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The Influence of Individual and School Factors on the Development of Social Awareness Among Youth

Author

Hoskins, Jessica Elizabeth Schnittka

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The Influence of Individual and School Factors on the Development of Social Awareness Among Youth

A dissertation submitted in partial satisfaction of the

requirements for the degree

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by

Jessica Elizabeth Schnittka Hoskins

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ABSTRACT OF THE DISSERTATION

The Influence of Individual and School Factors

on the Development of

Social Awareness Among Youth

by

Jessica Elizabeth Schnittka Hoskins

Doctor of Philosophy in Education

University of California, Los Angeles, 2023

Professor Noreen Webb, Chair

Social awareness, the "ability to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, and contexts" (CASEL, 2020) is a critical skill for youth in a multicultural democracy. This study explored individual and school environmental predictors of student patterns in social awareness development across middle school. Mixture modeling was used to classify students based on their patterns of social awareness development across middle school, and multinomial logistic regressions explored how student demographics, perceptions of school culture/climate, and exposure to peers from different racial/ethnic backgrounds were related to class assignment. Findings show worse developmental trajectories for males and African American, Hispanic/Latinx, and White students compared with Asian and female students, implying something needs to be done to better serve

them. Positive trends in student perceptions of culture/climate (i.e., consistent positive or improving perceptions) and moderate levels of exposure to peers from different racial/ethnic backgrounds were both predictive of better odds that a student would improve their levels of social awareness across middle school. However, changes in student perceptions of their own sense of belonging in school were the most reliably linked to trends in social awareness. This pattern was observed consistently across intersectional demographic subgroups, suggesting that social awareness can be improved through the cultivation of more positive, caring social relationships between students and their peers and teachers.

The dissertation of Jessica Elizabeth Schnittka Hoskins is approved.

Sandra Graham

Minjeong Jeon

Juliana Karras

Karen Nylund-Gibson

Noreen Webb, Committee Chair

University of California, Los Angeles

2023

Dedicated to Jay and Joey

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CURRICULUM VITA

Education

2014	M.A. in Educational Psychology, Research and Evaluation University of Colorado, Denver, CO School of Education and Human Development
2008	B.A. in Psychology B.A. in Studio Art University of Virginia (UVA), Charlottesville, VA School of Arts and Sciences

Professional Experience

2018-2023	Teaching Fellow, Social Research Methodology Division Graduate Research Methods and Statistics Series University of California, Los Angeles School of Education and Information Science
2019	Summer Associate, RAND Corporation Santa Monica, CA
2017-2018	Graduate Student Researcher, Dr. Felipe Martinez & Dr. Jon Schweig University of California, Los Angeles School of Education and Information Science
2014-2017	Professional Research Assistant, Research and Assessment Design (RAD) Jefferson County School District, Denver, Colorado
2013-2016	Teaching Assistant, Research and Evaluation Methodology University of Colorado, Denver School of Education and Human Development
2012-2014	Project Coordinator, Pyramid Plus: The Colorado Center for Social Emotional Competence and Inclusion, University of Colorado, Denver
2011-2013	Graduate Research Assistant, The Research Center University of Colorado, Denver School of Education and Human Development Fostering Healthy Futures Program, Children's Hospital, Colorado

Peer-Reviewed Publications

Schnittka Hoskins, J. & Schweig, J. (2022). SEL in context: School mobility and social-emotional learning trajectories in a low-income, urban school district. *Education and Urban Society*. *DOI: https://doi.org/10.1177/00131245221106735*

Schweig, J., Martinez, F., & **Schnittka Hoskins, J**. (2022). Making sense of consensus: Disagreement in student survey reports can help identify instructional microclimates within classrooms. *American Journal of Education, 128(4), 557-590.*

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CHAPTER 1: INTRODUCTION

If we're to live up to our own time
then victory won't lie in the blade
but in all the bridges we've made.
That is the promise to glade,
the hill we climb
if only we dare it,
because being American is more than a pride we inherit —
it's the past we step into
and how we repair it.

-Excerpt from "The Hill we Climb," by Amanda Gorman

These powerful words, spoken by 20-year-old National Youth Poet Laureate Amanda Gorman at the 2020 U.S. presidential inauguration, compelled Americans to build bridges across our many divides, and "climb the hill" that represents repairing the damage strewn from institutionalized and systemic racism. Many who work in the field of education have taken these words to heart (e.g., Armenti, January 26, 2021), but this "hill" sometimes feels more like Mount Everest. The COVID-19 pandemic forced K-12 students to stay home for many months, leaving them devoid of social interaction. Isolated and struggling with mental health, American youth are increasingly acting out (Vestal, November 9, 2021), and some are being radicalized online into violent extremist groups, outside of the purview of parents or educators (Alva et al, 2017). Attempts to address systemic racism in American schools are being met with accusations of anti-White racism and brainwashing (e.g., Schuessler, November 29, 2021; Moyer & Asbury, January 14, 2022), and political polarization is at an all-time high (e.g., Pew Research Center, 2020; Harrington, March 25, 2019).

The trajectory our nation has been on has brought a renewed focus on social emotional learning within K-12 schools (U.S. Department of Education, 2021). When students learn social and emotional skills like empathy, self-awareness, and tolerance, school environments become

more supportive (Hough et al, 2017; Faria et al., 2013), students become more positively engaged in school (Yang et al, 2018), and student mental health improves (Panayiotou et al, 2019). Across a multitude of studies, social emotional programming has been associated with improved behavioral, academic, and educational outcomes in both the short (e.g., Archambault et al, 2009; Wang & Fredricks, 2014) and long term (Elias & Haynes, 2008; Valiente et al, 2011; Mahoney et al, 2019; Taylor et al., 2017).

Social emotional learning (SEL), defined as "the processes through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to manage their emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions" (Weissberg and Cascarino, 2013), involves the development of several student competencies (Berg et al, 2017). The most used SEL competency framework is from the Collaborative for Academic, Social, and Emotional Learning (CASEL), which lists five research-based core competencies: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL, 2020). This study focuses specifically on *social awareness*, defined as the "ability to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, and contexts" (CASEL, 2020) for several reasons. First, social awareness is particularly poised to meet this historical moment because of its emphasis on fostering unity, tolerance, and peace. Second, social awareness is distinct in that it requires students to make connections to broader social needs and norms. Whereas "relationship skills" are about communicating and solving problems within existing relationships, social awareness asks students to empathize and understand the perspectives, needs, and worldviews of people outside of their immediate circle (e.g., people with *different* needs or from *different* backgrounds).

Indeed, psychometric evaluations show that social awareness is a statistically unique construct (see Gelbach, 2018; Ross et al, 2017), and deficiencies predict participation in risky behaviors and school delinquency to a greater extent than other constructs (Ross & Tolan, 2018; Epstein, Atkins, Cullinan, Kutash, & Weaver, 2008). Therefore, identifying and supporting students with particularly low or declining trends in social awareness could have an outsized impact on levels of school delinquency.

Recent studies conducted in California public schools have shown social awareness to decline each year from 6th to 12th grade, dropping most precipitously in middle school (West et al, 2018b; West et al, 2020). Certain subgroups of students appeared to demonstrate particularly steep declines relative to others. Girls, economically disadvantaged, Asian, Black, and Hispanic/Latinx students showed steeper estimated declines relative to their male, higher-SES and white counterparts, respectively (West et al, 2018b; West et al, 2020). These declines were most dramatic for girls, Black, and Hispanic/Latinx students. Clearly, something needs to be done to address these steep declines. However, it is important that the development of targeted school interventions is based on an understanding of the conditions and potential causes of this phenomenon. Specifically, we need to know how the development of social awareness depends on intersections of individual characteristics and what role school environmental characteristics play in terms of development of social awareness.

Finding answers to these questions is important for several reasons. Identifying how the development of social awareness may depend on intersections of individual characteristics (e.g., gender, race/ethnicity, economic disadvantage) can help us identify sources of inequities. For example, if social awareness increases over time for White girls, but decreases for Hispanic/Latinx girls, this suggests these groups of students are responding differently to their

school environments or programming. Discovering normative social awareness trajectories across student groups will also create benchmarks to facilitate the evaluation of programs aimed at increasing social awareness. Addressing the role of school characteristics (e.g., school culture/climate, student racial/ethnic diversity) in the development of social awareness can help pinpoint specific school-level interventions that have the highest potential to improve social awareness, and thus reduce school delinquency and other behavioral issues. If a positive school climate is found to have the highest effect on the development of social awareness in diverse schools, for example, schools could develop interventions to improve school climate, such as school-wide teacher training or peer mentoring programs. If school diversity is found to have a strong relationship to social awareness development, district, county, or state policies could influence zoning, school choice practices, or bussing programs to achieve a balanced representation of different student demographic groups.

Through this dissertation, I aimed to answer these questions by analyzing yearly survey data on social awareness collected by schools across middle school. Taking a variable- and person-centered longitudinal approach, I examined how the development of social awareness depended on individual and school environmental characteristics. I focused specifically on adolescence because it is a critical period in which youth form racial/ethnic identities (Graham & Echols, 2018; Wolfer, Schmid, Hewstone, & van Zalk, 2016; Yip, Cheon, & Wang, 2019), solidifying social trajectories that last into adulthood (Eccles & Roeser, 2009). Promotion to middle school also typically coincides with increased access to racially/ethnically or socioeconomically different peers (Eccles & Roeser, 2009), meaning the quality of student experiences is prescient.

Methodological Approach and Contributions

This study takes advantage of two complementary approaches: "variable" (Wohlwill, 1973; Block, 1971) and "person" centered analyses (Magnusson, 2003). Until recently, variable centered approaches were standard in the social sciences (Rose et al, 2013) and typically involved fitting a series of regression models to identify average effects of certain variables while controlling for others (Shudde, 2018), as I have done in prior studies (Schnittka Hoskins & Schweig, 2021). Results of these analyses can be helpful because they rank the relative influence of certain predictors on an outcome, identifying interventions poised to help the most (Laursen & Hoff, 2006). Variable-centered approaches are also appropriate if certain assumptions hold: for example, that "the interrelations among variables studied at the group level can be used to make inferences about how the variables function within individuals" (Magnusson, 2003, p. 14). If these assumptions do not hold, then results may obscure important effects or be used to erroneously claim effects are present for most students. For example, average effects might not be true for any students in a sample (i.e., in the case of multimodal distributions; see Magnussen, 2003). If some students experience a very negative effect, then it's possible these negative effects cancel out positive effects, making them statistically invisible (see Estes, 1956; von Eye, 2009). An additional limitation is that if the number of potential independent variables exceeds a handful, then the number of interactions could easily approach 20-30 or even 50, resulting in under-powered analyses and results that are difficult to interpret and use (Flanders et al, 1992; Schudde, 2018).

In response to the limitations of variable-centered approaches, an increasing number of scholars have called for a "Science of Individuality" that focuses explicitly on heterogeneity (Rose et al, 2013; Bergman, & El-Khouri, 2003; Magnusson, 2003). These approaches have

been termed “person-centered analyses,” and are becoming increasingly popular in educational and developmental psychology (e.g., Dietrich & Lazarides, 2019; Umarji et al., 2018; Schenke et al, 2017), the learning sciences (e.g., Wang & Eccles, 2013), and public health research (e.g., Blau & Liakopoulou, 2013). Person-centered analysis rejects “the assumption that the entire population is homogeneous with respect to how variables influence each other” (Laursen & Hoff, 2006, pp. 379-280), and instead identifies latent subgroups (called “classes”) of individuals who display similar, distinct patterns of outcomes. When used with longitudinal data, person-centered analysis helps to identify hidden classes of students with similar trajectories of development (Laursen & Hoff, 2006), which may or may not relate to other measured categories of difference (e.g., gender or race/ethnicity) or outcomes of interest. Following the assignment of classes with a variable-centered approach, membership in particular classes can then be predicted by combinations of independent variables, allowing each group to have different sets of predictors and regression coefficients (Asparouhov & Muthén, 2014; Vermunt, 2010; and Serang; 2021), which can identify potential theories of development for specific groups. By first understanding patterns of individual variation and then building towards theories of development (Rose et al, 2013), we are less likely to develop theories believed to be universal that only apply to certain subsets of individuals within certain contexts. Theories developed through this more inductive approach can help us develop interventions that are differentiated and personalized based on specific students’ developmental trajectories (e.g., Fischer, Bernstein, & Immordino-Yang, 2007).

Combining both variable and person-centered approaches is particularly fruitful for longitudinal studies (Laursen & Hoff, 2006) because each approach is complementary, and can help identify and streamline interventions. For example, Suárez-Orozco and colleagues (2010)

used a person-centered approach to identify five classes of immigrant students based on how their academic achievement changed over the course of five years. The authors then conducted follow-up multiple case studies for students in each subgroup, uncovering patterns of experiences that were not made apparent through variable-centered analyses. One example of this is that the authors discovered students whose achievement slowly declined over the course of the study commonly transferred from a lower achieving school to a higher achieving one where their social and language needs were not met. These findings were reportedly later used to identify students on this trajectory and justify providing them with extra support for these types of school transitions. Using this approach in the present study can help uncover variables that help explain why certain students have better or worse social awareness trajectories, thus helping schools identify interventions that might be particularly beneficial for these students.

CHAPTER 2: LITERATURE REVIEW

Defining and Measuring Social Awareness

Along with self-awareness, self-management, relationship skills, and responsible decision-making, social awareness is one of five core social emotional learning competencies that comprise the most widely used SEL framework in the United States (the Collaborative for Academic, Social, and Emotional Learning; CASEL, 2020). District and state use of SEL frameworks like CASEL's and corresponding measures has increased since 2015, when the federal Every Student Succeeds Act (ESSA) mandated the inclusion of non-academic student success indicators in school accountability indices (e.g., SEL or school climate; 2015; U.S. Department of Education, n.d.; National Council on Teacher Quality, 2017). CASEL defines social awareness as the ability to,

> understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, and contexts. This includes the capacities to feel compassion for others, understand broader historical and social norms for behavior in different settings, and recognize family, school, and community resources and supports. (CASEL, 2020)

This definition is multifaceted and emphasizes understanding and empathy towards different types of students, as well as the ability to pick up social norms and identify potential resources and supports. Thus, social awareness can be conceptualized as including empathy and care towards others, as well as several "tiers" of awareness: awareness of other individuals, awareness of norms, and awareness of resources and supports. Previous conceptualizations of social awareness in the developmental psychology literature were narrower, instead focusing on whether young children recognized other people or correctly identified the emotions of others (Nowicki & Duke, 1994; Ryan, 2001). Research on social awareness as defined currently did not begin at scale until school districts started using the CASEL framework to collect data on social emotional learning. The first to collect such data was CORE, a consortium of districts in

California that received a waiver from the accountability requirements of No Child Left Behind (see Knudson & Garibaldi, 2015). As a result of this waiver, CORE districts were able to begin measuring SEL and school climate as early as the 2014-15 school year. This dissertation adds to the growing body of literature based on CORE's longitudinal SEL and school climate data (e.g., West et al, 2018b; West et al, 2020; Kanopka et al, 2020) by focusing specifically on social awareness and its development across individuals in middle school. The remaining paragraphs in this section serve to review the status of research on the development of social awareness as well as its smaller components (e.g., empathy and perspective-taking).

Development of Social Awareness

Recent research suggests that one of the affective components of social awareness, empathetic concern, can be observed in children as young as one year old (e.g., Hoffman, 2000; Davidov et al, 2013). During toddlerhood, children become self-aware, and begin to understand that they are separate from others (Martorell et al, 2014). This understanding helps children develop other awareness and the ability to understand that others can experience emotions and pain (Martorell et al, 2014). As children develop more cognitive capabilities, early forms of empathy can develop into more advanced perspective taking skills. According to Cognitive-Developmental theory, around the age of seven children begin to become less egocentric (considering everything only from their own viewpoint) and more aware of other viewpoints (Piaget, 1923). These cognitive skills are thought to increase slowly from early to late childhood (Davidov et al, 2013; Roth-Hanania, Davidov, & Zahn Waxler, 2011). As children become adolescents, increasing value is placed on social interactions and friendships (Ryan, 2001; Wigfield, Byrnes, & Eccles, 2006), thus potentially fostering further development. Indeed self-awareness, empathetic concern, and perspective taking (constructs overlapping or composing

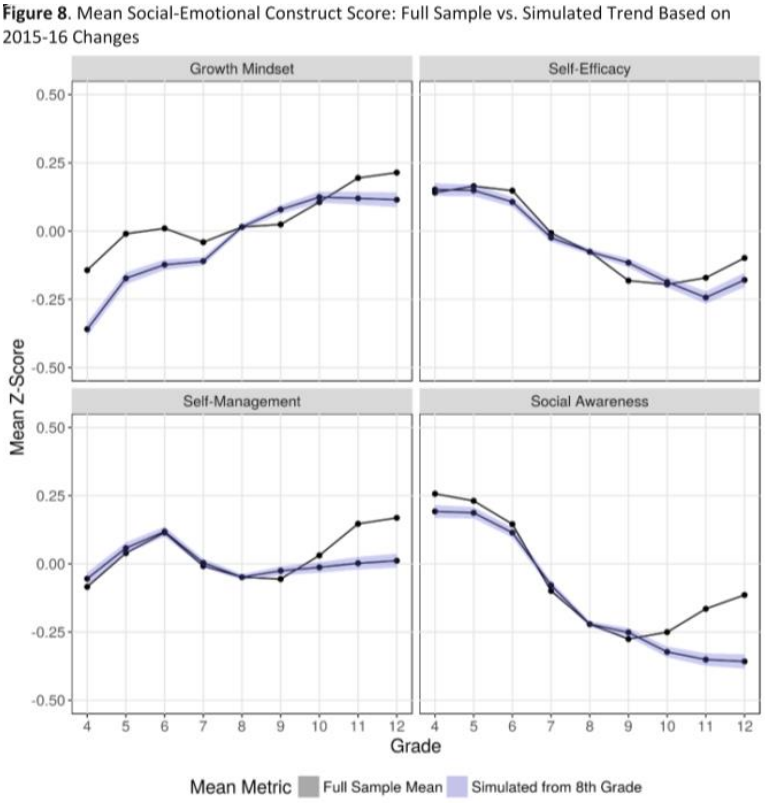
social awareness; Malti et al, 2016) have been found to increase with age (Choudhury et al., 2006; Eccles, 1999); although others have observed these skills to remain stagnant (e.g., Roth-Hanania et al., 2011; Vaish, Carpenter, & Tomasello, 2009). However much of the prior research on these skills was conducted with younger (pre-adolescent) children (e.g., Edossa et al., 2018; Rothbart et al., 2006; Roth-Hanania et al., 2011; Vaish, Carpenter, & Tomasello, 2009).

