that may shape the environments the child is likely to experience. The model calls for a within-group exploration of promoting environments that may protect or buffer students from marginalization. To that end, as aligned with the integrative model's emphasis on examining minoritized students' adaptive sociocultural contexts, this study attends to teacher-child relationship quality as a key social context that may play a key promoting or inhibiting role for Latinx children.

It is important to note that this social context often changes, as elementary school children typically experience different teachers each school year and therefore establish new relationships with teachers annually. As guided by attachment theory and long-term consequences of risk and protective factors (Masten & Gewirtz, 2006), it is expected that

student's prior relationships with teachers may continue to have a profound influence on the quality of future STRs and in turn, students' long-term school adjustment. For example, prior research has examined longitudinal trends in STRs using mean levels of closeness and conflict experienced over time and has examined trajectories characterized by increases/decreases in closeness and conflict across grade levels (Bosman et al., 2018; Ettekal & Shi, 2020; O'Connor et al., 2011; Spilt et al., 2012). More recent, but limited work has also examined fluctuations in the quality of STRs across school years (Lee & Bierman, 2018).

Integrating these perspectives suggests the need for work that 1) takes a person-centered approach, within-group focus on Latinx students and their teachers, and 2) examines longitudinal transition patterns of the stability and change of STRs, specifically closeness and conflict. This study contributes to this area of research by examining joint patterns (i.e., statuses) of closeness and conflict within a given year and the likelihood of remaining in a similarly defined status across time with a Latinx student population. Therefore, the current study used latent transition analysis (LTA) to examine the likelihood of students transitioning from one pattern of STR quality to a different pattern of STR quality or remaining in the same pattern of STR quality over the course of three years. For example, should a student's STR status with their teacher be characterized as Complicated (high closeness and high conflict) in first grade, this analysis allowed me to examine the probability of the same student remaining in a Complicated status or transitioning to a Reserved, Positive, or Negative status in second grade.

As guided by Rimm-Kaufman and Pianta's (2000) ecological perspective of school transitions, and Bronfenbrenner's (1979) ecological systems theory, STRs along with the classroom and school context are important for student development across time. A host of different student, family, and teacher factors, such as student gender and age, student behavior,

family background, teaching-efficacy, and teacher's years of experience, may influence student's developmental outcomes and their relationships. Whatever the cause, strategies for understanding both declines and fluctuations in STR quality are important (Lee & Bierman, 2018). As such, this study examined what child-level characteristics were associated with STR quality statuses between first to third grade, so as to identify those students most at-risk for experiencing potentially inhibiting educational environments.

Literature Review

Benefits of Student-Teacher Relationships

Close and supportive STRs have important impacts on student outcomes. STRs characterized by high closeness have been associated with improved student well-being and engagement, prosocial skills and behaviors, higher achievement scores, and closer peer relationships (Hamre & Pianta, 2001; McGrath & Van Bergen, 2015; Paes et al., 2021). Additionally, teachers' close and conflictual experiences with their students are predictive of teacher's general wellbeing and job satisfaction (Corbin et al., 2019; Milatz et al., 2015; Split et al., 2012). Relationships characterized by high conflict have been found to contribute to greater disciplinary infractions and low academic achievement, even when student behavior is accounted for (Hamre & Pianta, 2001). Furthermore, positive and caring STRs have been found to prevent student absenteeism, suspension, and school dropout (Joest & Fairchild, 2015). Even one close relationship between a student and their teacher may serve as a protective factor or be predictive of student outcomes for students who are at-risk (McGrath & Van Bergen, 2015). For example, Goldberg & Iruka (2022), found that on average, pre-K teachers had closer relationships with White boys than Latino boys, and when examined as a moderator, close STRs served as a promotive factor for Latino boys' teacher-reported language gains. In another study examining

Latinx English Learners (ELs), Banse & Palacios (2018) suggest that warmth and support from teachers can help children feel more welcomed in an environment where the language is less familiar. Moreover, studies conducted with both low-risk and at-risk populations have shown that STRs become moderately stable over time (Jerome et al., 2009) with some children experiencing considerable variability across different teachers and school years (O'Connor & McCartney, 2007). As such, having consecutive and multiple close relationships with teachers is optimal (Lee & Bierman, 2018; Martin & Collie, 2019).

Variability in Relationships Over Time

Most existing longitudinal STR quality research has been approached by examining normative (i.e., average or mean-level) developmental trends over time and examining heterogeneity (i.e., individual differences) in the developmental trajectories of STRs. Person-centered approaches have identified subgroups of children who show different trajectories of STRs over time (Jerome et al., 2009; O'Connor et al., 2011; O'Connor & McCartney, 2007; Spilt et al., 2012). In general, these studies find most children follow a stable positive trajectory of STR quality, with a minority of children following a stable poor or worsening STR quality, and other groups of children start low and improve over time or start high and decline over time. Although there is a lot to learn from growth curve models of student-teacher closeness and conflict, it is likely that individual children may vary in terms of the amount of change they experience in STR quality from year to year (Lee & Beirman, 2018). In attempts to understand the impact of year-to-year fluctuations in student teacher closeness and conflict on child aggression, Lee & Beirman (2018), used intra-individual standard deviations, and found detrimental effects of variability in student-teacher conflict (and for a subgroup of children, variability in student-teacher closeness) that children experienced year-to-year. Findings would

suggest the importance of understanding inconsistencies or discontinuities in children's support systems overtime, as they may negatively affect student outcomes. Furthermore, these person-centered studies suggest differences in developmental trajectories of closeness and conflict (increasing or decreasing) separately, that children experience overtime. Given that these dimensions of STRs are interrelated and it is possible that the same child could follow a trajectory pattern of stable poor conflict and stable positive closeness (or any other variation of trajectory patterns), examining person-centered longitudinal patterns of closeness and conflict together may illuminate varied STR trajectories important for understanding child adjustment.

Examining Within-Group Heterogeneity & Student-Teacher Relationships

Aside from student's ethnic/racial characteristics, other student characteristics, along with family, teacher, and school characteristics, may be associated with changes in STR quality in the early elementary period. The current study identified within-group differences among Latinx students by examining child and family demographics as a way of understanding which Latinx students seem to experience more negative/positive relationships with their teachers.

Research examining child and family level demographics and their association with STR quality, have revealed differing experiences in the quality of relationships that teachers and students develop. For example, teachers may have more positive relationships with female students and students from higher social class backgrounds (Hamre & Pianta, 2001; Jerome et al., 2008; Lu et al., 2022; O'Connor, 2010; Rudasil & Rimm-Kaufman, 2009; Silva, et al., 2011). This is particularly important among Latinx students trying to form strong STRs, as students from this population are, on average, more socioeconomically disadvantaged than their white counterparts (Fortuny et al. 2009). Moreover, a student's ability to communicate with their teacher in English, a barrier often experienced by immigrant and multilingual students, may also

impact student-teacher relationships. For example, Sullivan et al. (2015), suggests that teachers may have less close but also less conflictual relationships with ELs (compared to non-ELs) as language and cultural barriers may reduce the amount of interaction between students and teachers. Similarly, when examining immigrant populations, Cherng (2017), found that mathematics teachers (but not English teachers) had weak relationships with first and second generation Latinx students compared with third generation white students. Findings highlight that strong and positive relationships are not enjoyed by all ethnic/racial or generational backgrounds.

Given the variability of experiences that Latinx students encounter in and outside the school system, it is important to understand what characteristics of a child's social positioning are predictive of the relationship quality they develop with teachers. As such, the current study examined the variability in STR pattern membership by child/family demographic factors in order to explore within-group heterogeneity among Latinx students. These factors included: time varying demographics such as student's socioeconomic status (SES) and EL status; and time invariant demographics such as: student's gender, multilingual status, and immigration status.

Statuses and Transitions of Student-Teacher Relationship Quality

The LTA approach demonstrated in this paper is a longitudinal extension of latent profile analysis (LPA). LPA is a multivariate statistical model that is based on a measurement theory which posits that an underlying grouping variable (i.e., a latent profile variable) is not observed but can be inferred from a set of continuous indicators (Bauer & Steinley, 2020). Often the latent profiles are used to organize multiple dimensions of behavior, such that individuals in each latent profile share common behavior patterns (Laursen & Hoff, 2006). This person-centered approach lends itself well to the study of student-teacher relationship quality. Few studies have used

person-centered approaches, such as cluster analysis techniques to examine patterns of STRs (closeness and conflict) simultaneously from the teacher's perspective in early childhood. Using the student-teacher relationship scale (STRS), Pianta (1994), found six cluster groups: 'positively involved' (39%), 'functional average' (35%), 'dependent' (11%), 'angry/dependent' (3%), 'dysfunctional' (5%) and 'uninvolved' (7%). And later regroups them into two broad groups reflecting a generally positive relationship (positively involved, functional/average) and a generally difficult relationship (dependent, dysfunctional, angry, uninvolved). Gregoriadis & Grammatikopolous (2014), identified four cluster types of STRs based on Greek version of STRS: dysfunctional (15%), functional/average (15%), high on 'dependency' and 'closeness' and low on the 'conflict' (25%), positively involved (44%). Lastly, Vatou et al. (2020), also using the Greek version of STRS, found four types of STRs: secure attachment (20%), functional/average relationship (14%), ambivalent attachment (18%), and general attachment (48%). Identifying potential patterns of STRs could develop interventions to support children who do not experience school as a welcoming context (Murray & Greenberg, 2000). More research is needed in order to understand patterns of relationships and consider how they change over time.

Importantly, LPA can be extended to model longitudinal data, where transitions over time in latent profile membership are estimated, in a model called latent transition analysis (LTA). In LPA, latent profiles represent stable sets of characteristics or states of behavior. However, in LTA, individuals may change membership in latent profiles over time (Lanza et al., 2013). Thus, instead of using the term "latent profiles," we will use "latent statuses" to refer to the relationship subgroups, to reflect the fact that subgroup membership is not assumed to be stable over time (Collins & Lanza, 2010). The current study examined multivariate STR statuses and transitions

in relationship quality from first to third grade. The associations between student demographics STR status membership over time were explored. Examining the variability in status membership by student demographics will yield meaningful descriptive information related to the variability of STR quality experienced within the Latinx student population.