Adolescent studies on social awareness, which is related more to the advanced, cognitive components of empathy and perspective taking (Björkqvist, Österman, & Kaukiainen, 2000; Feshbach et al, 1983) are relatively rare. No consensus exists regarding whether social awareness improves or declines across adolescence. West and colleagues documented trends in grade level SEL means in the CORE districts (2018b; 2020), finding that the four measured constructs did not develop linearly or in a consistent direction across 4th through 12th grade. For social awareness, there was a large decline in grade level means from 5th to 6th grade, and the decline continued until students matriculated to high school. Starting in 10th grade, means started to increase. Reported social awareness was about .5 standard deviations higher in Grade 4 than in Grade 9 (West et al, 2018b; 2020). Although others also reported declines in social awareness across middle school (Coelho & Sousa, 2017), means have also been shown to increase (Ross & Tolan, 2017) or remain stagnant (Coehlo at al., 2015a) across these same years. One potential reason for these inconsistencies is that grade level means represented different cohorts of students and were biased by differences in student composition at certain grade levels. For example, if students with higher levels of social awareness are more likely to leave CORE schools as they approach high school, then lower means in 8th grade may be a result of these students leaving and not actual declines in social awareness.

The only way to fully account for differences in student composition across grade levels is to conduct a longitudinal analysis with the same cohort of students across multiple years. However, at the time of their study, West and colleagues only had access to two consecutive years of SEL data. To make inferences about SEL development across more than two years, the authors created simulated SEL trends based on differences in cohort SEL means and changes in those means across two years. According to the authors, these simulated SEL trends show "trends in the SEL constructs among students who would be expected to attend CORE district schools continuously from Grade 4 through Grade 12, assuming that everything else about the CORE districts (including selection into and out of the districts, as well as all aspects of the educational environment relevant to SEL development) remain as they were in 2014-15 and 2015-16" (West et al, 2018; 2020). Based on these simulated trends, social awareness appears to have declined each year from 4th until 12th grade instead of partially recovering in high school (see Figure 1). This discrepancy suggests that students entering CORE schools in high school had higher levels of social awareness than those already attending, or that students leaving CORE schools in high school had lower levels of social awareness than those remaining. School dropout (otherwise known as "pushout," referencing the fact that schools may fail to adequately serve these students) may explain this phenomenon since students who drop out are more likely to have a history of delinquency (Wang & Fredricks, 2014), which is associated with lower levels of social awareness (Ross & Tolan, 2018; Epstein et al, 2008).

Figure 1

Simulated SEL Trends from West et al (2018, 2020)



The decline in social awareness is quite dramatic compared to the simulated time trends witnessed for the other CORE SEL constructs. Instead of declining, growth mindset appears to increase as students age. For self-efficacy and self-management, there is a decline in means at some point during 4th-12th grade, but there is evidence of some recovery in competency between at least two of those years (for self-management there appears to be a slow increase starting in 8th grade, and for self-efficacy there is an increase during the last year of high school). This suggests that the decline in student perceptions of social awareness is not due solely to declining self-efficacy over time; if this were the case, then we would expect declines in each of the four SEL constructs. Instead, this difference signals that social awareness should be specifically addressed, as the present study does.

Although West and colleagues (2018a; 2020) were able to account somewhat for differences in student composition across grades, they did not use a within-person design, meaning we can't rule out the possibility that other student compositional factors accounted for these observed changes in means. In a more recent study, Kanopka and colleagues (2020) examined changes in student grade level ranking on social awareness (i.e., scores standardized within each grade level each school year) using a repeated measures (within-person) design across three years in CORE districts. Cohort score means were found to remain stagnant between 6th and 7th grade and decline by about 20% from 7th to 8th grade; however, the modal change in social awareness between years was 0, meaning that social awareness levels often did not change from year to year during middle school. However, for some students, scores declined greatly, and there was much more variability in year-to-year changes in social awareness relative to other SEL constructs and academic measures. Thus, a second potential explanation for conflicting reports regarding social awareness development is that there is a lot of unexplained variation in social awareness development across students. The present study builds on the work of Kanopka and colleagues by examining individual and contextual sources of this heterogeneity in social awareness trends, potentially explaining why these declines were present for some students but not for others.

Development of Social Awareness and Individual Student Factors

Individual demographic factors like race/ethnicity, gender, and economic disadvantage, can influence development through exposure to different social experiences and norms. In the following section, I describe the state of current research on how social awareness development and the social context in which it occurs differs across individual demographic factors.

Gender

Social-awareness development across the grade span appears to differ by gender, though there are conflicting reports as to how. Girls' situational responsiveness (a construct similar to social awareness) has been shown to increase with age whereas the opposite is observed for boys (MacDermott et al, 2010). Within the CORE districts, all demographic subgroups demonstrate a decline in social awareness from 6th-11th grade. However, girls show steeper declines relative to their male counterparts (see Figure 2), especially in middle school (West, 2018b; 2020). Unfortunately, the statistical significance of this difference in slope has not been reported, and as mentioned in the previous section, this study suffered from selection bias as it did not track the same students across all years and instead simulated trends from two sequential years (West, 2018b; 2020).

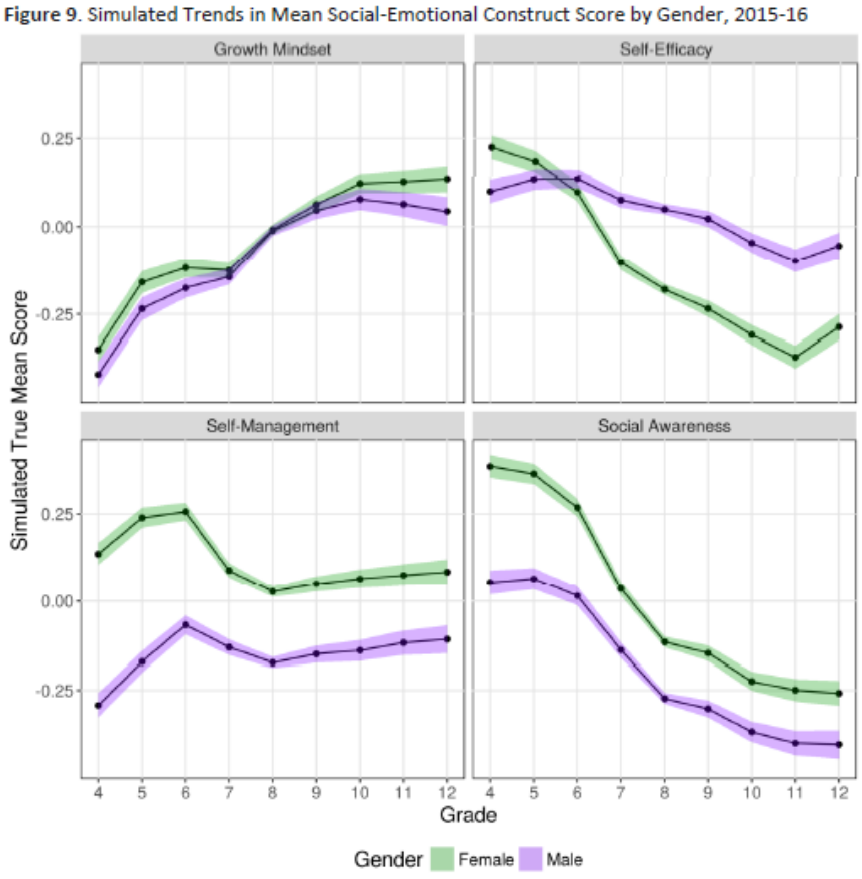
There are several explanations for differences in social awareness development across gender. As youth enter adolescence, socialization becomes more gender segregated (Kågesten et al., 2016), and awareness of and adherence to culturally specific gender stereotypes intensify (Eccles, 1987; Hill & Lynch, 1983; Kågesten et al., 2016). For girls, this means that the social sphere becomes more salient, potentially affecting levels of social awareness. Indeed, girls behave more socially and are more motivated by social factors (Wentzel, 1994). If girls have more negative social experiences in school, then their development of social awareness may be stunted.

Although boys' levels of loneliness do not appear to change as they enter high school (Benner & Graham, 2009), male-specific social contexts may become less conducive to meaningful interaction. As boys develop into teens, there is increasing importance placed on defining themselves in opposition to "feminine" traits like kindness and empathy (Chu, 2018).

Boys are instead taught to adhere to the dominant cultures' construction of masculinity, which includes traits like stoicism, toughness, indifference, and self-sufficiency (Chu, 2018). Although younger boys are just as outwardly compassionate towards others as girls, once they become adolescents, they tend to view their need for close connections with peers as a weakness instead of a strength (Chu, 2018). This results in older adolescents and men reporting fewer close relationships relative to younger boys, and the relationships they do have tend to be less intimate (Way et al, 2014).

Figure 2

Simulated Self-Management and Social Awareness Trends by Gender and Grade Level from West et al (2018, 2020)



With this background in mind, it seems likely that differential social experiences and norms across gender can influence social awareness development. This supports the importance of including gender in models of social awareness development. However, it's also likely that experiences differ based on constellations of demographic categories, and no studies to date have examined this possibility. This study fills a gap in the literature on social awareness development by examining how these individual factors intersect.

Economic Disadvantage

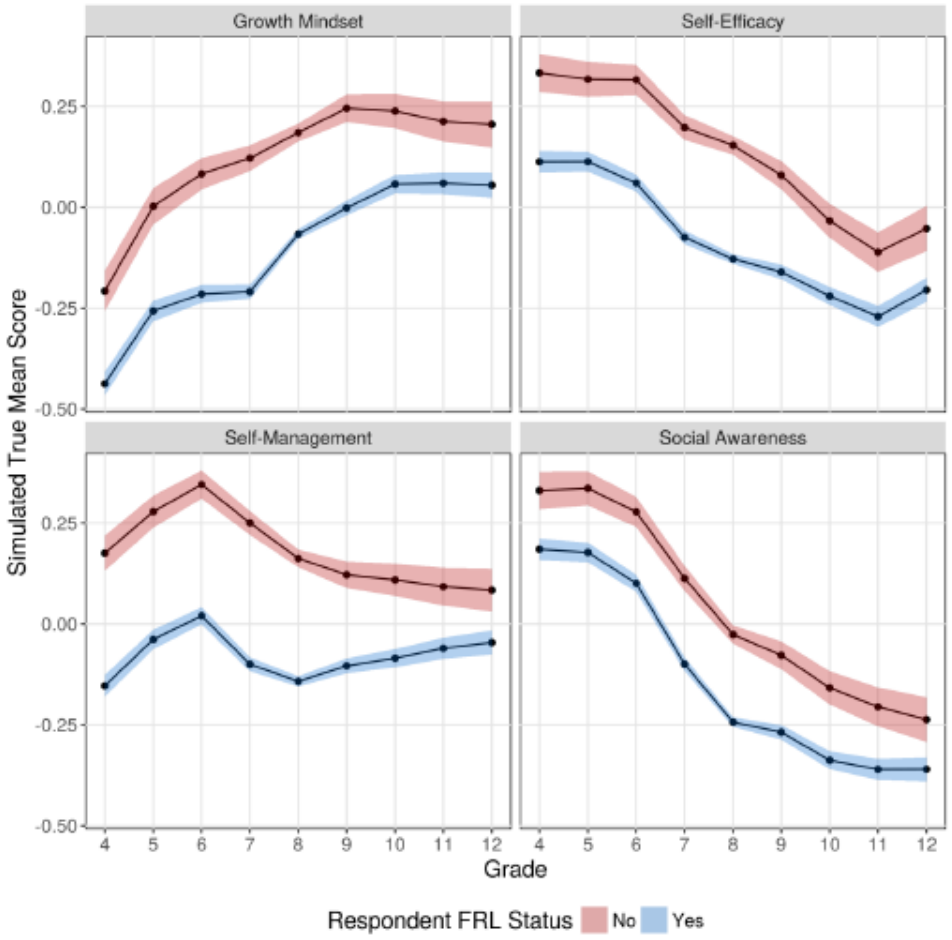
We don't know much about how economic disadvantage relates to social awareness development. The only study to report differences across degrees of economic disadvantage was the CORE study (West, 2018b; 2020), which showed simulated trends in social awareness means across grade levels. This study showed steeper negative declines for students who qualified for free or reduced lunch (FRL; a metric for economic disadvantage) than for those who did not (see Figure 3), but only in middle school. Between 6th and 8th grade, the gaps in social awareness between FRL-eligible and FRL-ineligible students got wider, whereas during the high school years, it remained stagnant and then narrowed as students entered 11th and 12th grade (though as the confidence intervals show, there is much more uncertainty in these estimates during the later high school years). This trend is similar for other constructs in that the gaps across economic disadvantage tend to be widest during the middle school years. Gaps across gender were narrower during the middle school years, and widest either during the elementary years (e.g., for social awareness and self-management) or later in high school (self-efficacy), showing that gender and economic disadvantage have differential effects across development.

One problem with existing comparisons between economically disadvantaged and advantaged students in terms of their patterns of social awareness is that they don't account for

the uneven distribution of economically disadvantaged students across racial/ethnic groups. Because African American and Hispanic/Latinx students in the United States are typically disadvantaged at higher rates, it is difficult to conclude that gaps in social awareness are caused by economic disadvantage alone. The present study adds to the literature by addressing how race/ethnicity and economic (dis)advantage intersect to explain differences in patterns of social awareness development across middle school.

Figure 3

Simulated Trends in Mean Social Emotional Construct Score by Economic Disadvantage from West et al (2018, 2020)

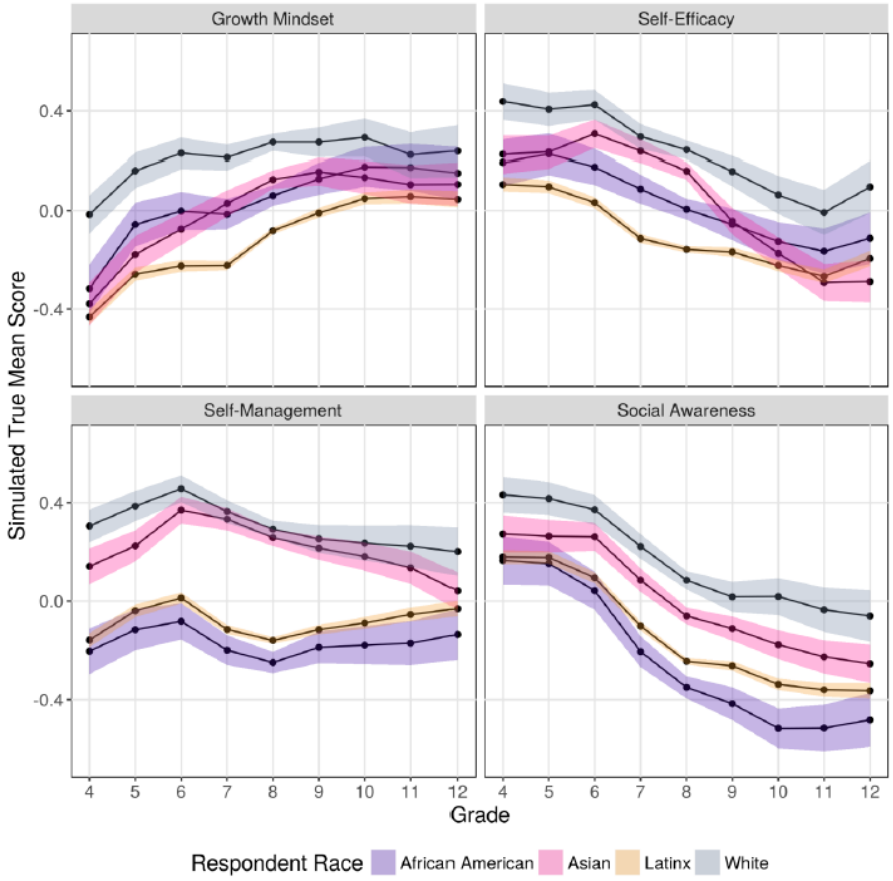


Race/Ethnicity

The only known study to report differences in social awareness development across race/ethnicity is the CORE study conducted by West and colleagues (2018b; 2020). Simulated grade level means (see Figure 4) showed that African American and Hispanic/Latinx students' social awareness means declined more across the middle school years than their Asian and White peers, resulting in much larger racial social awareness gaps in 9^{th}-10^{th} grade. For all three other constructs, gaps were observed shrinking during this same time period, suggesting that the experiences of students depending on their race/ethnicity effect social awareness development in different ways than for the other SEL constructs.

Figure 4

Simulated SEL Construct Score Means by Race/Ethnicity from West et al. (2018, 2020)



I include race/ethnicity (as well as gender) in the list of potentially impactful individual factors because of expected differences in student experience across these variables (Carter et al, 2016). Indeed, students of color generally report experiencing more negative school climate than their White peers (e.g., Bottiani et al, 2017; Shukla et al, 2016; Voight et al, 2015), even compared to students attending the same school (Hough, Kalogrides, and Loeb, 2017). Ample research has also documented disciplinary disparities across racial lines (e.g., students of color are punished more harshly than White students; Bottiani et al, 2017) and disparities in teacher expectations (e.g., expecting students of color to perform more poorly; Gregory, Skiba, &

Noguera, 2010; Lareau & Horvat, 1999; Lewis, 2003; Okonofua, Walton, & Eberhardt, 2016; Tenenbaum & Ruck, 2007; Warikoo & Carter, 2009). Having to face these additional adversities can make it more difficult for students to demonstrate and develop social emotional competencies like social awareness. In addition, programming aimed at increasing levels of social emotional competence often fails to address the effects of racial discrimination and can instead perpetuate deficit narratives and worsen racial gaps in SEL (see Gregory & Fergus, 2017; Kaler-Jones, 2020; Simmons, 2017; 2019; Jacobson, 2021). The failure of many SEL programs to create safe spaces for students of color to express emotions and heal from racial or other forms of trauma (see Soodjinda et al, 2021) may explain these programs' reduced efficacy for these students.

Theory and research support the idea that experiences of students depend not only on race/ethnicity, gender, and economic (dis)advantage acting alone, but on intersections of these categories (Cole, 2009; Hancock, 2007, Collins, 1990; Hurtado, 1989; Smith & Stewart, 1983). The present study fills a gap in the research on social awareness by addressing how race/ethnicity, gender, and economic (dis)advantage intersect to influence the development of social awareness. It also addresses several limitations of previous work, including sampling bias across years when comparing grade level means. By tracking social awareness levels for the same students across three years, we get a more accurate sense of how social awareness develops over time and how development differs across intersections of race/ethnicity, gender, and economic dis/advantage.

Social Awareness and School Environmental Factors

Development of Social Awareness in Schools

Schools are important contexts for adolescent development. Other than home, students spend most of their time in school, and during that time, develop close personal relationships with students, teachers, and staff. It is through these relationships, and the interactions that comprise them, that students develop social emotional competencies at school (e.g., Bronfenbrenner & Morris, 2006). Positive learning and development are generally fostered when students experience positive conditions for learning, which include the presence of quality relationships (e.g., trusting, supportive) as well as emotional, intellectual, and physical safety, a sense of belonging, and enriching opportunities to practice skills (Osher & Berg, in press; Osher & Kendziora, 2010; Lachini et al, 2016). These positive conditions support development by removing learning barriers that might arise due to classroom disruptions (e.g., teachers responding to student misbehavior) and by fostering interest and engagement (e.g., Schmidt, Shernoff, & Csikszentmihalyi, 2014). Students may be negatively influenced by their school social environment when they are exposed to negative conditions for learning, which may include violence and bullying (Osher et al, 2020). The absence of positive conditions, and the presence of negative stressors can trigger the stress response system and impact learning through diminishing cognitive ability (e.g., concentration or memory; Shackman et al., 2006).

Evidence suggests that schools can and do influence the development of SEL skills (McCormick, Cappella, O'Connor, & McClowry, 2015; Nagaoka, Farrington, Ehrlich, & Heath, 2015; Fricke et al, 2021), including social awareness (Loeb et al, 2019; Fricke et al, 2021). Loeb and colleagues created value-added school measures of SEL growth within CORE districts across two consecutive years (2019) and reported true variation in the extent to which schools

contribute to student SEL growth. About 24-29 percent of variance in social awareness competency scores during a particular year were attributed to non-school factors including student demographics as well as prior year achievement and social-awareness, and about 8-10 percent was attributed to the school effects. School contributions to SEL growth were correlated with one another and to academic outcomes. A follow up study conducted by Fricke and colleagues examined the stability of school contributions to SEL across years for the same grade, and across contiguous grades for the same cohort (2021). Their results show that school effects are positively (albeit weakly) correlated from year to year and thus somewhat stable, but not as stable as school effects on academic measures like math and English language arts. These findings suggest that there is something about the school social environment that explains why students differ so much in their own social awareness development. However, to date, no study has been leveraged to explore how these school environmental factors relate to social awareness development, let alone how they affect different groups of students. The present study meets this call by exploring how individual demographic factors and aspects of school social environments intersect to explain student trends in development of social awareness across middle school.

Exposure to Peers from Different Backgrounds

According to intergroup contact theory, schools can foster social awareness by providing students with safe and supportive opportunities to interact with peers from different backgrounds (Allport, 1954). Unfortunately, these opportunities are becoming rarer. Almost 70 years have passed since the landmark decision in the case of Brown v. Board of Education (1954) ended de jure "separate but equal" school racial segregation. But despite decades of slow progress integrating U.S. public schools, segregation is becoming a serious problem yet again (Frankenberg et al, 2019; Reardon and Owens 2014; Stroub and Richards 2013). The percent of

Black students attending intensely segregated schools (where 90-100% of students are non-White) has increased in the last 20 years, up from 32.1% in 1988 to 40.1% in 2016 (Frankenberg et al, 2016). An even more drastic shift has happened for Hispanic/Latinx students. Hispanic/Latinx students are twice as likely to attend intensely segregated schools in 2016 (41.6%) than before desegregation in 1968 (23.2%).

One undeniable consequence of school segregation is that it limits opportunities for students to meet and engage with peers from different socio-economic, racial, ethnic, or social groups. Although no prior studies have looked at the effects of limited contact on social awareness specifically, there is evidence that cross-group interaction and friendship can lead to improvements in constructs like social awareness. When children develop friendships across racial categories, they display lower levels of prejudice and higher levels of prosocial behavior and academic achievement (Lewis et al., 2018; Rubin et al., 2007; Binder et al., 2009). At the college level, participation in intergroup dialogue has been associated with increased levels of personal awareness and interest in taking action to support social justice (Dessel, Rogge, & Garlington, 2006; Zúñiga, Nagda, Chesler, & Cytron-Walker, 2007). Conversely, a 2011 meta-analysis found considerable evidence that limiting intergroup contact can increase prejudicial attitudes based on race, ethnicity, or nationality (Raabe & Beelman, 2011).

Both theory and research support the idea that attitudes towards other racial or ethnic groups improve with greater exposure to individuals within those groups. Intergroup contact theory states that prejudice lessens as individuals have increased contact with individuals from minoritized groups (Allport, 1954), as long as certain conditions are met. Allport's optimal conditions are equal status, cooperation, common goals, and institutional support (1954) but these conditions aren't thought to be necessary (Pettigrew & Tropp, 2006). The idea is that

higher levels of exposure to individuals from different backgrounds within a confined space like a classroom leads to increased levels of contact (Blau, 1974), and increased contact lessens anxiety and leads to better understanding and empathy (Pettigrew et al, 2011). Research across differing contexts supports this hypothesis (Mitchell, 2019; Pettigrew & Tropp, 2006; Van Laar et al., 2005; Bubritzki et al., 2017; Janmaat, 2014; Munniksma et al., 2017).

It is important to address how social awareness levels might change in tandem with changes in students' exposure to other race/ethnicity peers because, barring large-scale policy changes (like national school bussing laws), segregation is only expected to get worse. Sometime in 2015, our nation reached an inflection point in terms of the proportion of White students attending public schools (U.S. Department of Education, 2020; Frankenberg et al, 2019). For the first time, White students no longer comprised a majority of K-12 public school students, and by 2045, the same will be true for the United States as a whole (Vespa et al, 2020). This means there will be fewer White students available to integrate schools. White parents may be particularly sensitive to this trend, preferring to send their children to majority White schools already attended by children of peers who tend to share racial/ethnic or economic backgrounds (Holme, 2009). Parents also have more school choice than ever. As school choice policies across the U.S. have proliferated, we have witnessed an increasing chance that White parents will end up sending their children to segregated schools (Torres & Weissbourd, 2020). Indeed, as school choice becomes more available, rates of segregation tend to increase (Karsten et al., 2003; Pearman, 2020; Roda & Wells, 2013). Exposure to White and more affluent peers is also expected to have declined because of the COVID pandemic. Anecdotally, White families pulled their children out of the public school system due to frustration with pandemic restrictions (Camera, 2021), and parents of Black, Indigenous, or other students of color – because they were

more likely to lose their jobs due to the pandemic – were more likely to keep their kids at home while virtually attending public school (Calarco, 2021).

Ethnic Group Conflict Theory

Although exposure to peers from different backgrounds is thought to be beneficial for learning in general, unhealthy social conditions may negate or even reverse the positive effect exposure to other race/ethnicity peers might have on social awareness. According to ethnic group conflict theory, real or perceived threats to an individual's group reinforces feelings of difference and thus increases negative feelings towards other groups (Blalock, 1967; Coenders & Scheepers, 2008; LeVine & Campbell, 1972). Therefore, it is possible that higher exposure to other race/ethnicity peers paired with acrimonious social conditions has a detrimental effect on social awareness.

Research on adults seems to support ethnic group conflict theory. Knowles and Tropp (2018) found that White adults felt more "group threat" and "white racial identification" in economically depressed communities with a high proportion of racial and ethnic minorities relative to diverse communities thriving economically. When White Americans experience economic hardship, they are thought to feel increased competition with other groups in their community and are more susceptible to agreeing with anti-immigrant rhetoric.

School Climate

School climate, or a school's social environment (Cohen et al, 2009), refers to the "norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures of the school" (McCormik et al, 2015; NSCC, 2007; Thapa et al, 2013). Positive school climates (e.g., those that are safe and supportive) have been repeatedly linked to positive academic (Berkowitz et al, 2016; Wang & Degol, 2016), mental (Lester & Cross, 2015;

Way et al, 2007), and behavioral outcomes (e.g., Brand et al, 2008; Klein et al, 2012; Kuperminc et al, 2001; Way et al, 2007; Gregory et al, 2011), less school violence and bullying (Bradshaw et al, 2015; Gottfredson et al, 2005; Gregory et al, 2010), and social emotional student development (see Berg et al, 2017). The more positive the school social environment, and the healthier the relationships between students and staff, the better students can cooperate and express their emotions in a healthy way.

Both intergroup contact theory and ethnic group conflict theory support the idea that exposure to peers from different backgrounds under positive social conditions can increase social awareness, whereas exposure under negative social conditions can increase prejudice and decrease social awareness (Allport, 1954; Blalock, 1967). When applied to the study of how social awareness develops in schools, intergroup contact theory and ethnic group conflict theory support the hypothesis that school culture/climate moderates the effect of school diversity on social awareness development.

There is also a small but growing body of literature that has documented how social emotional development is affected by school climate, though no study so far has explicitly looked at social awareness outcomes. In 2007, Way and colleagues used cross-domain growth modeling to examine how changes in yearly middle school student perceptions on four components of school climate (teacher and peer support, student autonomy, and clarity and consistency of school rules) were associated with changes in school adjustment (depressive symptom, self-esteem, and behavior problems). After controlling for race/ethnicity, gender and socio-economic status, they found that as student climate perceptions became more negative across middle school, so too did levels of psychological and behavioral adjustment. After

additional analyses, the authors concluded that this relationship was unidirectional in that changes in student climate perceptions led to changes in adjustment, and not vice versa.

Studies have also taken advantage of the fact that students change schools (e.g., as they are promoted to middle or high school) to help estimate school climate effects on social emotional development. Again, students were observed having more positive social emotional learning trajectories (in terms of academic, social, and emotional self-concept and self-esteem) in middle school when they reported higher perceptions of middle school climate their first year (Coelho et al, 2020). Thus, climate has been found to be a protective factor during the middle school transition (Lester & Cross, 2015). Through my own study on the relationships between student school mobility and social emotional learning, I found school changes to be detrimental for the development of self-awareness only when students moved to schools with worse levels of relative school safety (defined as the absence of crime, violence, and school bullying; Schnittka Hoskins & Schweig, 2022). Two other studies have explored how changes in social support and school climate across the middle to high school transition relate to student mental health outcomes. When this change occurred in tandem with increasing levels of peer support and/or school climate, students reported fewer depressive symptoms in high school (Newman et al, 2007), better psychological adjustment and school engagement (Benner et al, 2017). These studies seem to suggest school climate has an impact on the development of social awareness (indeed, self-awareness is a prerequisite of social awareness), however none looked at social awareness specifically. Additionally, researchers typically used demographic variables individually (versus adding interactions) and as statistical controls, not as central factors in the analysis (e.g., Way et al, 2007). Therefore, it is still unknown the extent to which school climate affects social awareness differentially by group.

School Climate and Exposure to Other Race/Ethnicity Peers in Combination

There is a dearth of studies examining how school climate and exposure to other racial/ethnic peers act together to affect social emotional learning for students, depending on their demographic background. However, a few studies have looked at the effect of changing schools on school climate and/or psychological adjustment when the new school reflects lower levels of racial diversity or a lower percentage of ethnically or racially congruent students (e.g., a Hispanic/Latinx student moving from a majority-Hispanic/Latinx to minority-Hispanic/Latinx school). Students moving to ethnically incongruent high schools relative to their middle school reported lower levels of school liking, belonging and connectedness in their schools (Benner & Graham, 2007; 2009), whereas levels remained unchanged for students moving to ethnically congruent high schools. When students transitioned to high schools that were more diverse than their middle schools, school belonging also increased significantly (Benner & Graham, 2009). The present study extends this important prior work by focusing specifically on a social emotional learning skill (social awareness) and how it's affected by different combinations of individual and school environmental variables for certain groups of students.

Summary and Research Questions

This dissertation contributes to the emerging body of research on social awareness development by uncovering common trends in social awareness development across middle school and exploring how they relate to characteristics of students and their middle school social environments. Student level predictors included student race/ethnicity, economic (dis)advantage, and gender (alone and in combination). Two aspects of middle school social environments were included: (a) how much students were exposed to peers from different racial/ethnic backgrounds and (b) how much a student's school environment was perceived to be conducive to positive

interaction (as measured by student perceptions of school culture/climate across 6th, 7th and 8th grade).

In addition to examining evidence to support the application of ethnic group conflict theory and intergroup contact theory to the understanding of social awareness, this study is one of the first to apply recent advances in person-centered methodology to the study of social emotional development in schools. The research questions were as follows:

1. What patterns of social awareness development are exhibited by students from 6th-8th grade?
2. What variables seem to explain which pattern of social awareness development students display?
    A. How do student demographics (race/ethnicity, gender, and economic (dis)advantage) predict which pattern of social awareness development students display?
    B. How do school social environments (perceptions of school culture/climate and degree of exposure to peers from different racial/ethnic backgrounds) explain which pattern of social awareness development students display?
    C. How do student demographics and school social environments together explain which pattern of social awareness development students display?

Although no prior studies have uncovered common patterns in social awareness across middle school, I tentatively hypothesized (based on the study by Kanopka et al, 2020) that most students' social awareness would remain unchanged across middle school. I also expected some students to display a downward trend in social awareness, with few students displaying a positive one. Because girls, African American, and Hispanic/Latinx students had the steepest negative social awareness developmental trends in middle school in previous research, I expected to find a higher percentage of students in these categories in the latter group. In line with ethnic group conflict theory and intergroup contact theory I hypothesized that patterns of social awareness would be better when students are exposed to a higher percentage of students from different

racial/ethnic backgrounds and more positive school social environments (positive culture/climates). I also expected to find a moderation effect between degree of exposure to other racial/ethnic peers and culture/climate, such that school culture/climate would have a greater positive impact on social awareness when students are exposed to a greater percent of other race/ethnicity peers in their school.

CHAPTER 3: METHODOLOGY

Data Collection

This study used historical data from the CORE districts, a consortium of California public school districts representing over 1 million students. The consortium currently includes:

- Los Angeles Unified School District (LAUSD)
- Long Beach Unified School District
- Santa Ana Independent School District
- Garden Grove Unified School District
- Fresno Unified School District
- San Francisco Unified School District (SFUSD)
- Oakland Unified School District, and
- Sacramento City Unified School District.

All student and school-level data were provided by the Policy Analysis for California Education (PACE), which partners with CORE to collect data and provide access for approved researchers. As part of the approval process, I signed data use agreements with individual districts, UCLA, and PACE; and my data analysis plan was approved by the UCLA IRB and PACE board members.

Social emotional learning and school climate surveys were administered to students annually by school staff (West, Buckley & Krachman, 2017). School staff were instructed to keep responses confidential, to stand at the back of the room when administering the survey, and to place demographic questions at the end of the survey if asked to increase validity of the data. Administrative data including enrollment, attendance, and demographic information were provided by each district. After school districts stripped administrative and survey data of

identifiable information (e.g., birthdates and names), data were sent to PACE for cleaning and dissemination to researchers via remote server.