Current Study

The current study expands on prior research by focusing on the nature of student-teacher relationship quality among Latinx children, how relationship quality patterns change over time, and what factors influence these patterns from year-to-year. Although it is clear that STR quality typically declines across the school years (Jerome et al., 2009), and Latinx students are at greater risk for experiencing poorer-quality relationships, little is known about fluctuations in STRs from year-to-year using person-centered approaches. Furthermore, current person-centered trajectory studies (such as, Jerome et al., 2009; O'Connor et al., 2011; O'Connor & McCartney, 2007; Spilt et al., 2012) examine closeness and conflict separately, and suggest that some children experience increasing or decreasing student–teacher relationship quality over the course of elementary school. These approaches further support the positive-negative dichotomy of relationship quality types.

In the current study, I focused on identifying various patterns/statuses of student-teacher relationship quality (including atypical relationship types; McGrath & Van Bergen, 2017, 2019) and what relationship types/patterns are most and least likely to change over time. Although we have made great progress in understanding growth trajectories of STR quality, we have made less progress in understanding the meaningful variation within individual students across time (that cannot be accounted for by growth curves). Furthermore, the goal of the current study was to use longitudinal data to characterize student-teacher relationships among Latinx children,

explore how relationship quality differs by student demographics in first, second, and third grade. This issue is potentially important because some characteristics might be predictive of belonging to optimal relationship type statuses, whereas others might undermine belonging to optimal relationship type statuses. Such information may yield insight into the processes that sustain or counter positive student-teacher relationship quality and could guide future efforts to mitigate the likelihood of Latinx children experiencing poor quality relationships and in turn negative educational outcomes.

Methodology

Study & Sample

I used data from the ECLS-K:2011 general information Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K:2011; National Center for Education Statistics). The ECLS-K:2011 is a longitudinal study that followed a cohort of children from their Kindergarten year (fall 2010) through their elementary school years. During the kindergarten year, approximately 18,000 children from 970 schools participated. Data collected, included information from parents and teachers pertaining to student experiences, and their cognitive, socioemotional, and physical development (Tourangeau et al., 2015).

Analytic Sample

I conducted LTA using restricted data from first through third grade. This included approximately 4,590 Latinx students and 1,460 teachers (*N* rounded to the nearest tens place as required by the restricted data agreement). I identified Latinx students as those listed as Hispanic of any race, including those identified as multiracial. Children whose ethnicity identifier data were missing, were not included in the sample.

In first grade, fifty-one percent of the children in the sample were boys. About half of the sample (49%) were below the poverty threshold, and about 39% of the sample had at least one parent with some college education or more. A little less than half of the sample's primary home language was English (48%). Most teachers in the sample (68%) identified as white non-Hispanic, 22% identified as Latinx (race specified or unspecified), and 9% as another race or multiracial, non-Hispanic. About 49% of teachers held a master's degree or beyond, with 14.34 years of teaching experience, on average. See Table 1 for demographics on the student and teacher sample, and student-teacher closeness and conflict scores from first to third grade.

[INSERT TABLE 1 AROUND HERE]

Variables

Student-Teacher Relationship Quality as Indicators

Student-teacher relationships were measured based on reports from children's teachers during the first, second, and third grade wave (items were the same at each time point). The constructs assessed included Closeness and Conflict, as assessed by the Student-Teacher Relationship Scale (STRS; Pianta & Steinberg, 1992). Closeness reflects the degree of affection, warmth, and open communication that a teacher experiences with the student using the average rating of seven items. Conflict is a measure of the negative and conflictual aspects of the teacher's relationship with the student using the average rating of eight items. Each item was rated using a 5-point scale, ranging from "definitely does not apply" to "definitely applies." High Closeness scale scores indicate that the teacher perceived they had a close relationship with the child and high Conflict scale scores indicate that the teacher perceived his or her relationship with the child to be characterized by conflict. Cronbach's alpha reliability coefficient for the Closeness scale ranges from 0.86 to 0.89, and for the Conflict scale ranges from 0.88-0.90 from

first to third grade (Tourangeau et al., 2015). Teacher responses to individual items on the STRS were not available on the ECLS-K:2011 (due to copyright restrictions), and therefore reliability analyses were not conducted for the specific subsample in the current study. Considering these variables had skewed distributions, no more than 3% of a distribution's tail was winsorized in attempts to normalize their distribution. In the spring of first grade, average Closeness scores were 4.22 (SD= 0.68) and Conflict scores were 1.57 (SD= 0.70; as shown in Table 1). In the spring of second grade, average Closeness scores were 4.14 (SD= 0.69) and Conflict scores were 1.56 (SD= 0.69). And in the spring of third grade, average Closeness scores were 4.06 (SD= 0.74) and Conflict scores were 1.54 (SD= 0.69). It should be noted that participants in this sample dropout over time. In first grade, there are about 3,440 responses to the STRS, in second grade there are about 3,350 responses to the STRS, and in third grade there are about 3,210 responses to the STRS. There does not appear to be much of a trend in these marginal means across the three time points, except for a slight drop in closeness scores over time. However, there has been some attrition between Times 1 and 3, making it difficult to interpret this slight trend. Also, these averages provide no insight into individual-level trends over time in student-teacher relationship quality.

Heterogeneous Factors Associated with Status Membership

Student demographic characteristics were considered as predictors of student-teacher relationship statuses between first to third grade. Time invariant student demographic characteristics included gender (male/female), multilingual status (multilingual/non-multilingual), and child immigration status (born inside/outside of the US). Time-varying child and family, demographics included the child's EL status (EL-classified/non-EL) and SES (0= lives below the poverty threshold; 1= lives at or above the poverty threshold).

Analytic Strategy

Latent Transition Analysis

The current study sought to use latent transition analysis (LTA) to examine the following research questions: 1) what are statuses of student-teacher relationship quality among Latinx students; 2) what is the likelihood of transitioning from one status to another over time, from first to third grade? Three sets of parameters were estimated in LTA: 1) latent status membership prevalence, 2), transition probabilities, and 3) marginal predicted means of indicators. Specifically, I employed a mixture model in Mplus Version 8.8 (Muthén, & Muthén, 2017), and applied residual correlations over time (Asparouhov & Muthén, 2015), along with lag-2 modeling (Mplus, 2021). Including the residual associations eliminate spurious class/status formations that are due to residual indicator associations and including lag-2 modeling allows for a more direct correlation between time points 3 and 1. As such, I jointly modeled teacher ratings of closeness and conflict in Time 1 to ratings in Time 2, and ratings in Time 2 to ratings in Time 3. At the same time, I imposed measure invariance across indictors, allowed residual associations between status indicators across time (e.g., allowing first grade closeness scores to be associated with second grade closeness scores, and second grade closeness scores to be associated with third grade closeness scores) and allowed Time 1 (first grade) latent variables to be associated with Time 3 (third grade) latent variables. See Figure 2 for a visual representation of an LTA model with residual associations and lag-2 modeling.

[INSERT FIGURE 2 AROUND HERE]

This analysis yielded important information about the STR statuses in first, second, and third grades, as well as each transition point (i.e., first to second, second to third grades), and serves as the LTA model used for further analysis. I ran the model with 500 initial stage starts

and 50 final stage optimizations. In the process of model identification, I increased the number of statuses to optimize model fit (arriving at smaller Bayesian Information Criterion (BIC) and Akaike Information Criterion (AIC) values, and larger log-likelihood values), considered the interpretability and parsimony of the statuses (as determined by the marginal predicted means of the closeness and conflict ratings within a single status), and examined latent status membership proportions, to identify the best-fitting model (Bauer & Steinley, 2020; Collins & Lanza, 2010, L. Muthén, personal communication, June 15, 2022). Additionally, I consider findings from a preliminary step of examining model fit for latent profiles of student-teacher relationships at each point individually (as suggested by Lanza & Bray, 2021; see Appendix). This preliminary step of performing latent profile analysis at each individual time point had a profile characterized by low closeness and low conflict appears in both second and third grade. This type of pattern does not reappear until the 5-status LTA model.

These preliminary latent profile analysis results, information criterion values, and parsimony of the statuses, indicated that the best fit model for our analytic purposes was a five-status model. See Table 4 in the Appendix for a comparison of model fit for a regular LTA, and Table 2 for an LTA with residual associations and lag-2 modeling. After selecting the best-fitting model for identification of latent statues, I examined transition probabilities between the early elementary grades, as provided by the model results.

[INSERT TABLE 2 AROUND HERE]

Missing data. On latent status indicators of closeness and conflict in first and second grade, 25.12% of observations were incomplete. In third grade, 30.02% of closeness scores, and 29.91% of conflict scores were incomplete. The latent status classification model handles missing data using maximum likelihood with robust standard errors using a numerical integration

algorithm which allows for greater use of observations (Mplus, 2017). Individuals missing with data on all indicators were dropped from the analysis.

Exploring Child Factors Associated with Status Membership

The LTA was the foundation upon which I examined the third research question: What individual child factors are associated with belonging to different statuses across time? Specifically, I explored the heterogeneity of the STR statuses (i.e., status membership: first, second, third grades) by using multinomial logistic regression to examine the extent to which status membership at each time point varies by child demographic factors. As determined by the LTA results, each Latinx student was assigned to a single status at each time point. For example, Student A belonged to the Complicated Status in first grade, and then to the Positive Status in second and third grade. This information (i.e., status membership) for each student (N=3880) was pulled into the dataset and then used for a descriptive exploration of variability in status membership by child demographic factors. Using Stata 14 (StataCorp, 2015), I employed the mlogit command to examine the extent to which status membership was associated with child demographics, with the Positive status serving as the reference group. Additionally, comparisons between the other statuses were also examined. It should be noted that each time invariant factor was modeled individually, and time-varying factors were modeled jointly at each time point. For example, when examining student gender in second grade, the model only contained the categorical variable for status membership at Time 2 and the dichotomous variable for student gender. When examining student EL status in second grade, the model contained the categorical variable for status membership at Time 2, and both the Time 1 and Time 2 EL status identifier, as EL status at Time 2 is known to be correlated with EL status in Time 1.