Sample/Participants

Participation Criteria

The sample was selected for a larger study investigating how social awareness is learned across middle and high school contexts. Three cohorts of middle school students (students in 6th grade during the 2014-15, 2015-16, or 2016-17 school years) had complete 6th-9th grade data and were therefore used for the study. See Table 1 for years of data collection and count of participants by cohort. Note that data collection for the third cohort spanned the 2019-20 school year and therefore had limited survey completion (and representation in the analytic sample) due to the COVID pandemic. Districts and cohorts were combined for analysis and reporting to maintain district confidentiality as per signed data use agreements.

Table 1

Sample Cohorts and School Years Represented

Cohort	*6th*	*7th*	*8th*	*9th*	*Sample n*
1	2016-17	2017-18	2018-19	2019-20	2888
2	2015-16	2016-17	2017-18	2018-19	3224
3	2014-15	2015-16	2016-17	2017-18	5431

The analytic sample consisted of 11,543 students who were selected based on school enrollment and attendance patterns, type and number of middle schools attended, and data completion. Because the purpose of the study was to examine how social awareness develops in in the context of middle school, students who attended more than one school during 6th through 8th grade were eliminated from the sample. This removed students with high degrees of school mobility or chronic underattendance since these factors were not of interest for the present study.

More specifically, students needed to attend at least 80% (or equivalent) of the total possible school days per year in the same school for all three years of middle school to participate in the study. (Attendance thresholds during the COVID pandemic were calculated using z-score equivalents, which resulted in a requirement of at least 39% attendance in 2020 and at least 55% attendance in 2021.) To fit criteria for the analysis plan, students also needed three valid social awareness scale scores (for 6th, 7th, and 8th grade) to participate. This eliminated students who,

- were retained or skipped a grade level,
- attended a school that only served 7th and 8th grade,
- took the survey while attending a school that was not their most attended school across 6th, 7th, and 8th grade, or
- had invalid social awareness survey scale scores during focal school years.

Finally, based on requirements for the broader study, students needed to matriculate to a high school with a large enough cohort of students to support future analyses on school transition effects. More specifically, after combining all three cohorts, students needed to matriculate to high school with at least 25 fellow students (see Hox & McNeish, 2020).

After applying these criteria to the total population of students in participating districts, students remaining in the sample only represented a small proportion (about 8%) of the total population (see Table 2). Schools were better represented. About 60% of the middle schools with 6-8, 7-8 or K-8 grade configurations in participating districts were represented in the analytic sample.

Table 2

Student and School Representation

	Sample	*Population*	*% Represented*
Students	11,543	146,764	7.9%
Schools	81	142	57.0%
Students per school	143	1033.5	13.8%

Notes: *6th, 7th, or 8th grade Population in K-8, 6-8 or 7-8 schools in 2017, **Across all three cohorts combined

Sample Demographics

The sample was comprised of primarily Hispanic/Latinx students (58.8%) who were eligible for free or reduced lunch (68.6%; see Table 3). Sample demographics were generally similar to the population of students in the three sampled cohorts across participating districts, with some noticeable differences. Asian and White students were overrepresented in the sample (representing 16.9% and 13.5% of the analytic sample but only 8% and 10.7% of the population respectively). Conversely, African American, Hispanic/Latinx, male, and economically disadvantaged students were slightly underrepresented in the analytic sample (representing only 6.1%, 58.8%, 48.9%, and 68.6% of the analytic sample and 8.1%, 64.8%, 51.4, and 71.8% of the population respectively).

The demographic composition of schools represented in the analytic sample was close to the average composition of eligible schools in participating districts (see Table 3). The average school percent of African American, Asian, Hispanic/Latinx, White and male students in the analytic sample were within 1-2 percentage points of the average percents across all eligible schools. However, the average percentage of students eligible for free or reduced lunch was slightly lower in the analytic sample (66.8% compared with 71.3% of all eligible schools). Overall, although the analytic sample only represented less than 10% of the population of

students across three cohorts of students in participating districts, demographic representation was similar in the sample to the population, with the one most notable exception being that Asian students represented twice the proportion of students in the sample relative to their population representation (16.9% of the sample and only 8% of the population).

Sample social awareness and ELA scores. After applying analytic sample criteria to the dataset, some notable differences in social awareness and ELA scores emerged between the sample and the population (see Table 4). Students in the sample had higher average ELA scores than the population by about .4 standard deviations, and higher social awareness scores by about .27 standard deviations. Therefore, the sample underrepresents students with lower ELA and social awareness scores, likely due to stringent attendance and data completion requirements.

Table 3

Demographic Representation of the Sample

Demographic Variable	***Sample Student % (n=11,543)***	***Population* Student % (n=146,527)***	***Sample Mean School % (n=81)***	***Population Mean* School % (n=129)***
African American	6.1	8.1	7.2	8.2
Asian	16.9	8.0	9.8	8.0
Hispanic/Latinx	58.8	64.8	63.6	65
White	13.5	10.7	10.6	10.9
Male	48.9	51.4	51.2	51.5
Free or Reduced Lunch Eligible	68.6	71.8	66.8	71.3

Notes: *6th, 7th, or 8th grade population in K-8, 6-8 or 7-8 schools in 2017; **Average of student population in 6-8 or 7-8 middle schools (K-8 and elementary schools are not represented here since their student body includes mostly students in younger grades)

Table 4

*Social Awareness and ELA Scores in Sample vs. Population**

Variable	*Sample Mean*	*Sample SD*	*Sample Range*	*Population Mean**	*Population SD*	*Population Range*	*Standardized Mean Difference***
ELA Scale Score (2017)	2559.7	94.4	2234-2769	2518.2	103.9	2210-2769	0.4
Social Awareness Score (2017)	2.69	.67	.07-3.94	2.5	.71	.07-3.94	0.27

Notes: *6th, 7th, or 8th grade population in K-8, 6-8 or 7-8 schools in 2017; **Calculated by subtracting the population mean from the sample mean and dividing by the population standard deviation

Measures

Race/Ethnicity

Districts provided PACE with race/ethnicity student information, which was typically collected from parents during school enrollment. Race/ethnicity was categorized into the following: Native American, Asian, Pacific Islander, Filipino, African American, White, or Hispanic/Latinx. Students were able to receive more than one characterization, however district practices varied in terms of whether Hispanic/Latinx students were automatically labeled as having a White racial background. To make designations equivalent across districts, students listed as both Hispanic/Latinx and White were recoded as Hispanic/Latinx, and students listed as Hispanic and Asian, Pacific Islander, Filipino, or African American were recoded as having multiple race/ethnicity designations. The racial/ethnic categories used for this study were Native American, Asian, Pacific Islander, Filipino, African-American, White, or Hispanic/Latinx. Students with more than one race/ethnicity category represented a very small proportion of the potential sample (3.2% of students and less than 1% of students in each school on average).

Because sample sizes for multi-racial/ethnic students were too small to make generalizable conclusions based on the analysis plan, these students were eliminated from the analytic sample.

Gender

Gender was reported by districts and is based on "a person's actual sex or perceived sex and includes a person's perceived identity, appearance or behavior, whether or not that identity, appearance or behavior is different from that traditionally associated with a person's sex at birth" (PACE Data Documentation, 2018). Students were not asked to report on their gender identity, and only "male" and "female" designations were used.

Economic (Dis)advantage

Economic disadvantage was measured by annual participation in each school's free or reduced lunch program. This information was reported by school districts on an annual basis. Students who participated in the program at least one year during middle school were flagged in my analysis as economically disadvantaged.

Smarter Balanced English Language Arts (ELA) Scale Scores

Grade level ELA scale scores were used to control for differences in English comprehension and language arts performance across students. Scores were taken from each student's 6^{th}, 7^{th} and 8^{th} grade year. Values were imputed for students missing 6^{th} or 8^{th} grade scores (see Appendix I). These scale scores were reported annually for each student by the Smarter Balanced Consortium.

Social Awareness

Social awareness was one of four social emotional competencies selected by CORE district representatives and SEL content experts for inclusion in the School Quality Improvement

Index (Krachman et al, 2016). Selection was based on district priority and the extent to which the competency was meaningful, measurable, and malleable (the "3 Ms"). Measures were then selected by experts in the field of SEL based on similar criteria used to select culture/climate measures: that the measure is evidence based, free to administer, practical to administer, parsimonious, and strengths based (Krachman et al, 2016, p. 11). Practical was operationalized as having the option to administer via paper or online and strength-based meant that items were to be worded positively wherever possible (West et al, 2018a). Multiple forms were tested with a sample of students, and items were then selected for inclusion based on internal consistency and correlations with other scales and external criteria.

CORE districts attempted to minimize three common forms of survey bias. Social desirability bias, the tendency of respondents to answer questions about themselves based on what they think is socially acceptable instead of what is true for themselves (Podsakoff, MacKenzie, & Lee, 2003; Fisher, 1993) was minimized by: (a) telling students that their responses were confidential and would have no bearing on grades, and (b) by telling adults to stand at the back of the room while administering the survey to ensure confidentiality (West et al, 2018). The second threat accounted for was stereotype threat, which occurs when members of a negatively stereotyped social group rate themselves lower (or perform worse) than their true ability because they have internalized these stereotypes (see Spencer, Steele and Quinn, 1999). Stereotype threat was addressed by placing items about student identity (e.g., gender, race) at the end of the survey (or removing them completely). Although this does not guarantee stereotype threat is not an issue, it helps minimize priming effects found in previous research (Walton and Spencer, 2009). CORE also expected that students might be influenced by reference bias, which "occurs when individual responses are influenced by differing implicit standards of comparison"

(West et al, 2016, p. 151). To help ensure that students used similar standards, in partnership with Educational Testing Service (ETS), CORE added anchoring vignettes to the social awareness scale. Students were asked to rate hypothetical individuals described in vignettes using the same scale they used to assess themselves. These responses were then used to rescale scores on self-referenced items. Anchoring vignettes were eventually discarded because they did not improve internal consistency or convergent validity when considering CORE as a whole (West, Dow, & Buckley 2017).

The final version of the secondary SEL survey measuring social awareness prompted students with the following language: "In this section, please help us better understand your thoughts and actions when you are with other people. Please answer how often you did the following during the past 30 days. During the past 30 days…" Students then responded to several statements using the following response options:

- How carefully did you listen to other people's points of view? *(Not Carefully At All, Slightly Carefully, Somewhat Carefully, Quite Carefully, Extremely Carefully)*
- How often did you compliment others' accomplishments? *(Almost Never, Once in a while, Sometimes, Often, Almost all the time)*
- How well did you get along with students who are different from you? *(Did Not Get Along At All, Got Along A Little Bit, Got Along Somewhat, Got Along Pretty Well, Got Along Extremely Well)*
- How clearly were you able to describe your feelings? *(Not At All Clearly, Slightly Clearly, Somewhat Clearly, Quite Clearly, Extremely Clearly)*
- When others disagreed with you, how respectful were you of their views? (*Not At All Respectful, Slightly Respectful, Somewhat Respectful, Quite Respectful, Extremely Respectful; CORE, 2021)*

Following others (Meyer et al, 2018; Kanopka et al, 2020), when available, I used IRT social awareness "true" scale scores based on the generalized partial credit model. This model weighs items depending on both item "difficulty" and its ability to differentiate student performance (i.e., how strongly the item is related to the social awareness construct). This method is preferred

over classical test-based approaches (e.g., the mean sum score) because it produces better prediction of scale scores for students with missing item level data, weighs items differentially depending on difficulty and discrimination, and provides more comparable scores across years of administration (Education Analytics, Inc., 2018). "True" scores were placed on the original item scales so that they could be directly compared to scores calculated using the classical test approach. For the 2018-19 school year, since IRT-based scale scores were not available, I calculated scale scores by taking the average of all five item scores. Refer to Appendix II for additional psychometric information on the social awareness scale, including evidence of validity and reliability.

Degree of Exposure to Peers from Different Racial/Ethnic Backgrounds

I chose to focus on the degree of exposure to peers from different racial/ethnic backgrounds and not other forms of difference because it was the best measure available to me at the time of this study. Administered surveys did not include questions about other identity variables that could be at play, including sexual or gender orientation, family political orientation or social class. The only other available measure was exposure to students who did or did not share free or reduced lunch designation. There were two main issues with including this variable. First, free or reduced lunch eligibility is dichotomous (yes/no) and not a precise measure of exposure to socioeconomic diversity. Second, the sample was relatively homogeneous in terms of free or reduced lunch participation. All participating districts primarily served students eligible for free or reduced lunch, so schools with high levels of economic advantage were relatively rare.

To measure the degree to which a student was exposed to peers from different racial/ethnic backgrounds in middle school, I calculated scores on school *percent other*

race/ethnicity (*ORE*) for each student in the sample. Following Benner and Graham (2009), I measured percent other race/ethnicity by calculating the percent of peers in a student's school who do not share his or her race/ethnicity. Therefore, an African American student in a school with 15% African American students and 85% Hispanic/Latinx students would receive an *ORE* score of 0.85; Hispanic/Latinx students in the same school would receive a score of 0.15. Higher scores reflect a greater degree of exposure to other races/ethnicities. Although exposure to other race/ethnicity peers is known to vary across classrooms within schools in impactful ways (i.e., even in racially/ethnically heterogeneous schools, students may be segregated by race/ethnicity within their classes; see Kogachi & Graham, 2020), classroom level race/ethnicity data was not available and is therefore not included in this study. Calculating the degree of exposure to other race/ethnicity peers by comparing each student's race/ethnicity to the representation of his or her race/ethnicity at the school level assumes that even if students have differential exposure to other races/ethnicities across their classes, interactions during non-class time periods are enough to influence social awareness of peers from different backgrounds. For example, students may intermingle during lunch, between classes, during homeroom class periods, or before or after school through participation in extracurricular activities (e.g., sports or clubs). Even without meaningful interaction, students could be exposed to others through observation (e.g., during pep rallies, morning announcements) or asynchronous communication (e.g., social media).

School Culture/Climate

Two dimensions of school culture/climate were used: student reported *sense of belonging – school connectedness*, which falls under the CORE climate category "interpersonal relationships" and *sense of school safety*. These constructs were selected by CORE district leadership to be part of their school accountability framework based on the following criteria:

that the measures be "evidence-based (including meaningful, measurable, and "actionable"); free; aligned with other surveys given by the districts; feasible to complete within 10-20 minutes; and applicable to students in grades 4 and above" (Krachman et al, 2016, p. 16). Items were primarily taken from the California Healthy Schools Survey, which was developed by WestEd (California Department of Education, 2021). The CORE districts piloted the measures in 2014-15 and revised items based on district desire to "complement other Index components, remove repetitive items, align with California's Local Control and Accountability Plan (LCAP) requirements, ensure appropriate measurement of all stakeholder groups (students, staff, and parents), and improve the validity and reliability of the measures" (Krachman et al, 2016, p. 18). See Appendix III for an overview of psychometric properties of these scales.

Sense of belonging – school connectedness is defined by CORE as: "A positive sense of being accepted, valued, and included, by others (teacher and peers) in all school settings. Students and parents report feeling welcome at the school" (CORE, 2019). To measure this construct, students were asked via survey, "How strongly do you agree or disagree with the following statements?" and were allowed to respond with one of the following options: Strongly Disagree, Disagree, Neither Disagree Nor Agree, Agree, Strongly Agree. The item prompts were:

- I feel close to people at this school
- I am happy to be at this school
- I feel like I am part of this school
- The teachers at this school treat students fairly

Sense of safety is defined by CORE as: "Students and adults report feeling safe from verbal abuse, teasing, or exclusion by others in the school" (CORE, 2019). To measure this construct, students were asked via survey, "How safe do you feel when you are at school?" and were allowed to respond with one of the following options: Very Safe, Safe, Neither Safe nor

Unsafe, Unsafe, Very Unsafe. They were then asked, "During the past 12 months, how many times on school property have you …" and were allowed to respond with one of the following options: 0 Times, 1 Time, 2 or 3 Times, 4 or More Times. The item prompts were:

- been pushed, shoved, slapped, hit or kicked by someone who wasn't just kidding around?
- had mean rumors or lies spread about you?
- had sexual jokes, comments, or gestures made to you?
- been made fun of because of your looks or the way you talk?

I used average *sense of belonging – school connectedness* and *sense of safety* scale scores for each student at each grade level (6^{th}, 7^{th}, and 8^{th}). Scores were imputed for students missing one of three grade level scores. See Appendix I for more detail.

Analytic Approach

RQ1: What patterns of social awareness development are exhibited by students from 6th-8th grade?

To answer the first research question, I used mixture models to characterize students into subgroups based on their development of social awareness across middle school. Mixture modeling in a longitudinal context assumes that patterns in development can be explained by the presence of unobserved latent subpopulations (Collins & Lanza, 2010). In this study, latent populations were defined by patterns of social awareness scale scores across middle school using MPlus (Muthen & Muthen, 2023). Whether these trajectories could be assumed linear was tested empirically by comparing goodness of fit of *growth models*, which classify students based on each student's estimated social awareness intercept and slope (Muthen, 2000; Wardenaar, 2021), and *latent profile models*, which have no linearity constraints and simply classify based on patterns of social awareness across the three study years (Masyn, 2013).

The final model was selected based on a balance of parsimony, measures of comparative and relative model fit (see Nylund et al, 2007; Henson et al, 2007), class separation and homogeneity, approximate weight of evidence criterion (AWE), face and criterion validity, and appeal of the model based on theory and purpose (Collins & Lanza, 2010; Hickendorff et al, 2018; Nylund-Gibson, 2023). Because the purpose of the study was to explain differences in social awareness trajectories, all else being equal, preference was given to models with adequate estimated class sizes and heterogeneity in terms of patterns of social awareness across latent subgroups (for more detail, refer to Appendix IV). To measure comparative model fit, I used bootstrap likelihood ratio tests (BLRT; Nylund et al, 2007) and sample size adjusted Bayesian Information Criterion (aBIC; Sclove, 1987) because they performed well in simulations (Nylund et al, 2007; Henson et al, 2007). To measure relative fit, I conducted likelihood ratio tests comparing the fit of each model to the one prior (Nylund-Gibson, 2023).

RQ2: What variables seem to explain which pattern of social awareness development students display?

After identifying the optimal mixture model specification and number of latent classes, each student was assigned to their most probable social awareness trajectory class (Serang, 2021; Bray, Lanza, & Tran, 2015). I then used multinomial logistic regression models regressing most likely class on two sets of variables: (RQ 2A) student demographic variables (race/ethnicity, gender, free or reduced lunch eligibility, and their interactions) and (RQ 2B) variables related to the school social environment (school percent other race/ethnicity peers, perceptions of school culture/climate, and the interaction between the two). Because perceptions of school culture/climate and percent other race/ethnicity peers were related to other variables that influenced social awareness trajectories, regressions used for RQ 2B included a list of covariates.

I included continuous covariates that were correlated at a level of at least 10% (i.e., at least weakly correlated) with the focal predictor, and categorical covariates with standardized mean differences of at least .20 on the focal predictor (i.e., a small effect sizes). I used a stepwise approach to model building, beginning with adding blocks of variables, and then removing predictors iteratively if they were statistically insignificant ($p > .05$) or inflated (due to having cells with 0 students). For RQ2C, I then combined all variables into a single model, and iteratively removed interaction terms and then main effects if they were not statistically significant to the $p < .05$ level for at least one of the pairwise class comparisons.

Because the classification of students into social awareness trajectory classes was not accurate enough (Clark & Muthen, 2009), I estimated latent classes and regression models simultaneously using the BCH approach suggested by Bolck, Croon & Hagenaars, 2004 and outlined in detail by Ferguson (2020). This approach incorporates each individual's classification uncertainty into covariate models and is thought to be more robust than sequential approaches that treat classification as an observed variable (Clark & Muthen, 2009; Nylund-Gibson & Masyn, 2016).

CHAPTER 4: RESULTS

RQ1: What profiles of social awareness are exhibited by students from 6th-8th grade?

I used mixture models to uncover common patterns of social awareness development across middle school. The first step in this process was to determine if social awareness development could be modeled as a linear (or curvilinear) process (i.e., *growth mixture models*, Muthen, 2000; Wardenaar, 2021), or whether a more flexible modeling approach was needed (i.e., *latent profile models*; Masyn, 2013). I did this by comparing the model fit for the most common specifications of growth mixture models and latent profile models (see a description of each below; Nylund-Gibson, 2023; Wardenaar, 2020; Wardenaar, 2021; Jung & Wickrama, 2008). The seven initial model specifications I tested were:

- **LCGA**: Latent class growth analysis which estimates intercepts and slopes for each class but within class intercept and slope variances are fixed at 0 (Jung & Wickrama, 2008)
- **GMM-Constrained**: Growth mixture model with free class slope and intercept variances but variances are constrained to be equal across class.
- **GMM**: Growth mixture model with free within and between class slope and intercept variances (Jung & Wickrama, 2008).
- **LPA-EEI**: Mplus Default with free timepoint variances but variances are constrained to be equal across class. Timepoint covariances are fixed at 0 (Wardenar, 2021).
- **LPA-EEE**: Latent profile analysis with free timepoint variances and covariances but variances and covariances are constrained to be equal across classes.
- **LPA-VVI**: Latent profile analysis with free timepoint variances which are not constrained to be equal across classes but timepoint covariances are fixed at 0.
- **LPA-VVV**: Latent profile analysis with free timepoint variances and covariances which are not constrained to be equal across classes.

Table 5 displays the results of this first set of models. For each model specification (listed as columns in Table 5), I started by extracting one latent class, and continued to extract additional classes until (a) I got repeated model identification or computational errors (see Table 5 for types of errors encountered), (b) one or more classes were very small (about 1% or less)

and likely to be spurious (see Marsh et al, 2009 & Masyn, 2013), or (c) the difference in fit compared to the previous model was not statistically significant to the $p<.05$ level based on Lo, Mendell, and Rubin (2001) likelihood ratio (LMR-LRT) or Bootstrap Likelihood Ratio tests (Nylund et al, 2007; Nylund-Gibson, 2023). Out of the seven mixture model specifications tested, latent profile models (allowing for non-linear trends in social awareness across middle school) generally resulted in fewer model identification issues and better estimates of model fit. Table 5 shows sample size adjusted Bayesian Information Criterion (aBIC; Sclove, 1987) values for each of the models tested, with lower aBIC values indicating better model fit. The lowest aBIC was observed for the LPA VVV models, the least constrained LPA models. However upon reviewing class variance estimates, it became apparent that variance differences were the primary driver of class selection and not social awareness pattern differences. For example, for the two class VVV model (see right column), due to a ceiling effect the class with a high, stable trajectory had low timepoint variances, and the other class had much higher timepoint variances. Because the purpose of the model was to classify students based on patterns of social awareness, these models (LPA VVV) were eliminated from the set of LPA candidate models.

Plotting measures of model fit (aBIC) for candidate LPA models, the elbow (the point at which extracting additional classes is associated with a diminishing return on fit statistics) appeared somewhere between 3-4 classes (see bold aBIC values in Table 5). Therefore, a second series of 3, 4, and 5 class LPA specifications were tested with constraints made based on specific timepoint covariances (Nylund-Gibson, 2023). This set of models varied based on three criteria. First, models either had free timepoint variances or equality constraints imposed on timepoints so that each class would have the same estimated variance for social awareness scale scores at each timepoint. Second, instead of either estimating no timepoint covariances (as in EEI models) or

all possible timepoint covariances (as in VVV) specifications were tested with either (a) only 6th grade and 7th grade score covariances freely estimated, (b) both the covariance between 6th and 7th and the covariance between 7th and 8th grade social awareness scale scores freely estimated, or (c) all possible timepoint covariances freely estimated (6th & 7th, 7th & 8th, and 6th & 8th). The third criteria was whether timepoint covariances had equality constraints placed on them, and if they did, for how many classes. For example, for three-class models with only the covariance betewen 6th and 7th grade social awareness scale scores estimated, the covariance parameter was constrained to be equal across all three classes, across two classes or zero classes. Detailed model results for these specifications can be found in Appendix III.

Table 5

Comparison of aBIC for Student Social Awareness Mixture Models

Classes	LCGA	GMM-C	GMM	LPA EEI	LPA EEE	LPA VVI	LPA VVV
1	65994.750	59228.532	59228.532	65992.495	59217.016	65992.495	59217.016
2	60559.712	58677.449	58579.344	60539.55	58550.881	59294.37	**56844.957**
3	**59287.365**	58274.785	COV	**59192.87**	57949.240	**57282.142**	56627.730
4	58929.020	COV		58826.95	**57508.341**	56775.13	56516.520
5	58477.948			58394.69	57339.560	MI SS	LMR
6	SS			58028.75	57211.050		
7				57809.783	LMR SS		
8				LMR SS			

Notes:

- LCGA: Latent class growth analysis which estimates intercepts and slopes for each class but within class intercept and slope variances are fixed at 0 (Jung & Wickrama, 2008)
- GMM-Constrained: Growth mixture model with free class slope and intercept variances but variances are constrained to be equal across class.
- GMM: Growth mixture model with free within and between class slope and intercept variances (Jung & Wickrama, 2008).
- LPA-EEI: Mplus Default with free timepoint variances but variances are constrained to be equal across class. Timepoint covariances are fixed at 0 (Wardenar, 2021).
- LPA-EEE: Latent profile analysis with free timepoint variances and covariances but variances and covariances are constrained to be equal across classes.
- LPA-VVI: Latent profile analysis with free timepoint variances which are not constrained to be equal across classes but timepoint covariances are fixed at 0.
- LPA-VVV: Latent profile analysis with free timepoint variances and covariances which are not constrained to be equal across classes
- LMR: non-significant Lo, Mendell, and Rubin (2001) likelihood ratio test (LMR-LRT)
- SS: One or more classes <1% of the sample based on most likely class
- MI: Model identification issue
- Bold: aBIC at elbow when plotted
- COV: One or more classes have covariance matrix not positive definite

Five estimated classes of students were found with different patterns of social awareness across middle school. Figure 5 displays average trends in social awareness across these five groups of students (students were assigned to the class deemed most probable based on results from the analysis). The final model results are presented in Table 6. The largest subgroup (*High*; 75%) reported average social awareness scores of about 3 on a scale from 0-4 across 6th, 7th, and 8th grade. Responding with a 3 on each of the five social awareness items would mean (in the 30 days prior to taking the survey) students perceived themselves as listening to other's

points of view quite carefully (vs. somewhat or extremely carefully), complementing others' accomplishments often (vs. sometimes or almost all of the time), getting along with students who are different pretty well (vs. somewhat or extremely well), describing their feelings quite clearly (vs. somewhat or extremely clearly), and being quite respectful of different points of view (vs. somewhat or extremely respectful). Therefore, about three quarters of students in the sample considered themselves socially aware across all middle school years.

The next most common pattern of social awareness across middle school (7.7%) was characterized by a positive developmental trend (labeled *Improvers*). Students in this subgroup started middle school with average social awareness scores of 2 on a 0-4 point scale, corresponding with the selection of "somewhat" or "sometimes" responses to social awareness item prompts, and ended middle school on par with students in the High SA class. Tests of separation reported in Table 6 indicate 6th grade SA scores were significantly lower for students in the *Improver* SA class than for students in the *High* SA class, but not significantly different in 8th grade.

The next most common pattern of social awareness was characterized by a steep decline in social awareness from about 3 in 6th grade (statistically the same as students in the High class, based on tests of separation) to about 1.5 in 8th grade. Eighth grade scores were considerably and statistically significantly lower than 6th grade scores ($p<.05$) and corresponded to responses to social awareness item prompts in the range of *slightly* to *somewhat* and *once in a while* to *sometimes*.

Students labeled *Low 7th* showed the second to least most common pattern of social awareness across middle school. These students mean SA scores were statistically equivalent to students in the *High* class in 6th and 8th grade (see Table 6) but significantly lower in 7th grade

(with a mean of about 2 on a 0-4 point scale). These students experienced a decline in social awareness in 7th grade, but fully recovered by 8th grade on average.

The least common pattern of social awareness across middle school (4.6%) was characterized by a low, stable pattern of scores (averaging 1.75 in 6th grade and 1.5 in 8th grade). Students in the *Low* class scored similarly to students in the *Improver* class in 6th grade, but similar to *Decliners* in 8th grade (see Table 6).

Taken together, these results suggest that while a small minority of students report declining or low trends in social awareness in middle school (about 12% or about 1,400 students), the overwhelming majority reported high or improving levels of social awareness across middle school (about 82% or 9,500 students).

Table 6

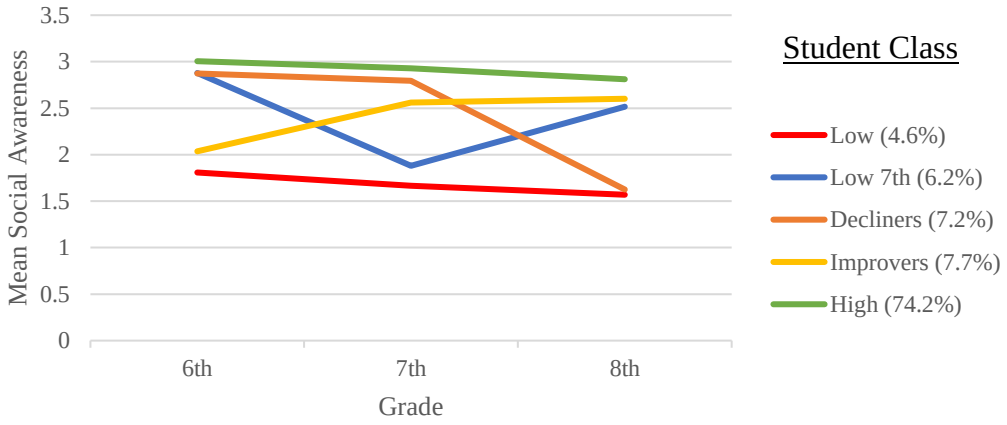
Final Mixture Model Results: 5 Class EEE c1234 LPA Model

nPar	***Max LL***	***aBIC***	***BIC***	***AWE***	***Entropy***	***AvePP***	**LMR-LRT & BLRT**	**Class Homogeneity 6th, 7th, 8th**	**Classes & Timepoints with low Separation**
28	-28401.7	56976.52	57065.5	57411.4	.725	.695, .708, .73, .68, .875	<.001, <.001	.67, .68, .67	2,3&5 6th 1&4 6th 3&4 7th 1&2 7th 2,4&5 8th 1&3 8th

Notes: LL: Log Likelihood; BLRT: Bootstrap likelihood ratio test; aBIC: sample size adjusted BIC; LMR-LRT: Lo, Mendell, and Rubin (2001) likelihood ratio test; Class 1 = Low, Class 2 = Low 7th, Class 3 = Decliners, Class 4 = Improvers, Class 5 = High ; High Homogeneity = <.6, Low Homogeneity = >.9; Low separation = <.85

Figure 5

Final Student Model Plot of Means



Notes: students were assigned to their most likely subgroup; subgroup labels were given based on observed patterns and were not tested for validity.

RQ2A: How do race/ethnicity, gender, and economic (dis)advantage predict which pattern of social awareness development students display?

Representation of students across race/ethnicity, gender, and economic (dis)advantage subgroups differed across social awareness trajectory classes (see Table 7). To test whether these demographic variables were predictive of social awareness trajectory class assignment, I used a series of stepwise multinomial logistic regression models. I used the *Improver* class as the reference class because any differences between students who showed improvements and those who showed stagnant or declining trends potentially explain why those improvements occurred. Using *Improvers* as the reference class means slope estimates for demographic dummy variables represented estimated differences between demographic groups in terms of the log-odds of being assigned to the *Improver* class relative to the other four social awareness trajectory classes (*High, Decliners, Low,* or *Low-7*th). For race/ethnicity, I chose to use Hispanic/Latinx students as the reference group because they were the largest racial/ethnic group and had the lowest mean social awareness scores in 8th grade. Due to small sample sizes within cells, I removed American Indian (n=18), Filipino (n=441) and Pacific Islander (n=85) students before running the regressions. The first model (Model 0 in Table 8) regressed SA Trajectory Classes on race/ethnicity only. In the second model (Model 1 in Table 8), I added economic disadvantage, which differed between racial/ethnic groups (28% of White students, 29% of Asian students, 76.5 of African American students and 89% of Hispanic students were eligible for free or reduced lunch). The third model included only gender as a predictor (see Table 9). Running these models separately allowed me to compare their predictive power and identify how the relationships between demographic variables and social awareness trajectory classes changed depending on which other variables included. I then used a stepwise approach to build a final

model using race/ethnicity, gender, and ED starting with the initial model that was most predictive of social awareness trajectory class (race/ethnicity and ED) and adding gender and corresponding interaction terms until they no longer contributed to improved model fit. I removed coefficients that were not statistically significant to the a <.05 level.