Missing data. Among those assigned to STR statuses (*N*=3880), I present the percentage of missing for each child demographic factor. On the variable indicative of gender, 0.2% of observations were incomplete. On multilingual status, 7.6% of observations were incomplete, and on immigration status, 6.8% of observations were incomplete. On EL status in first, second, and third grade, 53.6%, 54.7%, and 56.3% of observations were incomplete, respectively. On poverty status in first, second, and third grade, 20.6%, 22.0%, and 30.0% were incomplete, respectively.

Results

What are the Statuses of Student-Teacher Relationship Quality among Latinx Students?

The first aim of the study was to determine the patterns of student-teacher relationship quality for Latinx students from first to third grade using LTA. I found five statuses: (1) Positive, (2) Functional Average, (3) Reserved, (4) Complicated, and (5) Negative. See Table 3 for marginal predicted means of indicators for each status. See Figure 3 for a graph of mean indicator levels across statuses, and Figure 4 for the standardized version, both with Time 1 indicator means as reference points.

[INSERT TABLE 3 & FIGURES 3 & 4 AROUND HERE]

Status 1- *Positive*. The *Positive* status consisted of 59%, 57%, and 57% of the sample, at Time 1, 2, and 3, respectively. This group of students were rated the highest above average (about half a standard deviation) on student-teacher closeness, and they were rated the lowest below average (over half a standard deviation) on conflict. Average closeness scores were 4.47 and average conflict scores were 1.15, indicating high closeness and low conflict.

Status 2- *Functional Average*. The *Functional Average* status consisted of 18%, 18%, and 14% of the sample, at Time 1, 2, and 3, respectively. This group of students were rated the

slightly below average (0.25 standard deviations) on student-teacher closeness, and they were

rated the slightly above average (0.49 standard deviations) on conflict. Average closeness scores

were 4.05 and average conflict scores were 1.91, indicating relatively high closeness (but not as

high as the average closeness for those in the Positive status) and relatively low conflict (but not

as low as the average conflict ratings for those in the Positive status).

Status 3- *Reserved.* The *Reserved* status consisted of 8%, 11%, and 14% of the sample,

at Time 1, 2, and 3, respectively. This group of students were rated the lowest below average

(over 1.5 standard deviations) on student-teacher closeness, and they were rated below average

(0.39 standard deviations) on conflict. Average closeness scores were 3.17 and average conflict

scores were 1.30, indicating low closeness and low conflict.

Status 4- *Complicated.* The *Complicated* status consisted of 9%, 8%, and 8% of the

sample, at Time 1, 2, and 3, respectively. This group of students were rated the below average

(0.66 standard deviations) on student-teacher closeness, and they were rated the above average

(about 1.5 standard deviations) on conflict. Average closeness scores were 3.77 and average

conflict scores were 2.61, indicating relatively average closeness and high conflict.

Status 5- *Negative.* The last status, *Negative* status consisted of 6%, 7%, and 6% of the

sample, at Time 1, 2, and 3, respectively. This group of students were rated the below average

(0.87 standard deviations) on student-teacher closeness, and they were rated the highest above

average (over 2.5 standard deviations) on conflict. Average closeness scores were 3.63 and

average conflict scores were 3.47, indicating low closeness and high conflict.

What is the Likelihood of Transitioning Between Statuses from First to Third Grade?

The second aim of the study was to determine the transition probabilities of student-

teacher relationship quality for Latinx students from first to third grade using LTA. Transition

probabilities express how change occurs between latent statuses over time (Bauer & Steinley, 2020). See Table 3 for transition probabilities for student-teacher relationship quality across first to third grade. For each transition probability row, the five probabilities sum to 1, with room for rounding errors. The diagonal elements of each transition probability matrix reflect the probability of membership in the same latent status at two consecutive times of measurement. Off-diagonal elements represent the probability of transitioning from one latent status at the earlier time to a different latent status one grade later. Additionally, see Figure 5 for a Sankey plot depicting the proportion of students belonging to each status in first, second, and third grade, and the proportion of students transitioning from a single status at one time point to another status at a later time point.

<center>[INSERT FIGURE 5 AROUND HERE]</center>

Transition Probabilities

For Latinx students in the Positive status at time 1 (first grade), the probability is .72 to stay in the Positive status, .14 to transition to the Functional Average status, .10 to transition to the Reserved status, .04 to transition to the Complicated status, and .02 to transition to the Negative status at time 2 (second grade). For students in the Functional Average status at time 1 (first grade), the probability is .44 to transition to the Positive status, .28 to stay in the Functional Average status, .10 to transition to the Reserved status, .10 to transition to the Complicated status, and .08 to transition to the Negative status at time 2 (second grade). For students in the Reserved status, the probability is .33 to transition to the Positive status, .15 to transition to the Functional Average status, .41 to stay in the Reserved status, .07 to transition to the Complicated status, and .04 to transition to the Negative status in second grade. For Latinx students in the Complicated status, the probability is .35 to transition to the Positive status, .23 to transition to

the Functional Average status, .03 to transition to the Reserved status, .18 to stay in the

Complicated status, and .21 to transition to the Negative status at time 2. For students in the

Negative status, the probability is .10 to transition to the Positive status, .29 to transition to the

Functional Average status, .04 to transition to the Reserved status, .22 to transition to the

Complicated status, and .35 to stay in the Negative status at time 2 (second grade).

For Latinx students in the Positive status at time 2 (second grade), the probability is .72 to

stay in the Positive status, .10 to transition to the Functional Average status, .12 to transition to

the Reserved status, .04 to transition to the Complicated status, and .02 to transition to the

Negative status at time 3 (third grade). For students in the Functional Average status at time 2,

the probability is .49 to transition to the Positive status, .21 to stay in the Functional Average

status, .11 to transition to the Reserved status, .13 to transition to the Complicated status, and .06

to transition to the Negative status in third grade. For students in the Reserved status, the

probability is .40 to transition to the Positive status, .14 to transition to the Functional Average

status, .39 to stay in the Reserved status, .06 to transition to the Complicated status, and .01 to

transition to the Negative status in third grade. For Latinx students in the Complicated status, the

probability is .23 to transition to the Positive status, .23 to transition to the Functional Average

status, .14 to transition to the Reserved status, .17 to stay in the Complicated status, and .24 to

transition to the Negative status at time 3. For students in the Negative status in second grade, the

probability is .19 to transition to the Positive status, .20 to transition to the Functional Average

status, .05 to transition to the Reserved status, .25 to transition to the Complicated status, and .32

to stay in the Negative status at time 3 (third grade).

It would appear that those who start off in the Positive status at both Time 1 and 2, are

most likely to transition to or remain in a status characterized by low conflict (i.e., Positive,

Functional/Average, or Reserved). However, it would appear that there is considerable variability over time in the status characteristics related to closeness, with a potential decline in closeness over time. This is seen when examining those who belong to the Functional Average status at Time 2 showing an increased likelihood of transitioning to the Complicated status at the following time point, compared to those who start in the same status at Time 1. This is also seen when examining those who start in the Complicated status at Time 1 having a high likelihood of transitioning to the Positive status in Time 2 (.35), but then that likelihood diminishing (.23) when examining the same transition pattern from Time 2 to Time 3.

Status Stability

Belonging to and remaining in the Positive status across all three years was the most common transition pattern for students, compared to starting in and remaining in any other status. For Latinx students in this sample, about 38.5% of students who started in the Positive status in first grade, remained in the Positive status throughout second and third grade. For those who started in the Functional Average status in first grade, only about 1.1% of students remained in the Functional Average across second and then third grade. For those who started in the Reserved status in first grade, only about 1.8% of students remained in the Reserved status across second and then third grade. For those who started in the Complicated status in first grade, only about 0.2% of students remained in the Complicated status across second and then third grade. And for those who started in the Negative status in first grade, only about 2.1% of students remained in the Negative status across second and then third grade. As such, it is clear many students who start in the Positive status remain in the Positive status throughout the elementary grades. Furthermore, about 43.6% of students experience the same STR status from first to third grade, with over 55% of Latinx students likely to transition between statuses across

the grades. As such, it is evident that Latinx students experience various patterns of fluctuations in closeness and conflict with teachers over time.

What Factors are Associated with Status Membership Across Time?

The third aim of the study was to examine what student-level factors predict Latinx student's membership in a given STR status in first, second, and third grade. See Table 4 for odds ratio results for how heterogeneous factors predict status membership in first, second, and third grade. See Table 4 for relative risk ratios of each child demographic factor associated with status membership in first, second, and third grade.

[INSERT TABLE 4 AROUND HERE]

When examining to what extent status membership at each time point was associated with child demographic factors, most time invariant factors were significantly associated with status membership, with the Positive status serving as the comparison status. Few time-varying factors were significantly associated with another status membership in relation to the Positive status. I present those either positively or negatively significantly associated.

Across all grades, boys compared to girls were two to three times more likely to be in any of the other latent statuses (i.e., Functional/Average, Reserved, Complicated, or Negative) in relation to the Positive status, and significantly so. In Time 1: RRR_{FA}= 1.83 (p< .001), RRR_R= 1.85, (p< .001), RRR_C= 2.44 (p< .001), and RRR_N= 3.08 (p< .001); in Time 2: RRR_{FA}= 1.88 (p< .001), RRR_R= 1.89, (p< .001), RRR_C= 2.85 (p< .001), and RRR_N= 3.39 (p< .001); and in Time 3: RRR_{FA}= 2.15 (p< .001), RRR_R= 1.78, (p< .001), RRR_C= 2.83 (p< .001), and RRR_N= 3.15 (p< .001). Similarly, across all grades, students who were multilingual compared to those who were monolingual, were two times more likely to be in the Reserved status relative to the Positive status, having the relative risk expected to increase by a factor of 1.69 (p< .001), 1.79 (p< .001),

and 1.56 ($p< .001$), in first, second, and third grade respectively. At the same time, across all grades, students who were multilingual compared to those who were monolingual, the relative risk of being in the Negative status relative to the Positive status would be expected to decrease by a factor of 0.49 ($p< .001$), 0.58 ($p< .001$), and 0.49 ($p< .001$), in first, second, and third grade respectively. Only in first grade were multilingual students compared to monolingual students less likely to be in the Complicated status relative to the Positive status ($RRR= 0.72$, $p< .01$). And only in second grade were immigrant students compared to non-immigrant students less likely to be in the Complicated status relative to the Positive status ($RRR= 0.23$, $p< .05$).