Table 7

Demographic Representation by SA Class

Most Likely Class	N	%	Econ. Disadvantaged	Economically Advantaged	African American	Asian	Hispanic/ Latinx	White	Female	Male
1 (Low)	489	4.4	74.8	25.2	6.3	17.4	65.2	8.0	32.9	67.1
2 (Low 7th)	453	4.0	73.5	26.5	8.4	13.7	66.4	7.9	51.9	48.1
3 (Decliners)	592	5.3	82.3	17.7	6.9	7.1	71.8	10.3	43.2	56.8
4 (Improvers)	515	4.6	75.1	24.9	7.6	16.5	62.3	9.5	42.9	57.1
5 (High)	9172	81.7	66.0	34.0	5.9	18.1	56.4	14.6	53.2	46.8
Grand Total	11221	100	68	32.0	6.1	17.2	58.3	13.6	51.3	48.7

Table 8

Economic Disadvantage and Race/Ethnicity

Model	Covariate	*Improvers vs Low*	*Improvers v Low 7th*	*Improvers v. Decliners*	*Improvers vs High*	npar	-LL	aBIC
0	Intercept	.49***	.16	-.14	-2.14***	16	9619.2	19336
	African American	.37	-.04	.33	.24			
	Asian	-.09	.36	1.80***	-.31			
	White	.25	.38	.03	-.79***			
1	Intercept	.44	-.2	.24	-2.56***	20	-9581.7	19285.4
	ED	.05	.40	-0.4	.47**			
	African American	.38	.01	.30	.3			
	Asian	-.06	.59* (p=.08)	1.6***	-.03			
	White	.28	.61	-0.17	-.51* (p=.09)			
	ED*Asian	-	-	-	-			
	ED*African American	-	-	-	-			
	ED*White	-	-	-	-			

Notes: coefficients refer to the estimated change in log odds associated with a 1SD increase in the predictor variable. Log odds refer to the log odds that a student will be in the Improver trajectory class relative to the Low, Low-7th, Decliner, or High class (to aid interpretability, I present odds of being an *Improver* vs the other categories). To convert log odds to probabilities, I used this formula: log_e(b)/1+log_e(b)

Results of Models 0 and 1 predicting SA trajectory class assignment with economic disadvantage and race/ethnicity are presented in Table 8. Significant intercept terms in Model 0 show that Hispanic/Latinx students were more likely to be *Improvers* than in the *Low* SA Class (*B* = .49, p<.01), and more likely to be in the *High* class than the *Improver* class (*B* = -2.14, p<.01). Insignificant intercept terms comparing probabilities of being an *Improver* vs *Decliner* or *Low 7th* suggest that Hispanic/Latinx students were equally likely to be in the *Improver, Decliner,* and *Low 7th* class. Asian students were more likely than Hispanic/Latinx students to be an *Improver* vs *Decliner*, as shown by the significant Asian slope coefficient (*B* = 1.80, p<.01), and White students were more likely than Hispanic students to be in the *High* class

versus the *Improver* class. After controlling for economic disadvantage (Model 1 in Table 8), there was no longer a significant difference between White and Hispanic students in terms of whether they were more likely to be in the *High* or *Improver* class. Insignificant interaction terms between economic disadvantage and race/ethnicity suggested that the effect of economic disadvantage on social awareness trajectory class assignment did not differ across race/ethnicity. According to this model, within each race/ethnicity group, proportions of economically disadvantaged students were similar across *Low*, *Low 7th*, *Improver* and *Decliner* social awareness trajectory classes (note insignificant ED slope parameters for each of these pairwise comparisons). In other words, after accounting for race/ethnicity, economic (dis)advantage did not appear to affect whether students had an improving, declining, or low social awareness trajectory (the trajectory contrasts most related to the driving question of why some students report improvements in social awareness and others don't).

A higher proportion of economically disadvantaged students were assigned to the *Improver* class than the *High* class ($B = .47$, $p<.05$). Translating these logits to probabilities, compared to the *High* group, being economically disadvantaged increased a student's probability of being an *Improver* by 60% (from 7% to 11% for Hispanic/Latinx or Asian students, from 9% to 14% for African American students, and from 4% to 7% for White students). Considering that social awareness trajectories of *Improvers* and students in the *High* class only differed in their average 6th grade scores, this simply means that economically advantaged students were more likely to start middle school with high social awareness scores. This is consistent with the observation that economically advantaged students had higher average scores on the social awareness scale.

Race/ethnicity appeared to matter in distinguishing between *Improvers* and *Decliners.* Within economically advantaged and disadvantaged groups, being Asian was associated with a higher odds of being an *Improver* over a *Decliner* relative to Hispanic students ($B = 1.6$, $p<.01$). Translating this logit to probability, Asian students had a 35% higher chance of being assigned to the *Improver* vs the *Decliner* class relative to Hispanic/Latinx students. According to the prediction equation, economically disadvantaged students had a 45% chance of being an *Improver* (i.e., they were more likely to be a *Decliner*) if they were economically disadvantaged African American, Hispanic/Latinx, or White students, but an 81% chance of being an *Improver* if they were Asian. Economically *advantaged* students had about a 56% chance of being an *Improver* if they were African American, Hispanic/Latinx, or White, but an 86% chance of being an *Improver* if they were Asian. African American and White students appeared to have a similar odds of being an *Improver* vs *Decliner* relative to Hispanic students, as evidenced by the insignificant slope coefficients. Follow up post-hoc pairwise comparisons between African American, Hispanic/Latinx, and White students were non-significant, showing that the odds did not differ across the three non-Asian race/ethnicities represented.

Student race/ethnicity did not appear to distinguish between students in the *Improver* class and the *Low, Low 7th,* or *High* classes. Insignificant slope coefficients for African American, White, and Asian students under the *Low, Low 7th*, and *High* columns indicate each racial/ethnic group was represented at a similar rate compared with Hispanic students, who were in the reference group.

Table 9

Gender

Covariate	*Improvers vs Low*	*Improvers v Low 7th*	*Improvers v. Decliners*	*Improvers vs High*	npar	-LL	aBIC
Intercept	.96***	-.03	.01	-2.57***	8	9693.8	19436.4
Male	-.66***	.52**	.05	.56***			

Notes: coefficients refer to the estimated change in log odds associated with a 1SD increase in the predictor variable. Log odds refer to the log odds that a student will be in the Improver trajectory class relative to the Low, Low-7th, Decliner or High class (to aid interpretability, I present odds of being an *Improver* vs the other categories). To convert log odds to probabilities, I used this formula: log_e(b)/1+log_e(b); *p<.10, **p<.05, **p<.01

Results of the second initial model predicting social awareness trajectory class assignment with gender are presented in Table 9. These results show evidence of gender disproportionalities across social awareness classes. Females were equally as likely to be in the *Decliner* vs *Improvers* class, but more likely to be in the *Improver* vs *Low* class (B = .96, p<.01), the *Low 7th* versus the *Improver* class (B = .52, p<.05), and the *High* vs *Improver* class (B = -2.57, p<.01). Being male was associated with a higher chance of being in the *Low* class relative to females (B = -.66, p<.01), a higher chance of being in the *Improver* vs *Low 7th* class (B = .52, p<.05) relative to females, and a lower chance of being in the *High* vs *Improver* class relative to females (B = .56, p<.01). In Table 10, I translate these logits to probabilities, and show the estimated difference in probability between males and females for each class comparison. The row labeled *Diff (% points)* shows the percentage point difference in probabilities between males and females (e.g., for the first column labeled *Improvers vs. Low*, I subtracted 57% from 72% to get 15%). The row labeled *Diff (% change)* translates the difference in probability in terms of the percent change between females and males (e.g., for the first column, the -20% indicates that males had a 20% lower chance than females of being an *Improver*). This table shows that the

difference between males and females for the first comparison between *Improvers* and *Low* was practically significant in terms of percentage point difference and percent difference (15% and -20%). However, the difference between males and females in terms of the *Improvers* vs. *High* comparison was only practically significant when looking at the difference in % change (57%). This is because the probability of being in the *High* group was high for both males and females. In other words, gender didn't seem to have a practically meaningful bearing on whether students would be in the *Improver* or *High* group, but it did seem to have a bearing on whether students would be in the *Low* or *Improver* group.

Table 10

SA Class Estimated Probabilities by Gender

	Improvers vs Low	***Improvers v. Low 7th***	***Improvers v. Decliners***	***Improvers vs High***
Female (reference)	72%	49%	50%	7%
Male	57%	62%	52%	11%
Diff (% points)	15%***	-13%**	-2%	-4%***
Diff (% change)	-20%***	+27%**	+4%	+57%***

Notes: *Diff (% points)* refers to the difference in proportion between males and females in terms of percentage points; *Diff (% change)* refers to the difference between males and females in terms of % change; *p<.10, **p<.05, **p<.01

Table 11

Final Demographic Model

Covariate	*Improvers vs Low*	*Improvers v Low 7th*	*Improvers v. Decliners*	*Improvers vs High*	npar	-LL	aBIC
Intercept	1.24**	.03	1.34* (p=.09)	-2.77***			
African American	.36	.03	.30	.32			
Asian	-.06	.6	1.6***	-.03			
White	.29	.6	-.17	-.53* (p=.07)	28	9431	19034.7
Male	-1.16**	-.38	-1.53* (p=.06)	.42			
Economically Disadvantaged (ED)	-.41	-.23	-1.65**	.35			
Male*ED	.65	1.17**	1.8**	0.2			

Notes: coefficients refer to the estimated change in log odds associated with a 1SD increase in the predictor variable. Log odds refer to the log odds that a student will be in the Improver trajectory class relative to the Low, Low-7th, Decliner or High class (to aid interpretability, I present odds of being an *Improver* vs the other categories). To convert log odds to probabilities, I used this formula: log_e(b)/1+log_e(b); *p<.10, **p<.05, **p<.01

The final demographic model presented in Table 11 shows that after accounting for gender and economic (dis)advantage, the only significant race/ethnicity comparison was between Asian students and Hispanic/Latinx students. Gender still appeared to distinguish between students in the *Improver* and *Low* groups, however the effect of gender was dependent on whether students were economically disadvantaged when distinguishing between *Improvers* and *Decliners* or students in the *Low 7th* class. The remaining paragraphs interpret these results for each class comparison individually.

For the comparison between the *Improver* and *Low* classes, the only significant demographic factor was gender. Girls were more likely to be in the *Improver* class than the *Low* class ($B_0 = 1.24$, p<.01). Translating this estimate to probabilities, economically advantaged, Hispanic/Latinx girls (i.e., students in the reference group) had about an 80% chance of being an *Improver* vs. *Decliner* (note that 50% chance would be equivalent to having equal odds of being

an *Improver* or *Decliner*). Being male decreased the log odds of being an *Improver* (B = -1.16, $p<.01$), which translates to a decline from 80% to 52%.

For the comparison between the *Improver* and *Low 7th* class, the only significant coefficient was the interaction term between male and economic disadvantage (B = 1.17, $p<.05$). Students of each race/ethnicity were estimated to be equally represented in the *Improver* and *Low 7th* classes. After accounting for ED and race/ethnicity, there was no longer a main effect of gender, and economic disadvantage only appeared to matter for males. Females had about an equal odds of being in the *Improver* versus *Low 7th* class, and the odds did not appear to differ between economically disadvantaged and advantaged females. For males, economically advantaged males had a 59% chance of being in the *Low 7th* class and economically disadvantaged males had a 45% chance of being in the *Low 7th* class. Both probabilities were still relatively close to 50%, suggesting that the demographic composition of students in the *Low 7th* and *Improver* classes was similar.

For the comparison between *Improvers* and *Decliners* there was a main effect of being Asian, and an interaction effect between gender and economic (dis)advantage. Interpreting only coefficients significant to the $p<.05$ level, this model suggests that regardless of gender and economic (dis)advantage, Asian students were more likely than Hispanic/Latinx students to be in the *Improver* class vs the *Decliner* class (B = 1.6, $p<.01$). Table 12 translates these coefficients to probabilities and shows that although for advantaged females, race/ethnicity didn't seem to matter (they were likely to be *Improvers* regardless of race/ethnicity), there were practically significant differences in probabilities between Asian and Hispanic/Latinx students for boys and for economically disadvantaged students. Being Asian increases your probability of being in the *Improver* class from an estimated 42% to 78% for economically disadvantaged females, from

45% to 80% for economically advantaged males, and from 49% to 83% for economically disadvantaged males. Therefore, regardless of economic (dis)advantage and gender, Asian students were more likely than Hispanic students to be in the *Improver* class. Post hoc contrasts between Asian, African American and White probabilities indicated that Asian students were also more likely than African American and White students to be in the *Improver* class relative to the *Decliner* class.

The interaction effect between gender and economic (dis)advantage for the *Improver* vs *Decliner* comparison ($B = 1.8$, $p<.01$) can also be observed in Table 12. It shows that for males, economic disadvantage didn't seem to explain whether students were likely to be *Improvers* or *Decliners*, but for females it did. Using Hispanic/Latinx students as an example, females who were economically advantaged were more likely to be *Improvers* (vs. *Decliners*) than females who were economically disadvantaged (79% vs 42%). For Hispanic/Latinx males, the probability of being an *Improver* vs a *Decliner* was about equal (45% and 49%) for both disadvantaged and advantaged students.

For the comparison between the *Improver* and *High* classes, using an alpha level of .05, there were no statistically significant differences in the proportions of males and females, economically advantaged and disadvantaged, and Asian and non-Asian students. In other words, gender, economic (dis)advantage, and race/ethnicity did not predict whether a student would be in the *Improver* or *High* class.

Table 12

Improver vs. Decliner Probabilities by Race/Ethnicity, Gender, and Economic (Dis)advantage

	Advantaged		Disadvantaged	
Race/Ethnicity	***Male***	***Female***	***Male***	***Female***
African American	53%	84%	56%	50%
Asian	80%	95%	83%	78%
Hispanic/Latinx	45%	79%	49%	42%
White	41%	76%	45%	38%

Notes: To convert log odds to probabilities, I used this formula: log_e(x)/1+log_e(x), where x is the estimated log odds for students in a particular demographic subgroup based on the prediction equation.

To summarize the results of the final demographic model, students were more likely to have worse social awareness trajectories (low or declining) when they were males, African American, Hispanic/Latinx, or White, or when they were economically disadvantaged females. Students were more likely to have improving social awareness trajectories when they were economically advantaged females or Asian.

RQ2b: How do school social environments explain which pattern of social awareness development students display?

School Culture/Climate

After controlling for student race/ethnicity, gender and economic (dis)advantage (variables related to perceptions of culture/climate; see Appendix V for comparisons across groups), 6th grade sense of belonging (Belong) and school safety (Safety) explained which pattern of social awareness development (SA Trajectories) students displayed (see results in the Table 13). Adding either 6th grade Belong or Safety (Model 1 & 2) to the baseline model with student demographics only (Model 0 in Table 13) significantly improved predictions of SA Trajectory classes according to likelihood ratio tests ($p<.0001$), however 6th grade Belong was more strongly related to SA Trajectories than 6th grade Safety as evidenced by the lower -LL and

aBIC values ($-LL_{Belong}$ = 8303.8, $-LL_{Safety}$ = 9022.4; $aBIC_{Belong}$ = 16802.7, $aBIC_{Safety}$ = 18240). The smaller effect of perceptions of school safety may be due to the fact that, on average, student perceptions of safety didn't change as much as their sense of belonging from year to year (see Appendix V and Table 14). On average, as reported in Table 14, sense of safety perceptions declined by 8% of a point from 6th to 7th grade, and 3% of a point from 7th to 8th grade.

Changes in perceptions of climate/culture closely corresponded to changes in perceptions of social awareness. Figures 6a-c show mean social awareness, sense of belonging and sense of safety scores for students in each of the five social awareness trajectory classes. Improvements in average perceptions of culture/climate were associated with better social awareness trajectories and declines in average perceptions of culture/climate were associated with worse social awareness trajectories. To date, there is no consensus on how to test the effect of time varying predictors like perceptions of culture/climate on classifications based on longitudinal mixture modeling when the classifications are based on overlapping timepoints. However, a set of basic statistical tests demonstrates that this observed trend corresponds to a moderately strong, statistically significant relationship. When considering only participants with valid culture/climate scores (n=5856), changes in perceptions of sense of belonging from 6th-7th and 7th-8th grade were moderately and significantly correlated with changes in social awareness ($r_{6th\text{-}7th}$ = .34, p<.001, $r_{7th\text{-}8th}$ = .36, p<.001). The relationship between changes in sense of safety perceptions and changes in social awareness was also statistically significant, but less strong ($r_{6th\text{-}7th}$ = .15, p<.001, $r_{7th\text{-}8th}$ = .14, p<.001). Therefore, on average, when perceptions of sense of belonging or school safety improved from year to year, so did social awareness; when perceptions of sense of belonging or school safety declined from year to year, so did social awareness.

Class Comparisons

Table 13 shows how 6th grade sense of belonging and sense of school safety ratings differentiated between students in the *Improver* class and the *Low*, *Low 7th*, *Decliner*, and *High* classes.

Improvers vs Low. For the comparison between students in the *Improver* class and the *Low* class (the first column of Table 13), the coefficient for 6th grade sense of belonging (B = .44, p<.01) is positive, indicating that students in the *Improver* class had higher average 6th grade Belong scores compared with students in the *Low* class. The coefficient for 6th grade sense of safety is not significantly different from 0 (B = .01, p >.1), indicating that students in the *Improver* and *Low* classes had similar Safety ratings at the end of 6th grade. Figures 6b and 6c show that *Improvers* had higher average sense of belonging ratings but similar average safety ratings compared with students in the *Low* class. Because both social awareness and culture/climate were assessed simultaneously at the *end* of 6th grade, we don't know how *initial* middle school levels of culture/climate and social awareness differed between students in the *Low* and *Improver* class. However, when considered side by side with the patterns displayed in Figures 6a-c, these findings are consistent with the general observation that changes in culture/climate precede changes in social awareness. Students in both *Low* and *Improver* classes had relatively low social awareness scores at the end of 6th grade. For students with low social awareness scores in 6th grade, when they report experiencing more supportive and welcoming middle school environments at the end of 6th grade (sense of belonging), they report higher levels of social awareness for the remainder of middle school (on average). For students with low 6th grade social awareness *and* belong scores, social awareness does not seem to improve on average (students in the *Low* class). Students in the *Low* and *Improver* classes had similar levels of

social awareness and school safety at the end of 6th grade. What appears to differentiate students in the *Low* and *Improver* class is that for *Improvers,* sense of safety ratings improved in 7th and 8th grade on average whereas for students in the *Low* class, sense of safety ratings stayed about the same (see Figure 6c). Both findings support the theory that changes in culture/climate lead to corresponding changes in social awareness. When students report experiencing increasingly supportive and safe middle school social environments, they tend to also report improvements in their own social awareness.

Improvers vs Low 7th. For the comparison between students in the *Improver* class and the *Low 7th* class, 6th grade culture/climate coefficients were negative (B_{Belong} = -.87, p <.01, B_{Safety} = -.32, p <.01), indicating that students in the *Improver* class had lower culture/climate ratings at the end of 6th grade compared with students in the *Low 7th* class. These results are visualized in Figures 6a-c. Students in the *Improver* class also had lower average social awareness scores in 6th grade compared with students in the *Low 7th* class (see Table 6), further lending evidence that social awareness and culture/climate scores are positively correlated.

Improvers vs Decliners. For the comparison between *Improvers* and *Decliners* (the third column of Table 13), 6th grade culture/climate coefficients were again negative (B_{Belong} = -.98, p <.01, B_{Safety} = -.39, p <.01), indicating that students in the *Improver* class had lower culture/climate ratings at the end of 6th grade compared with students in the *Decliner* class. Students in the *Decliner* class also had higher average social awareness scores at the end of 6th grade compared to students in the *Improver* class (see Figure 6a and Table 6). These results lend compelling evidence to the theory that positive school social environments foster social awareness. Students in the *Decliner* class started out with high relative levels of social awareness, but those levels started to decline over time as perceptions of the school social

environment became more negative. Conversely, students in the *Improver* class had lower early social awareness levels but reported improvements in social awareness as their perceptions of the school social environment improved (see Figures 6a-c).

Improvers vs High. For the comparison between students in the *High* and *Improver* classes (the fourth column of Table 13), 6th grade culture/climate coefficients were again negative (B_{Belong} = -1.35, p <.01, B_{Safety} = -.77, p <.01), indicating that students in the *Improver* class had lower culture/climate ratings at the end of 6th grade compared with students in the *High* class. Students in the *Improver* class also had lower 6th grade social awareness scores, on average, compared with students in the *High* class. However, they did have similarly high average 8th grade social awareness scores (see Figure 6a and Table 6). This again supports the theory that improving perceptions of school culture/climate are associated with improvements in social awareness. Students in the *Improver* class had lower 6th grade perceptions of culture/climate and lower social awareness scores but were able to catch up to their peers in the *High* class by 8th grade when they reported improvements in school culture/climate.

Table 13

Results Regressing SA Trajectory Class on Culture/Climate

Model	Covariates	*Improvers vs Low*	*Improvers v Low 7th*	*Improvers v. Decliners*	*Improvers vs High*	npar	-LL	aBIC
0	**Student Demographics Only**					28	9431	19034.7
1	**Sense of Belonging**							
	Intercept	1.9***	-.56	0.73	-3.34***			
	African American	.43	-.05	.21	.19			
	Asian	-.14	.55	1.52***	-.18			
	White	.35	.6	-.16	-.50	32	8303.8***	16802.7
	Male	-1.21**	-.34	-1.47* (p=.08)	.47			
	Economically Disadvantaged	-.47	-.12	-1.53* (p=.06)	.48			
	Male*Econ. Dis.	.62	1.18**	1.78**	.21			
	Belong (6th) (z)	.44***	-.87***	-.98***	-1.35***			
2	**Sense of Safety**							
	Intercept	1.23**	-.04	1.27	-2.77***			
	African American	.36	-.07	.19	.11			
	Asian	-.05	.52	1.51***	-.22	32	9022.4***	18240
	White	.32	.5	-.28	-.72**			
	Male	-1.16**	-.46	-1.62**	.27			
	Economically Disadvantaged	-.4	-.26	-1.68**	.31			
	Male*Econ. Dis.	.65	1.2**	1.82**	.25			
	Safety (6th) (z)	.01	-.32***	-.39***	-.77***			

Notes: LL and aBIC values closer to 0 reflect better model fit; I used likelihood ratio tests to compare goodness of fit between models 1 &2 and model 0; coefficients refer to the estimated change in log odds associated with a 1SD increase in the predictor variable. Log odds refer to the log odds that a student will be in the Improver trajectory class relative to the Low, Low-7th, Decliner or High class (to aid interpretability, I present odds of being an *Improver* vs the other categories). To convert log odds to probabilities, I used this formula: log_e(b)/1+log_e(b); *p<.10, **p<.05, **p<.01

Figure 6 (a-c)

Social Awareness and Culture/Climate Means by Class

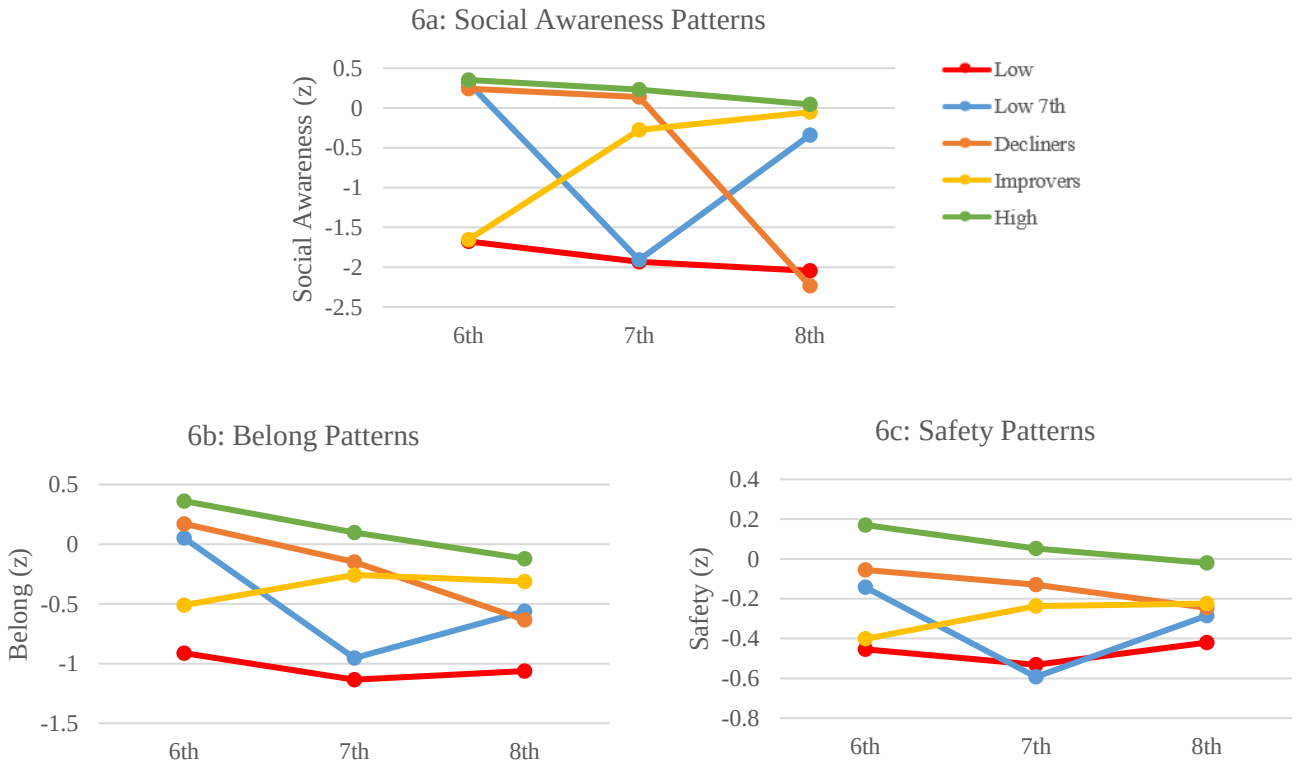


Table 14

Descriptive Statistics of Analytic Sample

Class	N	6th Grade Belong Rating		6th-7th Change Belong		7th-8th Change Belong		6th Grade Safety Rating		6th-7th Change Safety		7th-8th Change Safety	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1 (Low)	489	3.16	0.86	-0.17	0.97	0.05	0.77	3.09	0.78	-0.05	0.77	0.08	0.65
2 (Low 7th)	453	3.89	0.83	-0.76	1.01	0.30	0.88	3.31	0.77	-0.32	0.78	0.22	0.69
3 (Decliners)	592	3.98	0.75	-0.24	0.95	-0.37	0.78	3.37	0.74	-0.05	0.78	-0.08	0.60
4 (Improvers)	515	3.46	0.81	0.19	0.93	-0.04	0.77	3.12	0.80	0.12	0.79	0.01	0.68
5 (High)	9172	4.13	0.67	-0.20	0.73	-0.17	0.65	3.53	0.65	-0.08	0.65	-0.05	0.60
Grand Total	11221	4.04	0.74	-0.21	0.79	-0.14	0.69	3.47	0.69	-0.08	0.68	-0.03	0.61

Notes: Missing 6th grade ELA scores (n=5500), 6th Grade Sense of Belonging (n= 300), and 8th Grade Sense of Belonging (n=4000) scores were imputed for students with valid scores for the other two grade levels using equations based on multiple regression. Predictors included other grade level scores, growth, and demographic variables (more detail available in prior Update).

Table 14 (Cont.)

Class	N	6th Grade Social Awareness		7th Grade Social Awareness		8th Grade Social Awareness		6th ELA		6th-8th Change ELA		% Other Race/ Eth. Peers	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1 (Low)	489	1.70	0.49	1.58*	0.50	1.46*	0.53	2490	86	44*	48	0.39	0.31
2 (Low 7th)	453	2.96*	0.45	1.59*	0.41	2.54*	0.59	2496	83	50	52	0.42	0.29
3 (Decliners)	592	2.91*	0.51	2.84*	0.54	1.35*	0.45	2497	82	46*	45	0.35*	0.31
4 (Improvers)	515	1.71	0.31	2.59	0.52	2.72	0.54	2495	87	54	50	0.43	0.29
5 (High)	9172	2.98*	0.47	2.90*	0.49	2.79	0.53	2535*	84	54	47	0.47*	0.29
Grand Total	11221	2.86	0.59	2.77	0.61	2.64	0.67	2528	85	53	47	0.46	0.29

Notes: *Significantly different than *Improvers* mean at the p<.01 level; Missing 6th grade ELA scores (n=5500), 6th Grade Sense of Belonging (n= 300), and 8th Grade Sense of Belonging (n=4000) scores were imputed for students with valid scores for the other two grade levels using equations based on multiple regression. Predictors included other grade level scores, growth, and demographic variables (see Appendix I for more detail).

Directionality

Additional analyses using grade level sense of belonging and social awareness scores suggest that the effect of sense of belonging on social awareness was somewhat bidirectional. In line with others (see Way et al, 2007), I estimated whether improvements in perceptions of sense of belonging predated improvements in social awareness (or vice versa) by comparing two regression models. For both models, I used only data from students with valid scores on all belong and social awareness grade level scores (n=5856). The first model (B→SA) regressed 8th grade social awareness z scores on 7th grade Belong z scores and standardized 6th to 7th grade change in Belong scores, and the second (SA→B) regressed 8th grade sense of belonging z scores on 7th grade and 6th to 7th grade change in standardized social awareness scores. The model with the theorized direction of the effect (B→SA) had a better fit ($R^2_{B\rightarrow SA} = 0.14, df = 2, 5853, p < .0001$) than the model regressing Belong on Social Awareness ($R^2_{SA\rightarrow B} = 0.10, df = 2, 5853, p < .0001$). All slope estimates ($B_{Belong\,7} = .41$, $B_{Belong\,76} = -.17$, $B_{SA\,7} = .42$, $B_{SA\,76} = -.12$) were significant to the p<.0001 level. The former model was still better,

albeit by smaller margins, after controlling for all demographic variables (race/ethnicity, economic (dis)advantage, gender, and ED*gender; $R^2_{B\rightarrow SA} = 0.15,\ R^2_{SA\rightarrow B} = 0.12$). Additionally, all slope estimates were still significant to the p<.0001 level ($B_{Belong\ 7} = .35,\ B_{Belong\ 76} = -.11,\ B_{SA\ 7} = .45,\ B_{SA\ 76} = -.16$).

These results suggest that improvements in sense of belonging lead to improvements in social awareness, but that the relationship is somewhat bidirectional in nature. This bidirectional relationship might be explained as follows: as students learn more about other cultures and begin to tolerate other points of view (i.e., social awareness improves) it may be easier for students to make friends, which increases their sense of belonging. However, the larger effect appears to be that as students experience improvements in their sense of belonging at school (e.g., through participation in extracurricular activities or academic group work with other students) they become more aware of the perspectives, norms, and concerns of students who come from different backgrounds (and therefore improve in social awareness).

Effect Moderators

There was no evidence that the effect of sense of belonging on social awareness was moderated by gender, race/ethnicity, or economic (dis)advantage. To test for differences in the effect of sense of belonging on social awareness across gender, race/ethnicity, and economic (dis)advantage, I regressed 8th grade social awareness (again using only data from students with valid scores on all belong and social awareness grade level z scores, n=5856) on a vector of demographic variables and their interactions, 7th grade Belong z scores, standardized 6th to 7th grade change in Belong scores, and a vector of interactions between Belong and demographic variables. None of the interaction terms were statistically significant to the p<.1 level, suggesting that the effect of sense of belonging on social awareness is consistent for male,

female, African American, Hispanic/Latinx, Asian, White, economically disadvantaged and economically advantaged students.

Exposure to Peers from Different Racial/Ethnic Backgrounds

After controlling for student race/ethnicity and 6th grade ELA scores, the degree of exposure to other race/ethnicity peers significantly predicted which pattern of social awareness development students displayed, as evidenced by statistically significant differences in model fit between the baseline model (Model 0 in Table 15; $-LL_0 = 9241.6$, $aBIC_0 = 18450.8$) and the model with percent other race/ethnicity (Model 1 in Table 15; $LL_1 = 9140$, $aBIC_1 = 18450.8$; $p<.01$). However, percent other race/ethnicity peers only appeared to distinguish between *Improvers* vs *Decliners,* as it was the only contrast to produce statistically significant (at $p<.05$) parameter estimates for percent other race/ethnicity peers (see the third column in Table 15). For the comparison between *Improvers* and *Decliners,* as percent other race/ethnicity peers increased (i.e., as students were exposed to more other race/ethnicity peers) student patterns of social awareness were more likely to be positive (more likely to be an *Improver* vs *Decliner*; $B = .44$, $p<.05$). However, evidence suggests that the relationship between percent other race/ethnicity peers and whether students showed improving or declining social awareness trajectories was curvilinear, as evidenced by the significant quadratic term ($B = -.3$, $p<.05$). Figure 7 visualizes this relationship (interpreted below). Interactions between percent other race/ethnicity peers and race/ethnicity were not significant for any of the SA class comparisons to the $p<.05$ level, indicating that percent other race/ethnicity peers had a similar effect on SA trajectories across race/ethnicity categories.

Table 15

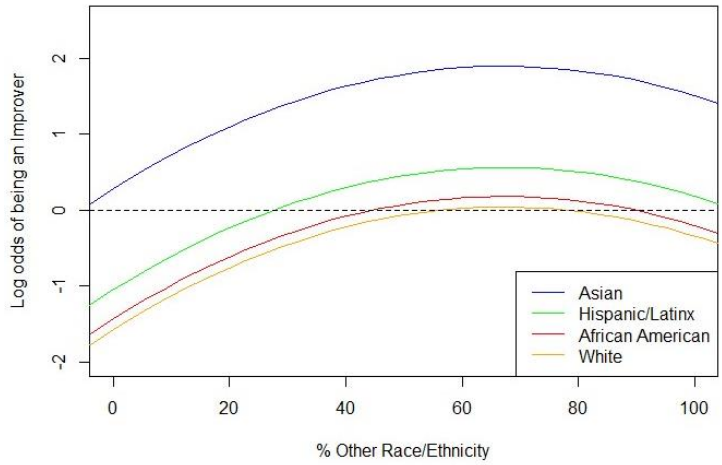
Results Regressing SA Trajectory Class on Percent Other Race/Ethnicity Peers

Model	Covariate	*Improvers vs Low*	*Improvers v Low 7th*	*Improvers v. Decliners*	*Improvers vs High*	npar	-LL	aBIC
0	**ELA and Race/Ethnicity**					20	9241.6***	18605.2
1	**ELA, Race/Ethnicity and % Other Race/Ethnicity Peers**							
	Intercept	.85***	.10	.40**	-2.48***			
	ELA 6th (z)	-.03	-.07	-.22* (p=.051)	-.75***			
	African American	.1	.01	-.38	.40	28	9140***	18450.8
	Asian	-.35	.43	1.33**	.29			
	White	-.06	.47	-.52	-.07			
	% ORE (z)	.21	-.02	.44**	-.07			
	(% ORE)^2	-.23* (p=.06)	-.001	-.30**	-.004			

Notes: coefficients refer to the estimated change in log odds associated with a 1SD increase in the predictor variable. Log odds refer to the log odds that a student will be in the Improver trajectory class relative to the Low, Low-7th, Decliner or High class (to aid interpretability, I present odds of being an *Improver* vs the other categories). To convert log odds to probabilities, I used this formula: log_e(b)/1+log_e(b); *p<.10, **p<.05, **p<.01

Figure 7

Relationship between % Other Race/Ethnicity Peers and Improver vs Decliner Log Odds



Corresponding Improver Probabilities

	% Other Race/Ethnicity		
	0%	**"Best"**	**99.9%**
African American	19%	54%	45%
Asian	57%	87%	82%
Hispanic	26%	63%	55%
White	17%	50%	42%

Notes: The "best" % other race/ethnicity (ORE) value was calculated by taking the derivative of the function $y = .40 + .44ORE + -.3ORE^2$ and estimating the value of X at which the slope =0. This value was 66.21%.