In Time 1, for those students who were labeled ELs in first grade compared to those not labeled as ELs in first grade, the relative risk of being in the Functional Average status relative to the Positive status would be expected to increase by a factor of 1.53 ($p< .01$). And in Time 3, those labeled as ELs in third grade compared to those not labeled as ELs in third grade, were more likely to be in the Reserved status relative to the Positive status ($RRR= 1.58$, $p< .05$). In Time 1, for those students living in poverty in first grade compared to those not in poverty in first grade, the relative risk of being in the Reserved status relative to the Positive status would be expected to increase by a factor of 1.98 ($p< .001$). Similarly, those students living in poverty in first grade compared to those not in poverty in first grade, were more likely to be in the Reserved status relative to the Positive status in Time 2 ($RRR= 1.54$, $p< .05$). Also, in Time 2, those students living in poverty in second grade compared to those not in poverty in second grade, were more likely to be in the Complicated status relative to the Positive status ($RRR= 1.72$, $p< .05$). In Time 3, for students living in poverty in first grade compared to those not in poverty in first grade, the relative risk of being in the Complicated status relative to the Positive status would be expected to decrease by a factor of 0.62 ($p< .05$). And, those in poverty in

second grade compared to those not in poverty in second grade, were more likely to be in the

Reserved status relative to the Positive status in Time 3 (*RRR*= 1.65, *p*< .05).

Discussion

The main purpose of the present study was to identify underlying patterns of student-

teacher relationships among Latinx students across time (first to third grade), the likelihood of

transitioning between patterns across time, and to examine the how various child demographic

factors were associated with belonging to any given pattern over time. Three key findings were

evident. First, five STR statuses were identified among Latinx students and their teachers—

Positive, Functional Average, Reserved, Complicated, and Negative. Second, there is

considerable variability in the likelihood of remaining in or transitioning to another STR status

across the early elementary period. Third, descriptive exploration of the variability of STR status

membership by child demographics provided a deeper understanding of which Latinx students

are most vulnerable to belonging to a relationship characterized by high conflict and/or low

closeness. The current findings suggest future research broaden it's understanding of student-

teacher closeness and conflict and to consider relationship patterns such as *Functional Average,*

Reserved, and *Complicated.* This examination of closeness and conflict jointly over time, is

particularly meaningful for identifying and examining associations of these patterns with future

developmental outcomes.

Identifying Student-Teacher Relationship Statuses Across First to Third Grade

This study is one of the few to consider atypical STR quality types and move beyond the

positive-negative relationship dichotomy (McGrath & Van Bergen, 2017; 2019). This study

explored within-group differences in the STR quality that Latinx students experience from first

to third grade. Results from this study provide further support for considering student's ratings of

closeness and conflict simultaneously across the early elementary period. Five distinct latent

statuses were enumerated: *Positive, Functional Average, Reserved, Complicated, and Negative*.

These five statuses offer a deeper understanding and depiction of the various relationship quality

patterns Latinx students and their teachers experience across the early elementary period. Given

the importance of high closeness and low conflict for children's positive adjustment and

outcomes, it is necessary to understand 'atypical' STR patterns (not just Positive and Negative

types) and how they may differentially impact child development across time, especially as they

may describe and impact the education environment that CLM students are exposed to.

It is promising that over half of Latinx students in this sample were likely to fall in the

Positive status across first through third grade regardless of prior year's STR quality (59%, 57%,

and 57%, respectively), despite this population, on average, typically experiencing lower quality

relationships with their teachers compared to their white counterparts (Goldberg & Iruka, 2021).

This was the most prevalent latent status at each time point, with the Negative status as the

smallest latent status at each time point, accounting for 6%, 7%, and 6% of the sample in first,

second, and third grade, respectively. It is evident that over a third of the sample (at each time

point) fall outside of the positive-negative dichotomy. Across all time points, the Functional

Average status is the second largest status, and at Time 3 it is similar in size/prevalence with the

Reserved status. However, the Reserved status was the second to last smallest status in Time 1,

and the third to last smallest status at Time 2. In Time 1, the Complicated status was the third

largest status, and then the second to last smallest status at both Times 2 and 3.

Noting the prevalence of these atypical STR patterns, highlights the need for teachers and

researchers to broaden discussions around STR quality, as these various patterns may

differentially impact student adjustment and outcomes. Despite students benefiting strongly from

relational closeness, students in the Functional Average or Complicated STR statuses may still require added supports to improve their prosocial behavior and reduce aggression. At the same time, given that closeness may be less stable than conflict (Lee & Bierman, 2018), students in the Complicated status may not experience the benefits of close relationships with other teachers over time. As such, it is important that teachers do not overlook including these students in behavior supports, despite their own feelings of closeness toward the student. Furthermore, students who experience a Reserved STR quality may be particularly vulnerable to negative academic and socioemotional outcomes. These students who experience low closeness and low conflict may receive less attention, time, and support from teachers, compared to students in other STR statuses. Although the STR quality they experience may not be conflictual, lack of closeness may indicate difficulties with social interactions. To ensure the development of close and supportive relationships with teachers and peers, such students must be identified and supported. It is possible that such relationship quality patterns are not similarly defined or prevalent among other populations or ethnic-racial backgrounds. As such, it is vital to identify common STR types that Latinx students experience, so as to better understand the various promoting and inhibiting environments that Latinx students experience. We can then investigate the likelihood of remaining in a given status over time and what factors are associated with children's status membership and transition probabilities.

Stability & Change of Student-Teacher Relationship Quality from First to Third Grade

To my knowledge, this is the first study to examine the patterns of closeness and conflict jointly over time and the likelihood of remaining in and moving between statuses over time. Understanding the stability and change of STRs over time is important as students establish new relationships with teachers annually and may not continuously experience a similar relationship

quality with future teachers (O'Connor & McCartney, 2007). However, past teachers can inform and influence future teachers' perceptions of students through notes and comments in report cards, and other forms of communication. This study illuminates the potential influence STRs at an earlier time may have on the quality of future STRs for Latinx students, and in turn, may guide future research for examining how fluctuations (or lack thereof) in STRs impact Latinx students' long-term socioemotional and academic adjustment.

Although the latent status prevalences are very similar at Time 1, 2, and 3, there is considerable movement between latent statuses, between Time 1 and Time 2 and Time 2 and Time 3. Similar to prior longitudinal research on a predominantly white sample of children from preschool to third grade (O'Connor & McCartney, 2007), Latinx students experience considerable variability in STR quality across different teachers from first to third grade. Less than half of the sample (43.6%) remained in the same status across all three grades, showing that many Latinx students (56.4%) experience fluctuations in STR quality from first to third grade. However, for students who did experience stability in status membership across each grade level, they were most likely to experience a Positive relationship with their teachers, as 38.5% of the entire sample belonged to and remained in the Positive status across all three years. Given that experiencing consecutive and multiple close relationships with teachers is optimal (Lee & Bierman, 2018; Martin & Collie, 2019), it is promising that belonging to and remaining in the Positive status across each time point was the most common transition pattern amongst Latinx students in the sample. These findings are important for future research to consider when examining how STR quality patterns are associated with students' socioemotional and academic development, as STR stability over time may act a protective mechanism for Latinx students in less optimal school conditions. Furthermore, the high proportion of stability for students in the

Positive status is particularly promising when there is such a large probability that Latinx students in all other statuses transition to the Positive status at a later time point.

Overall, for those students starting in the Positive, Reserved, or Negative status at a single time point had the highest likelihood to remain in the same status at the following time point. This in general shows great stability in transitioning between first to second grade, and from second to third grade. However, for those starting in any atypical STR pattern at a single time point, they had a high, if not the highest, likelihood of transitioning to the Positive status at the following time point. As such, many Latinx students have a high potential of moving to the most optimal status, regardless of not consistently experiencing a Positive relationship across all three years. And for those belonging to the Complicated status at either Time 1 or Time 2, they had a larger likelihood of transitioning not only to the Positive status but also to the Functional Average or Negative Status, compared to remaining in the Complicated status at Time 2 or Time 3. Therefore, belonging to an atypical pattern at a single time point showed an increased likelihood of transitioning to other statuses in the following time point, thus showing greater change in status membership for these students in the early elementary period. As such, it is vital that researchers and teachers be mindful of the variability in STRs that these Latinx students experience as we begin to further understand the impact of inconsistencies or discontinuities in children's support systems overtime, especially as related to long-term student outcomes (Lee & Bierman, 2018).

Looking more closely, for those in the Positive latent status at Time 1 who changed latent statuses were most likely to transition to the Functional Average status (14%) or the Reserved status (10%) but were most likely to remain in the Positive status (72%). Similarly, in Time 2, those in the Positive latent status were most likely to remain in the Positive status in Time 3, and

most likely to transition to the Reserved status (12%) or Functional Average status (10%). This suggests that membership in the Positive latent status may be associated with continued low conflict across the years, but there may be a greater tendency for closeness to decline over time (Lee & Bierman, 2018). Given that having consecutive and multiple close relationships with teachers is optimal (Lee & Bierman, 2018; Martin & Collie, 2019), it is important to examine what factors may influence the likelihood belonging to, and in turn transitioning to, statuses high in closeness over time.

For those in the Functional Average status, below average closeness and above average conflict, at Time 1 had the highest probability of transitioning to the Positive status (44%), followed by a 28% chance of remaining in the same status, and 10% chance of transitioning to either the Reserved or Complicated status. At Time 2, those in the Functional Average status had the highest probability of transitioning to the Positive status (49%), followed by remaining in the same status (21%), and transitioning to the Complicated status (13%). It is notable, that students in the Functional Average statuses at both time 1 and 2 are most likely to transition to STRs characterized by high closeness and low conflict. It is important to determine if there are characteristics of the child, teacher, classroom, and student environment that relate to these transitions to more favorable STRs.

In contrast, students in the Reserved status, lower than average closeness and conflict, at Time 1, were most likely (44%) to remain in the same status at Time 2, followed by transitioning to the Positive status (33%) and then the Functional Average status (15%) at Time 2. In Time 2, students in the Reserved status seemed to have a similar likelihood of transitioning into a Positive status (40%) as they did to remaining in the Reserved (39%) status at Time 3. This pattern suggests that over time students who start off in the Reserved status will continue to

experience lower than average conflict but fluctuate in the access that they have to relationships characterized by higher degrees of closeness.

There was considerable variability in the likelihood of transitioning to other statuses for students in the Complicated status, average closeness and higher conflict, at both time points. Students in the Complicated status had the highest probability of transitioning to the Positive latent status from Time 1 to Time 2 (35%), and to the Negative latent status from Time 2 to Time 3 (24%). Those in the Complicated status at Time 1, had a 23% and 21% chance of transitioning to the Functional Average or Negative status, respectively, at Time 2. The probability was .23 and .23 for transitioning to the Positive and Functional Average status from Time 2 to Time 3. In general, students in this status in first grade, had a high likelihood (58%) of transitioning to a more optimal status (i.e., Positive or Functional Average status) in second grade. However, students who were in the Complicated status at Time 2, had a higher likelihood (55%) of experiencing a less optimal status (i.e., Reserved, Complicated, or Negative) at Time 3. These findings suggest the importance of the STR transition from first to second grade in establishing positive patterns between students and their teachers, as it seems that shifting away from STRs characterized by challenging patterns of closeness and conflict is increasingly difficult over time. Although I did not examine patterns beyond third grade, future research needs to consider the extent to which these statuses are malleable in the later grades, as it is especially concerning that by second grade students in the Complicated status may have a difficult time accessing STRs characterized by high closeness and low conflict.

Similar concerns exist for those in the Negative status at both Time 1 and 2, it was most probable that they remain in the Negative status the following year (35% and 32% at Times 2 and 3, respectively). In Time 1, those in the Negative status were most likely to transition to the

Functional Average status (29%) or the Complicated status (22%) at Time 2. In Time 2, those in

the Negative status were most likely to transition to the Complicated status (25%) or the

Functional Average status (20%) at Time 3. It is notable that of all students who transition to the

Positive status in time 2 or time 3, those in the Negative status appear to have the lowest

likelihood of experiencing this Positive status. Although there is a possibility of moving to one of

statuses characterized by some degree of closeness, they remain most likely to experience some

degree of conflict. It is especially important to understand the intrapersonal, interpersonal, and

contextual factors that account for the limited opportunity for positive STRs in this group.

Demographics Associated with STR Statuses

To my knowledge, this is the first study to examine what child/family factors were

associated with closeness and conflict latent statuses in the early elementary period.

Understanding what heterogenous factors are associated with STR status membership over time

is important for identifying children most vulnerable to STRs characterized by high conflict or

low closeness. This is especially meaningful as students change teachers, classrooms, and even

schools over time, and help further our understanding of which child demographic factors may

position Latinx children to experience less optimal STRs in the early grades. Identifying these

social positioning factors related to poor STR patterns may allow schools and teachers to be

cognizant of the biases they hold that may compound the effects of ethnic-racial biases toward

Latinx students and creating optimal STRs. Similarly, identifying child characteristics indicative

of status membership allows for the identification of those students most in need of added

supports for future socioemotional and academic adjustment.

Across all time points gender was significantly associated with status membership for

every status relative to the Positive status. This meant that Latino boys were significantly more

likely than Latina girls to belong to any of the less optimal statuses relative to the most optimal status (i.e., Positive). This finding is consistent with prior research suggesting that teachers may have more positive relationships with female students (Hamre & Pianta, 2001; Jerome et al., 2008). It would appear that Latino boys are systematically disadvantaged compared to Latina girls, having a greater likelihood of experiencing lower quality STRs. Although unclear why, prior research on Latinx populations have also found that despite being raised in similar sociocultural and socioeconomic environments, Latina girls tend to score higher than Latino boys in expressive vocabulary, social skills, and sustained attention (Cabrera & Hennigar, 2019). Regardless of these differences are driven by teachers' gendered biases or are related to poor socioemotional skills inherent to boys in this sample, it is vital that the vulnerabilities experienced by Latino boys be identified. Latino boys' gender and ethnicity may doubly position them to experience discrimination and/or racism in educational spaces, to which educators may be made aware of and combat to dispel biases that curate inhibiting educational environments.

At the same time, Latinx children's multilingual status also showed to be a significant predictor of status membership at each time point. In first, second, and third grade, multilingual Latinx students compared to monolingual students were more likely to belong to the Reserved (characterized by low closeness and low conflict) status relative to the Positive status (characterized by high closeness and low conflict). Findings would suggest that multilingual students have a greater likelihood of belonging to a STR status in which children experience non-conflictual yet non-close relationships with their teachers. Given concerns related to belonging to the Reserved status (i.e., the potential to receive less attention, time, and support from teachers, compared to students in other STR statuses), there is a need for educators to be cognizant of and intentional about building more close and meaningful relationships with

multilingual their students. Further research toward understanding why multilingual students are more likely to belong to such a STR status is also needed, as this may be related to teachers' understanding of working with or ability to identify positive socialization processes among ethnically and linguistically minoritized students (Nieto, 2010). Furthermore, across all grades, Latinx multilingual students were less likely to belong to the least optimal status characterized by high conflict and low closeness (i.e., Negative) relative to the Positive status (characterized by high closeness and low conflict). And in first grade, multilingual students were less likely to be in the Complicated status (characterized by high closeness and high conflict) relative to the Positive status. The same was found for immigrant students in first grade, as they were less likely to be in the Complicated status relative to the Positive status. However, this finding is less clear or consistent for students who are immigrants, possibly due to such a low number of immigrant students in the final sample (3%). Although this may seem contradictory to the previously stated findings, it is possible that within inhibiting environments such as those characterized by high conflict (i.e., Negative status), a child's multilingualism or biculturalism may act as a protective mechanism. This is promising as we consider the benefits of children's biculturalism to be supportive of students' socioemotional processes and development.

Lastly, time-varying child-level factors showed few and inconsistent significant differences between status membership. EL-classified students in first grade compared to non-EL classified students, had a higher likelihood of belonging to the Functional Average status relative to the Positive status in first grade. And EL-classified students in third grade compared to non-EL classified students, had a higher likelihood of belonging to the Reserved status relative to the Positive status in third grade. This may suggest the possibility of EL students being more likely to experience less close STRs, especially given similar trends occuring for other comparisons.

However, I did not find the prior year EL classification to be associated with future year latent status membership, suggesting that findings are heavily time dependent. As such, these differences in STR status membership occuring for EL and non-EL students may depend on current grade-level teacher/classroom conditions as opposed to children's early language learning. Furthermore, children in poverty in first grade appeared to have a higher likelihood of belonging to the Reserved (characterized by low closeness and low conflict) status in both Time 1 and Time 2 than the Positive status. Additionally, children in poverty in second grade had a higher likelihood of belonging to the Complicated status (characterized by high closeness and high conflict) then the Positive status in Time 2 and the Reserved status than the Positive status in Time 3. Findings are consistent with prior research suggesting that teachers may have fewer positive relationships (high closeness and low conflict) with students from lower social class backgrounds (Silva, et al., 2011). However, given the inconsistent impacts of poverty by status membership, it is possible that these differences are highly dependent on current teachers' perspectives rather than the child's social positioning of living in poverty. Fortunately, this social positioning is capable of changing, as are the teachers a child experiences throughout schooling.

Limitations

This study makes an important contribution to our understanding of STRs by 1) employing a person-centered approach that considers patterns closeness and conflict jointly over time, 2) expanding our understanding of how students transition between patterns/statuses over the early elementary period, 3) exploring factors associated with of STR statuses from first to third grade, and 4) taking a within-group approach to exploring there processes specifically with Latinx students. However, there are several important limitations to consider. The analysis used only teacher-reports of closeness and conflict. The assessment of student-teacher relationship

quality did not consider the students' perspectives, nor did it incorporate third-party observations of classroom interactional dynamics. There is evidence to suggest that both of these factors are important and need to be considered in future research in this area (Gregoriadis & Grammatikopolous, 2014). In particular, student perspectives may offer seemingly different perspectives on relational quality, which is particularly important as what constitutes a positive relationship may be different among students from different cultural and linguistic backgrounds. Furthermore, teacher ratings of close and conflict are highly skewed to the right and left respectively. However, research validating observational measures suggest that there is often more variability along important dimensions than teachers report (Newfield, 1980). Thus, we are limited in capturing the potentially different views and experiences that Latinx students in the early elementary period have. Nonetheless, I argue that understanding teachers' perspectives on STRs is important, as they are a critical part of the student-teacher dyad and prior work suggests a fair degree of concordance between teacher and children's perceptions of their relational quality in the early grades (Birch, 1997).

Additionally, the STR status and transitions found in this study only speak to the Latinx population as a whole. Given differences found between Latino boys and Latina girls, future research should examine the prevalence of statuses among the two groups, as some statuses may be more pronounced amongst boys compared to girls and thus a smaller status model may fit the sample of Latina girls better. Furthermore, similar or different patterns, or more or less patterns could be prevalent among other ethnic-racial backgrounds. As such, future research is needed to assess similarities and the novelty in Latinx children's STR patterns from first to third grade, as compared to children from other ethnic-racial backgrounds.

Implications and Future Directions

The current study sought to use LTA to investigate the statuses of relational quality among Latinx students and their teachers from first to third grade and the likelihood of transitioning between status over time. Given that STR quality may be a key protective mechanism for Latinx students' future socioemotional and academic development, and the importance of taking a within-group approach among CLM student populations, this study also sought to examine how various factors were associated with belonging to STR statuses and transitions. Specifically, this study focused on three research questions: 1) what are statuses (i.e., patterns) of student-teacher relationship quality among Latinx students; 2) what is the likelihood of transitioning from one status to another over time, from first to third grade; 3) what child demographic factors are associated with belonging to different statuses across time?

I identified five (*Positive, Functional Average, Reserved, Complicated, and Negative*) STR quality statuses experienced by Latinx students and their teachers. I also found that there was considerable variability in the likelihood of remaining in or transitioning to another STR status across the early elementary period. Specifically, those who started out in a more optimal status (i.e., Positive and Functional Average) at either time point were most likely to remain in a status characterized by low conflict over time. In contrast, those who started in statuses characterized by high conflict (i.e., Negative and Complicated) at either time point, were most likely to remain in a status characterized by conflict. These findings support evidence of prior research suggesting conflict is relatively stable over time and closeness is less so (Lee & Bierman, 2018). However, identification of atypical STR patterns (i.e., Reserved and Complicated) and their transitions from first to third grade would suggest that these children will experience considerable variability in their access to statuses characterized by high closeness over the early elementary period. Thus, these findings illustrate which Latinx students (as

defined by their STR statuses) are most vulnerable to experiencing inhibiting educational environments (those characterized by low closeness and/or high conflict). Understanding the different experiences of Latinx children in various STR quality patterns, along with the impact of experiencing stability of fluctuations in STR quality over time is essential for future research to examine. Furthermore, identifying Latinx children in the classroom most likely to experience less optimal patterns (as these are most indicative of experiencing unstable STR qualities over time), may benefit educators, so as to be able to tailor and provide more attention or behavioral services toward supporting student's socialization processes. These interventions/services can be further tailored not only to students' STR status pattern, but also toward their demographic characteristics, as children's demographic characteristics may be indicative of belonging to less optimal STR patterns.

Lastly, descriptive exploration of the variability in status membership by child demographic factors revealed characteristics of Latinx children most vulnerable to experiencing less optimal relationships. In examining heterogenous factors, findings on boys increased likelihood of belonging to less optimal statuses would align with the integrative model (Garcia Coll et al., 1996) that would suggest that one's social position may set the stage for the environment that the child likely experiences. However, other factors such as Latinx student's multilingualism may act as an adaptive culture, protective of belonging to statuses characterized by conflict. This would highlight the need to continue to foster and promote student's bilingualism and biculturalism. However, at the same time, multilingualism may not be protective or supportive of belonging to a status characterized by lower closeness. As such, it is important to further understand why multilingualism is associated with an increased risk of being in a status characterized by low closeness and low conflict. More research on teacher's

perceptions related to children's socialization processes and children from culturally and linguistically minoritized populations in needed. Additionally, more research on teacher training and preparedness for working with CLM populations, and its association with student-teacher closeness and conflict is needed. By doing so, we may further disentangle and understand how a child's social positioning may be associated with Latinx student's STR status membership. By taking a within-group approach of Latinx students and their relationships with their teachers, this study contributes to a deeper understanding of the educational environment teachers create for students. Furthermore, this research highlights important factors related to student's realties, which may highlight important points of intervention for improving Latinx student's classroom experiences over time.

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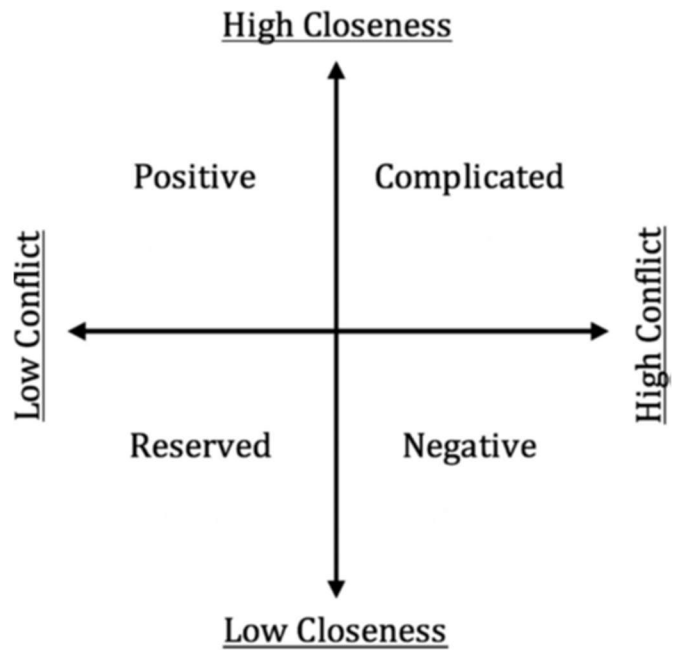
Figure 1. Four-quadrant model of student-teacher relationships created by bisecting ratings of closeness and conflict, as cited in McGrath & VanBergen (2019).

Table 1
Descriptive statistics of demographics and latent status indicator variables

Demographics	%	Range
Child sex	51	(0= female, 1= male)
Below poverty threshold	49	(0= at or above poverty threshold, 1= below poverty threshold
At least one parent has some college education or more	39	(0= neither parent has a some college education or more, 1= at least one parent has some college education or more)
Teacher's highest level of education	49	(0= bachelor's degree or less, 1= master's degree or beyond)
Teacher identifies as white*	68	(0= other race or multiracial*, 1= white*)
Teacher identifies as Latinx	22	(0= other race or multiracial*, 1= Latinx)
Teacher identifies as other race*	9	(0= white* or Latinx, 1= other race or multiracial*)
	M(SD)	
Years of teaching experience	14.34 (9.90)	1-50
Teacher-Student Relationship Quality		
1st Grade Closeness	4.22(.68)	(1) Definitely does not apply- (5) Definitely applies
1st Grade Conflict	1.57(.70)	(1) Definitely does not apply- (5) Definitely applies
2nd Grade Closeness	4.14(.69)	(1) Definitely does not apply- (5) Definitely applies
2nd Grade Conflict	1.57(.69)	(1) Definitely does not apply- (5) Definitely applies
3rd Grade Closeness	4.06(.74)	(1) Definitely does not apply- (5) Definitely applies
3rd Grade Conflict	1.54(.69)	(1) Definitely does not apply- (5) Definitely applies

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.
Note. Means rounded to hundredth place. * = non-Hispanic.
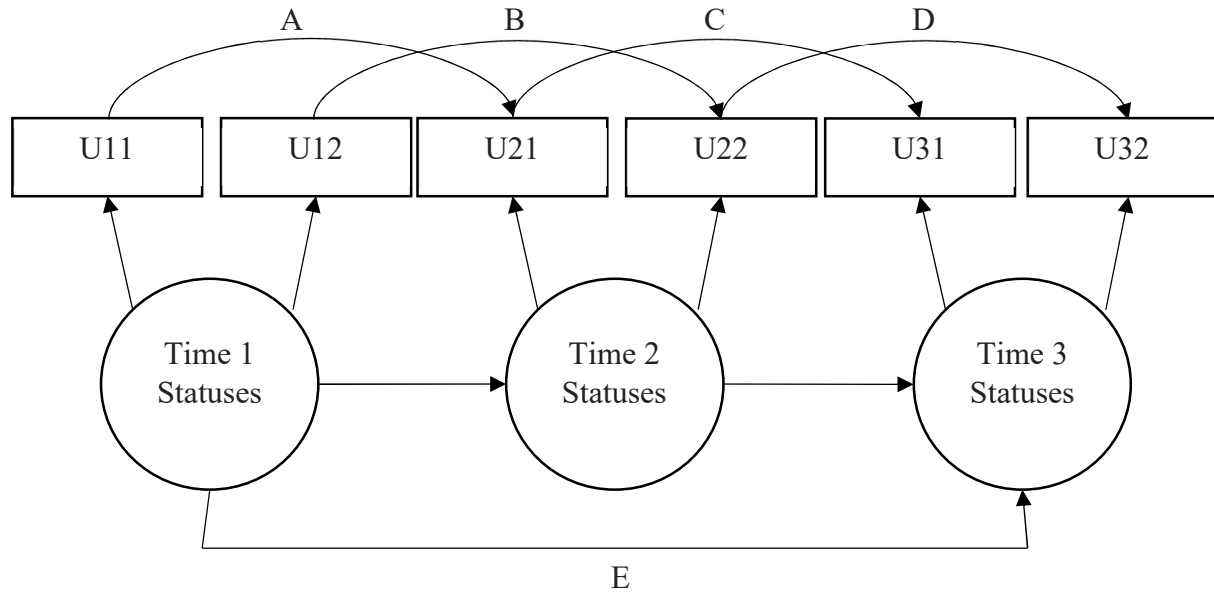
Figure 2. Latent transition model for three time points.

Note. The current figure indicates that the different Time 1 statuses have different slopes for the regression of Time 2 statuses, and that the different Time 2 statuses have different slopes for the regression of Time 3 statuses. Time 1, Time 2, and Time 3 statues are latent variables. U11 and U12 are indicator variables of the latent status variables at Time 1. U21 and U22 are indictor variables of the latent status variables at Time 2. U31 and U32 are indicator variables of the latent status variables at Time 3. Lines A-D depict residual associations between indicators over time. And line E depicts lag-2 modeling, with a direct correlation of Time 1 statuses to Time 2 statuses.

Indicators of Teacher's Perceptions of Student-Teacher Relationships
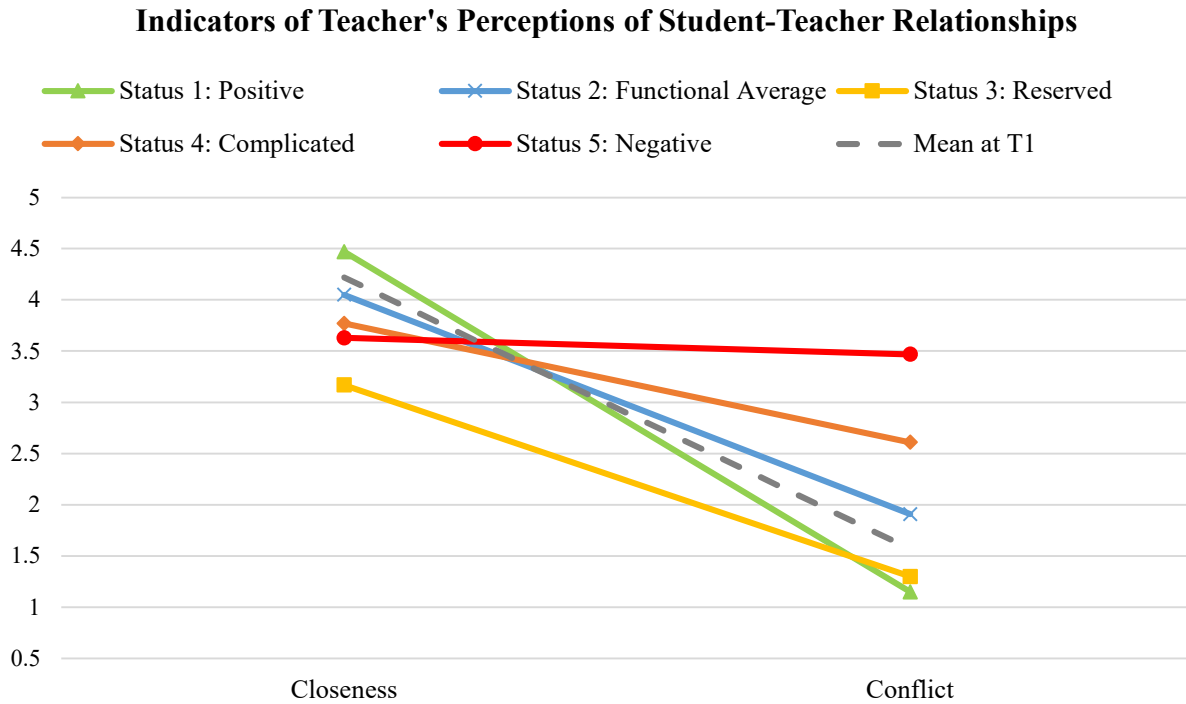
Figure 3. Predicted status indicator means for each student-teacher relationship quality status. Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.
Note. *N*= 3,880, rounded to nearest tens place. Grey dotted line indicates average closeness and conflict scores at time 1 (first grade).

Indicators of Teacher's Perceptions of Student-Teacher Relationships
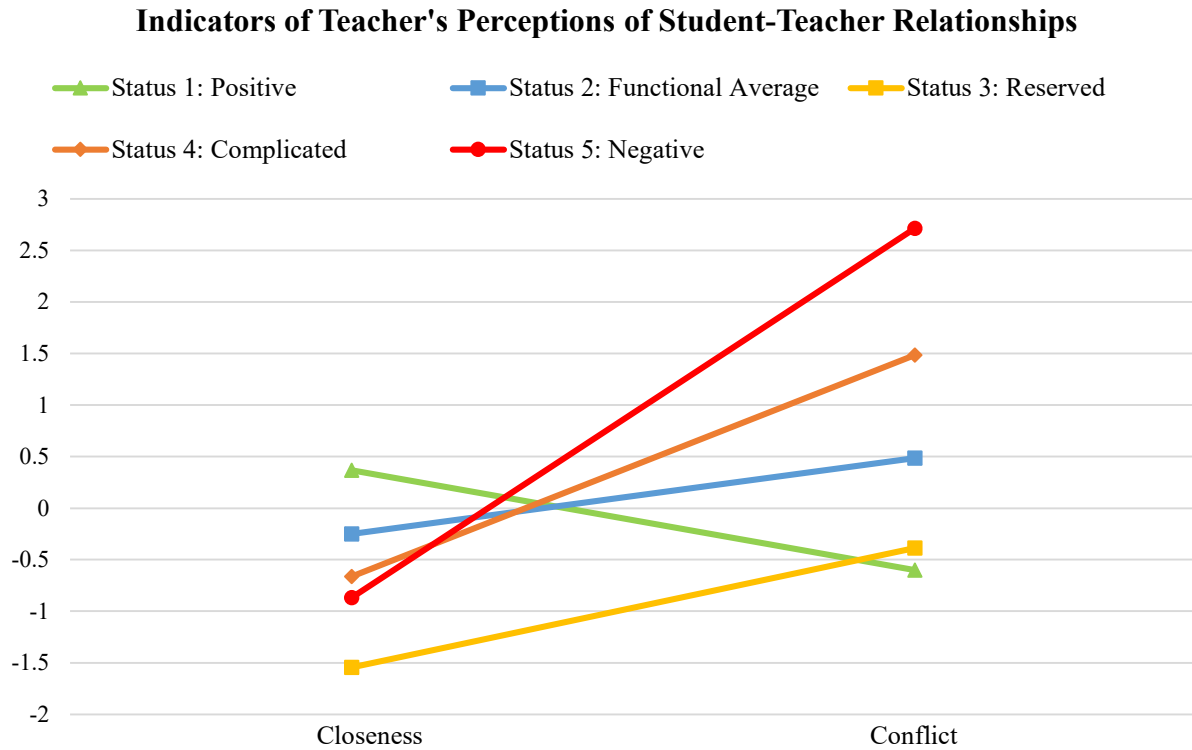
Figure 4. Standardized predicted status indicator means for each student-teacher relationship quality status.
Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.
Note. Profile indicator measures have been standardized to be compared in the same figure. *N*= 3,880, rounded to nearest tens place.

Table 2

Comparison of model fit for a latent transition analysis with residual associations and lag-2 modeling from first to third grade

	2 Status	3 Status	4 Status	*5 Status*	6 Status
AIC	35570.04	32860.56	31573.23	*30804.55*	29856.60
BIC	35695.31	33073.52	31911.46	*31305.64*	30545.60
LogL	-17765.02	-16396.28	-15732.61	*-15322.28*	-14818.30
Entropy	0.88	0.86	0.85	*0.80*	0.83
% Profile 1*	16%, 15%, 15%	71%, 72%, 74%	9%, 8%, 8%	*59%, 57%, 57%*	55%, 55%, 58%
% Profile 2*	84%, 85%, 85%	20%, 19%, 17%	19%, 19%, 16%	*18%, 18%, 14%*	13%, 13%, 10%
% Profile 3*	-	9%, 9%, 9%	66%, 66%, 70%	*8%, 11%, 14%*	17%, 17%, 17%
% Profile 4*	-	-	6%, 7%, 6%	*9%, 8%, 8%*	5%, 4%, 4%
% Profile 5*	-	-	-	*6%, 7%, 6%*	7%, 6%, 7%
% Profile 6*	-	-	-	-	5%, 5%, 4%
Profile 1 MCL	3.71	4.27	3.80	*4.47*	4.30
Profile 1 MCO	2.90	1.21	2.60	*1.15*	1.11
Profile 2 MCL	4.23	3.91	3.99	*4.04*	4.01
Profile 2 MCO	1.32	2.13	1.88	*1.91*	1.97
Profile 3 MCL	-	3.66	4.29	*3.17*	4.11
Profile 3 MCO	-	3.30	1.17	*1.29*	1.52
Profile 4 MCL	-	-	3.64	*3.78*	3.75
Profile 4 MCO	-	-	3.46	*2.61*	3.01
Profile 5 MCL	-	-	-	*3.65*	3.85
Profile 5 MCO	-	-	-	*3.47*	2.46
Profile 6 MCL	-	-	-	-	3.62
Profile 6 MCO	-	-	-	-	3.60

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. AIC = Akaike information criteria, BIC = Bayesian information criteria, LogL = Loglikelihood. Fit statistics have been rounded to two decimal places. *at Time 1, Time 2, and Time 3. *N*= 3,880, rounded to nearest tens place. Best-fitting column italicized.

Table 3

Five-latent-status model of student-teacher relationship quality among Latinx students in first, second, and third grade

	Latent Status				
	Positive	Functional Average	Reserved	Complicated	Negative
Latent status prevalences					
Time 1 (1st grade)	.59	.18	.08	.09	.06
Time 2 (2nd grade)	.57	.18	.11	.08	.07
Time 3 (3rd grade)	.57	.14	.14	.08	.06
*Marginal predicted means**					
Closeness	4.47	4.05	3.17	3.77	3.63
Conflict	1.15	1.91	1.30	2.61	3.47
	Time 2 latent status				
Probability of transitioning from **Time 1 latent status** *to*	Positive	Functional Average	Reserved	Complicated	Negative
Positive	**.72**	.14	.10	.04	.02
Functional Average	.44	**.28**	.10	.10	.08
Reserved	.33	.15	**.41**	.07	.04
Complicated	.35	.23	.03	**.18**	.21
Negative	.10	.29	.04	.22	**.35**
	Time 3 latent status				
Probability of transitioning from **Time 2 latent status** *to*	Positive	Functional Average	Reserved	Complicated	Negative
Positive	**.72**	.10	.12	.04	.02
Functional Average	.49	**.21**	.11	.13	.06
Reserved	.40	.14	**.39**	.06	.01
Complicated	.23	.23	.14	**.17**	.24
Negative	.19	.20	.05	.25	**.32**

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. Means rounded to hundredth place. *N*= 3, 880, rounded to nearest tens place.

*Marginal predicted means constrained equal across times.

^Diagonal transition probabilities in bold to facilitate interpretation.
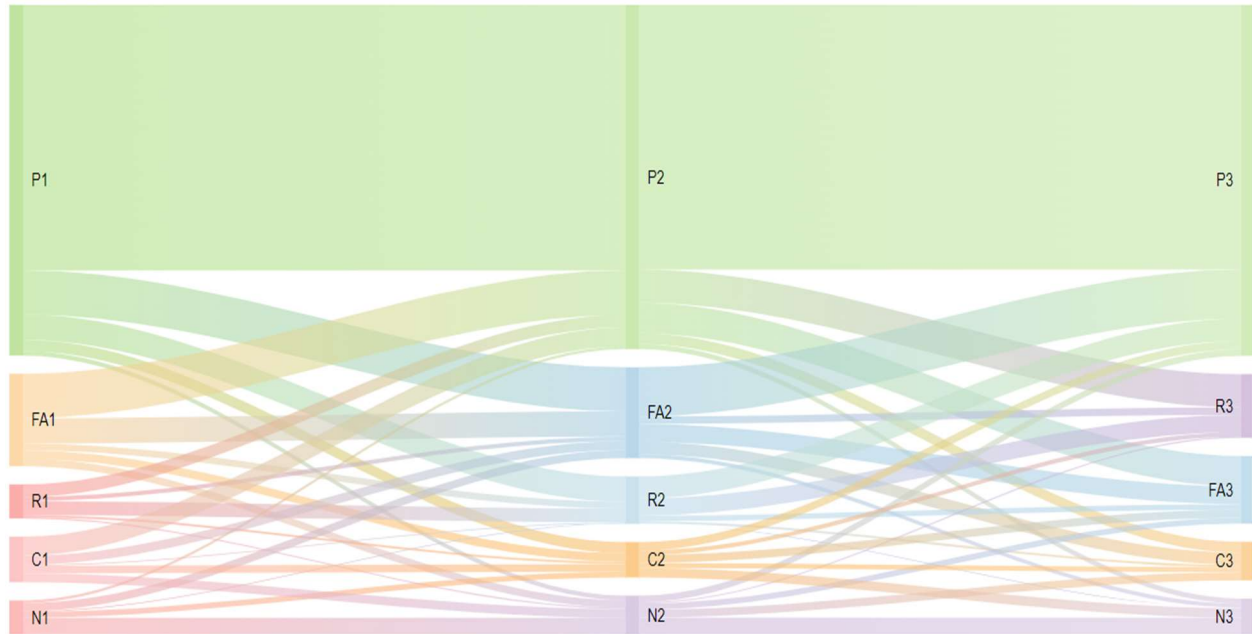
Figure 5. Sankey plot for the estimated proportion of Latinx students transitioning between student-teacher relationship statuses from first to third grade.

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. The width of the lines depicts the estimated proportion of Latinx students moving from one status at one time point to another status at the next time point. Adjacent lines do not necessarily depict the same students. For example, those moving from P1 to P2 are not necessarily the same students moving from P2 to P3.

P= Positive Status. FA= Functional Average Status. R= Reserved Status. C= Complicated Status. N= Negative Status. 1= 1st grade. 2= 2nd grade. 3= 3rd grade. *N*= 3,880, rounded to nearest tens place.

Table 4

Relative risk ratios for the association between child demographics and status membership for first, second, and third grade latent statuses of Student-Teacher Relationship Quality

	Positive	Functional Average	Reserved	Complicated	Negative	Other Comparisons
		Time 1 Latent Status Model				
Gender	Ref	1.83***	1.85***	2.44***	3.08***	N > FA, R
		Time 2 Latent Status Model				C > FA
Gender	Ref	1.88***	1.89***	2.85***	3.39***	N > FA, R
		Time 3 Latent Status Model				C > R
Gender	Ref	2.15***	1.78***	2.83***	3.15***	N > R, C
		Time 1 Latent Status Model				
Multilingual	Ref	1.10	1.69***	.72**	.49***	FA, R > C, N
		Time 2 Latent Status Model				FA > N
Multilingual	Ref	.94	1.79***	.87	.58***	R > FA, C, N
		Time 3 Latent Status Model				R > FA, C, N
Multilingual	Ref	.96	1.56***	.85	.49***	FA, C > N
		Time 1 Latent Status Model				
Immigrant	Ref	1.51	1.36	.61	1.10	
		Time 2 Latent Status Model				
Immigrant	Ref	1.13	1.26	.23*	1.23	
		Time 3 Latent Status Model				
Immigrant	Ref	1.12	.99	.74	.95	
		Time 1 Latent Status Model				
EL Status 1	Ref	1.53**	1.37	1.27	1.02	
		Time 2 Latent Status Model				
EL Status 1	Ref	1.14	1.54	1.07	1.40	
EL Status 2	Ref	1.21	1.47	1.11	1.02	
		Time 3 Latent Status Model				
EL Status 1	Ref	.79	.79	.73	.89	
EL Status 2	Ref	1.18	1.09	.90	1.41	
EL Status 3	Ref	1.34	1.58*	1.60	1.32	
		Time 1 Latent Status Model				
Poverty 1	Ref	1.19	1.98***	1.26	1.02	R > FA, N
		Time 2 Latent Status Model				
Poverty 1	Ref	.87	1.54*	.78	.90	
Poverty 2	Ref	1.07	1.35	1.72*	1.15	
		Time 3 Latent Status Model				
Poverty 1	Ref	1.27	1.22	.62*	1.13	
Poverty 2	Ref	1.05	1.65*	1.35	1.04	
Poverty 3	Ref	1.18	1.13	1.22	1.11	

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. Results rounded to hundredth place. 1= first grade. 2= second grade. 3= third grade. *N* changes by child-level factor in each model. Coefficients represent comparisons between the omitted category (Positive) and all other categories; additional comparisons with statistical significance less than .01 are presented in the "Other Comparisons" column.

***p<=.001, **p<=.01, *p<=.05

Appendix

Table 1

Comparison of model fit for a latent profile analysis in first grade

	2 Profile	3 Profile	4 Profile
AIC	*12687.30*	12191.92	12193.918
BIC	*12730.29*	12253.34	12261.48
LogL	*-6336.65*	-6085.96	-6085.96
Entropy	*.92*	.85	.53
% Profile 1	*85%*	14%	31%
% Profile 2	*15%*	71%	15%
% Profile 3	-	15%	14%
% Profile 4	-	-	41%
Profile 1 MCL	*4.30*	3.83	4.51
Profile 1 MCO	*1.32*	3.01	1.29
Profile 2 MCL	*3.78*	4.51	3.18
Profile 2 MCO	*2.95*	1.29	1.57
Profile 3 MCL	-	3.18	3.83
Profile 3 MCO	-	1.57	3.01
Profile 4 MCL	-	-	4.51
Profile 4 MCO	-	-	1.29

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. AIC = Akaike information criteria, BIC = Bayesian information criteria, LogL = Loglikelihood. MCL = marginal predicated means for closeness ratings. MCO = marginal predicted means for conflict ratings. Fit statistics have been rounded to two decimal places. *N*= 3,440, rounded to nearest tens place. Best-fitting column italicized.

Table 2

Comparison of model fit for a latent profile analysis in second grade

	2 Profile	*3 Profile*	4 Profile
AIC	13274.91	*11866.20*	11866.20
BIC	13317.72	*11927.35*	11927.35
LogL	-6630.46	*-5923.10*	-5923.10
Entropy	.74	*.83*	.53
% Profile 1	73%	*13%*	18%
% Profile 2	27%	*69%*	29%
% Profile 3	-	*18%*	13%
% Profile 4	-	-	41%
Profile 1 MCL	4.46	*3.76*	3.20
Profile 1 MCO	1.41	*3.04*	1.53
Profile 2 MCL	3.27	*4.45*	4.45
Profile 2 MCO	1.99	*1.30*	1.30
Profile 3 MCL	-	*3.20*	3.76
Profile 3 MCO	-	*1.53*	3.04
Profile 4 MCL	-	-	4.45
Profile 4 MCO	-	-	1.30

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. AIC = Akaike information criteria, BIC = Bayesian information criteria, LogL = Loglikelihood. Fit statistics have been rounded to two decimal places. *N*= 3,340, rounded to nearest tens place. Best-fitting column italicized.

Table 3

Comparison of model fit for a latent profile analysis in third grade

	2 Profile	*3 Profile*	4 Profile
AIC	13130.47	*11704.05*	11704.05
BIC	13171.99	*11764.80*	11764.80
LogL	-6558.24	*-5842.03*	-5842.03
Entropy	.79	*.83*	.53
% Profile 1	74%	*14%*	29%
% Profile 2	26%	*69%*	14%
% Profile 3	-	*17%*	17%
% Profile 4	-	-	40%
Profile 1 MCL	4.41	*3.62*	4.40
Profile 1 MCO	1.39	*2.98*	1.26
Profile 2 MCL	3.08	*4.40*	3.62
Profile 2 MCO	1.96	*1.26*	2.98
Profile 3 MCL	-	*3.06*	3.06
Profile 3 MCO	-	*1.48*	1.48
Profile 4 MCL	-	-	4.40
Profile 4 MCO	-	-	1.26

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. AIC = Akaike information criteria, BIC = Bayesian information criteria, LogL = Loglikelihood. Fit statistics have been rounded to two decimal places. *N*= 3,210, rounded to nearest tens place. Best-fitting column italicized.

Table 4

Comparison of model fit for a latent transition analysis from first to third grade

	2 Status	3 Status	4 Status	*5 Status*	6 Status
AIC	36352.55	33544.62	32228.93	*31269.62*	30664.96
BIC	36446.51	33707.47	32485.74	*31645.43*	31184.84
LogL	-18161.28	-16746.31	-16073.47	*-15574.81*	-15249.48
Entropy	0.87	0.85	0.85	*0.80*	0.78
% Profile 1*	84%, 84%, 85%	71%, 72%, 74%	66%, 66%, 70%	*6%, 7%, 6%*	16%, 15%, 13%
% Profile 2*	16%, 16%, 15%	9%, 9%, 8%	9%, 8%, 8%	*8%, 12%, 15%*	6%, 5%, 6%
% Profile 3*	-	20%, 20%, 17%	6%, 7%, 6%	*59%, 56%, 56%*	5%, 6%, 5%
% Profile 4*	-	-	19%, 19%, 16%	*9%, 8%, 8%*	11%, 11%, 10%
% Profile 5*	-	-	-	*18%, 18%, 14%*	7%, 12%, 14%
% Profile 6*	-	-	-	-	54%, 51%, 52%
Profile 1 MCL	4.23	4.27	4.29	*3.65*	4.23
Profile 1 MCO	1.31	1.20	1.17	*3.47*	1.69
Profile 2 MCL	3.72	3.68	3.81	*3.17*	3.80
Profile 2 MCO	2.93	3.31	2.60	*1.29*	2.82
Profile 3 MCL	-	3.90	3.66	*4.47*	3.64
Profile 3 MCO	-	2.14	3.47	*1.15*	3.54
Profile 4 MCL	-	-	3.97	*3.78*	3.80
Profile 4 MCO	-	-	1.88	*2.61*	2.18
Profile 5 MCL	-	-	-	*4.04*	3.18
Profile 5 MCO	-	-	-	*1.91*	1.28
Profile 6 MCL	-	-	-	-	4.48
Profile 6 MCO	-	-	-	-	1.12

Source: ECLS-K: 2011 kindergarten-third grade restricted-use data from the National Center for Education Statistics.

Note. AIC = Akaike information criteria, BIC = Bayesian information criteria, LogL = Loglikelihood. Fit statistics have been rounded to two decimal places. *at Time 1, Time 2, and Time 3. *N*= 3,880, rounded to nearest tens place. Best-fitting column italicized.