Figure 7 plots the log odds of being an *Improver* vs *Decliner* as a function of percent other race/ethnicity peers (ORE) and its quadratic term. Separate lines are plotted for African American, Asian, Hispanic/Latinx and White students with average 6th grade ELA scores. Corresponding *Improver* vs *Decliner* probabilities are also displayed at three points: at 0% other race/ethnicity peers (when a student attends a school with only students of the same race/ethnicity), at 99.9% other race/ethnicity peers (when a student is the only one with a particular race/ethnicity) and at the "best" percent other race/ethnicity peers (when a student attends a school with 66% other race/ethnicity peers, which I calculated by taking the derivative and solving for the maximum log odds value). Based on my calculation, regardless of race/ethnicity and 6th grade ELA scores, students have the highest chance of being an *Improver* (vs *Decliner*) when they attend a middle school with about 34% same race/ethnicity and about 66% other race/ethnicity peers. For Hispanic/Latinx students with average 6th grade ELA scores,

the probability they will be an *Improver* is 63% at this "best" percent other race/ethnicity peers, 26% at the lowest percent other race/ethnicity peers, and 55% at the highest percent other race/ethnicity peers. For African American students with average 6th grade ELA scores, the probability they will be an *Improver* is 54% at this "best" percent other race/ethnicity peers, 19% at the lowest percent other race/ethnicity peers, and 45% at the highest percent other race/ethnicity peers. For White students with average 6th grade ELA scores, the probability they will be an *Improver* is 50% at this "best" percent other race/ethnicity peers, 17% at the lowest percent other race/ethnicity, and 42% at the highest percent other race/ethnicity peers. For Asian students with average 6th grade ELA scores, the probability they will be an *Improver* is highest at the "best" percent other race/ethnicity peers (87%) but their probability of being an *Improver* is high regardless of percent other race/ethnicity peers (i.e., the probability never goes below 50%, at least for students within one standard deviation of the mean 6th grade ELA score; see Figure 7). This means that, although moderate proportions of other race/ethnicity peers (close to 66%) are projected to benefit students regardless of race/ethnicity and ELA scores, it is only likely to make a difference for African American, Hispanic, or White students in terms of whether they are predicted to be an *Improver* or *Decliner* for their middle school social awareness trajectories.

Interplay Between Culture/Climate and Percent Other Race/Ethnicity Peers

There was no evidence that the effect of culture/climate on social awareness trajectory class was moderated by percent other race/ethnicity peers (ORE). I tested for evidence of moderation by comparing the goodness of fit of a model with 6th grade sense of belonging, percent other race/ethnicity peers (ORE, and its quadratic term) and all combinations of demographic variables (race/ethnicity, economic disadvantage, and gender alone and their interactions) with a model that also included all interaction terms between sense of belonging

and percent other race/ethnicity peers. After adding the interaction terms, goodness of fit improved significantly according to a likelihood ratio test ($p<.0001$). However, only one of the interaction terms was significant to the <.05 level, and that term was the interaction between the quadratic slope term for ORE and 6th grade sense of belonging scores. Adding 12 estimated interaction parameters to the model at an alpha level of .05, there is a high probability that at least one will be statistically significant by chance alone. Therefore, because of this chance and the uninterpretable interaction term, I conclude that based on the results from this sample, there is no evidence that culture/climate is *more* or *less* important at higher levels of exposure to other race/ethnicity peers.

RQ2c: How do student demographics and school social environments together explain which pattern of social awareness development students display?

The combined model with only significant predictors of social awareness trajectory classes is presented in Table 16. Significant predictors included race/ethnicity, gender, percent other race/ethnicity peers (ORE), and 6th grade sense of belonging scores. Each predictor appeared to have an *additive* effect, meaning each contributed to social awareness trajectories independently of one another. Sense of belonging, percent other race/ethnicity peers (up to 74%), 6th grade ELA scores, and being female or Asian were all associated with more positive social awareness trajectories, whereas being male, African American, Hispanic/Latinx, or White was associated with worse social awareness trajectories. Interactions between school social environmental factors (6th grade sense of belonging and percent other race/ethnicity peers) and student demographics (gender and race/ethnicity) were not significant for any of the class

comparisons to the p<.05 level, suggesting that school social environmental factors had similar effects on social awareness trajectories across race/ethnicity and gender categories.

Table 16

Combined Model Predicting Social Awareness Class

Covariate	*Improvers vs Low*	*Improvers v Low 7th*	*Improvers v. Decliners*	*Improver vs Highs*	npar	LL	aBIC
Intercept	1.86***	-.64**	-.09	-3.14***			
Belong (6th) (z)	.43***	-.87***	-1.0***	-1.36***			
ELA (6th) (z)	-.05	-.07	-.27**	-.77***			
ORE (z)	.14	.03	.52***	.01			
$(ORE)^2$	-.26**	.03	-.27**	.04	36	-7977.7	16174.9
African American	.33	-.18	-.66	.08			
Asian	-.26	.25	1.12**	-.03			
White	.22	.28	-.69	-.27			
Male	-.74***	.54**	.03	.46**			

Notes: ORE: % other race/ethnicity peers; coefficients refer to the estimated change in log odds associated with a 1SD increase in the predictor variable. Log odds refer to the log odds that a student will be in the Improver trajectory class relative to the Low, Low-7th, Decliner or High class (to aid interpretability, I present odds of being an *Improver* vs the other categories). To convert log odds to probabilities, I used this formula: log_e(b)/1+log_e(b); *p<.10, **p<.05, **p<.01

Social Awareness Trajectory Class Comparisons

Improvers vs Low. I start by interpreting the comparison between students in the *Improver* and *Low* social awareness trajectory classes, as displayed in the first column of Table 16. Students in *Low* class started middle school at about the same level of social awareness as students in the *Improver* class (i.e., they had low levels of separation; see Table 6). According to this model, they also started with about the same average 6th grade ELA score (B = -.02, p>.1). The two most influential variables (i.e., largest coefficients, since all coefficients were standardized) that distinguished between students in the *Improver* class and the *Low* class appeared to be gender (boys were more likely to be in the *Low* class; B = -2.07, p<.01) and 6th grade perceptions of sense of belonging (B = 2.05, p<.01).

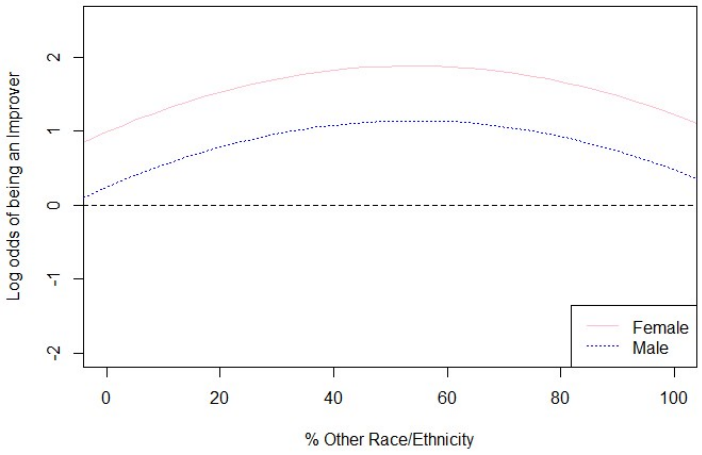
The significant 6th grade Belong coefficient is important because it shows that students in the *Improver* class had more positive Belong perceptions at the end of 6th grade compared with students in the *Low* class. Students who had more positive perceptions of their school social environment at the end of 6th grade were more likely to show improvements in social awareness compared with students who had more negative perceptions of their school social environment. This supports the theory that positive social environments in middle school foster improvements in social awareness (when students experience a supportive, welcoming social environment, they feel more comfortable building relationships with peers from different backgrounds, thus building an understanding of other social norms and worldviews).

The quadratic term for percent other race/ethnicity peers was also statistically significant to the $p<.05$ level ($B = -.26$, $p<.05$). This suggests that there was a curvilinear relationship between the percent of other race/ethnicity peers a student was exposed to in middle school and their odds of being in the *Improver* versus *Low* class (see Figure 8). Holding constant 6th grade sense of belonging and ELA, as percent other race/ethnicity peers increased from 0% (i.e., a completely racially/ethnically homogeneous school) to about 54% other race/ethnicity peers and 36% same race/ethnicity peers, the odds of being an *Improver* were predicted to increase. As the percent other race/ethnicity increased past 54% and the student became more racially/ethnically minoritized, based on this model, the odds of being an *Improver* started to decline. This pattern is visualized in Figure 8, which shows the log odds of being in the *Improver* vs *Low* class for students with average 6th grade sense of belonging and ELA scores as a function of percent other race/ethnicity peers and its quadratic term. Separate lines are plotted for males and females. Corresponding *Improver* vs *Low* probabilities are also displayed at three points: at 0% other race/ethnicity peers (when a student attends a school with only students of the same

race/ethnicity), at 99.9% other race/ethnicity peers (when a student is the only one with a particular race/ethnicity) and at the "best" percent other race/ethnicity peers (when a student attends a school with 54% other race/ethnicity peers, which I calculated by taking the derivative and solving for the maximum log odds value).

Figure 8

Relationship between % Other Race/Ethnicity Peers and Improver vs Low Log Odds



Corresponding Improver Probabilities

	% Other Race/Ethnicity Peers		
	0%	**"Best"**	**99.9%**
Female	73%	87%	77%
Male	56%	76%	62%

Notes: The "best" % other race/ethnicity peers (ORE) value was calculated by taking the derivative of the function $y = 1.86 + .14ORE + -.26RIC^2$ and estimating the value of X at which the slope =0. This value was calculated to be 54%.

The significant coefficient for males suggests that males were still overrepresented in the *Low* class after accounting for differences in percent other race/ethnicity peers, 6th grade ELA and sense of belonging scores. Translating log odds to percentages, male students in the reference group had a 25% chance of being in the *Low* class at average levels of all other predictors, and female students had only a 13% chance, $p<.01$). I explored two potential explanations for these remaining differences: first, I tested whether the gender difference was due to differences in strength of predictors between males/females, and second, I tested whether

social awareness trajectory class was better predicted by the unused culture/climate variable (Safety). Neither explanation was sufficient (if requested, more detail can be provided). Therefore, I conclude that factors not included in the analysis accounted for these observed gender differences.

Improvers vs Low 7th. For the comparison between students in the *Improver* class and the *Low-7th* class, the only significant predictors were 6th grade sense of belonging (B = -.87, p<.01) and male (B = -.54, p<.01) This indicates that students in the *Improver class* had lower 6th grade sense of belonging scores (which can be seen in Figures 6a-c) and were more likely to be female. Students in these two categories had similar exposure to peers from other racial/ethnic backgrounds. In addition to having lower Belong scores, students in the *Improver* class also had lower average social awareness scores in 6th grade compared with students in the *Low 7th* class (see Table 6). In 7th grade, for students in the *Low 7th* class, social awareness and Belong scores declined sharply but returned to moderate levels by 8th grade. The fact that average Belong scores changed in ways that corresponded to changes in social awareness mean scores for students in the *Low 7th* class further lends evidence that social awareness and culture/climate scores are positively correlated.

Improvers vs Decliners. Multiple predictors were statistically significant in distinguishing between students in the *Improver* and *Decliner* classes (see the third column of Table 16). Students in the *Decliner* class started out with relatively high perceptions of their own social awareness (see Table 6 and Table 14) – higher than *Improvers*. Compared with *Improvers*, they also had slightly higher 6th grade ELA scores (B = -.27, p < .05) and sense of belonging ratings (B =-1.0, p<.01), however by 8th grade they had lower Belong and social awareness means (see Table 6 and Figures 6a and 6b), again lending evidence to the theory that

increasingly negative school social environments are associated with worsening social awareness levels.

Asian students had the highest chance of being an *Improver* versus *Decliner* (74% for female students with average ELA, Belong, and ORE scores; $B = 1.12$, $p<.01$), followed by Hispanic/Latinx students (48%), African American (32%), and then White students (31%). However post hoc analyses indicate that only the difference between Asian and Hispanic/Latinx, African American, or White students was statistically significant ($p<.01$). The differences in probability between White, African American, and Hispanic/Latinx students were not statistically significant, meaning they shared a similar chance of being an *Improver* versus *Decliner*. These results show that Asian students were still overrepresented in the *Improver* class even after adjusting for mean differences in the other predictors. I explored two potential explanations for these remaining differences: first, I tested whether the difference was due to differences in strength of predictors between Asian and Hispanic/Latinx, African American or White students, and second, I tested whether social awareness trajectory class was better predicted by the unused culture/climate variable (Safety). Neither explanation was sufficient (if requested, more detail can be provided). Therefore, I conclude that factors not included in the analysis accounted for these observed differences.

The percent of other race/ethnicity peers (ORE) a student was exposed to in middle school also distinguished between *Improvers* and *Decliners* ($B = .52$, $p<.01$), and the relationship appeared to be curvilinear (as evidenced by the significant quadratic term for percent other race/ethnicity peers; $B = -.27$, $p<.01$). Holding constant 6th grade sense of belonging and ELA, as percent other race/ethnicity peers increased from 0% (i.e., a completely racially/ethnically homogeneous school) to about 74% other race/ethnicity peers and 26% same race/ethnicity

peers, odds of being an *Improver* were predicted to increase. As percent other race/ethnicity peers increased past 74% and the student became more racially/ethnically minoritized, based on this model, the odds of being an *Improver* started to decline. This pattern is visualized in Figure 9, which shows the log odds of being an *Improver* vs *Decliner* for students with average 6th grade sense of belonging and ELA scores as a function of percent other race/ethnicity peers and its quadratic term. Separate lines are plotted for African American, Asian, Hispanic/Latinx, and White students. Corresponding *Improver* vs *Decliner* probabilities are also displayed at three points: at 0% other race/ethnicity peers (when a student attends a school with only students of the same race/ethnicity), at 99.9% other race/ethnicity peers (when a student is the only one with a particular race/ethnicity) and at the "best" % other race/ethnicity peers (when a student attends a school with 74% other race/ethnicity peers, which I calculated by taking the derivative and solving for the maximum log odds value).

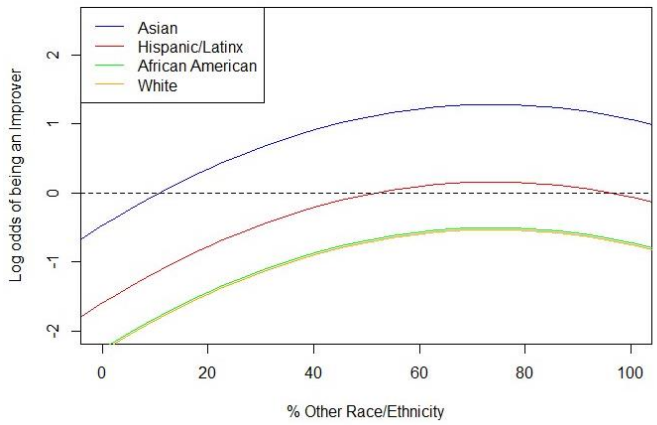
Percent other race/ethnicity peers was only projected to make a difference in social awareness trajectories for certain subgroups of students (see Figure 9). For Asian students with average 6th grade ELA and Belong scores, the probability they will be an *Improver* is low when they are exposed to very few other race/ethnicity peers (38-39%) and high once the percent of other race/ethnicity peers exceeds about 20%. For White or African American students with average 6th grade Belong and ELA scores, the probability they will be an *Improver* is 37-39% at this "best" % other race/ethnicity peers, 9-10% at the lowest percent other race/ethnicity peers, and 32-34% at the highest percent other race/ethnicity peers. This means that, although moderate levels of exposure to other race/ethnicity peers (close to 74%) were projected to benefit students regardless of race/ethnicity, gender, Belong and ELA scores, modest changes in percent other race/ethnicity peers alone was only likely to flip the odds in favor of being an *Improver* for

students who already had a relatively even chance of being an *Improver* or *Decliner* (e.g., Hispanic/Latinx students with average Belong and ELA scores in 6th grade).

Improvers vs High. The two predictors that best distinguished between *Improvers* and students in the *High* class were related to early levels of sense of belonging (B = -1.36, p<.01) and ELA scores (B = -.77, p<.01). This lends additional evidence to support the finding that changes in social awareness occur in tandem with changes in sense of belonging. For students in the *High* class, perhaps their sense of belonging perceptions improved immediately after beginning 6th grade whereas students in the *Improver* class took 2-3 years to demonstrate the same improvement. Quicker social adjustment to middle school would therefore increase social awareness levels before the first middle school survey administration (spring of their 6th grade year).

Figure 9

Final Model Relationship between % Other Race/Ethnicity Peers and Improver vs Decliner Log Odds



Corresponding Improver Probabilities

	% Other Race/Ethnicity		
	0%	*"Best"*	*99.9%*
Asian	38%	78%	74%
Hispanic/Latinx	17%	54%	49%
African American	10%	38%	33%
White	9%	37%	32%

Notes: The "best" % other race/ethnicity (ORE) value was calculated by taking the derivative of the function y = -.9 + .52ORE + -.27ORE^2 and estimating the value of X at which the slope =0. This value was calculated to be 73.84%.

Summary of the Effects of Independent Factors

In this section, I summarize how the predictive power of factors described in the sections corresponding to research questions RQ2a and RQ2b (student demographics, sense of belonging, and percent exposure to other race/ethnicity peers independent) changed after holding constant all other significant variables in the combined model (as reported in Table 16). The purpose of this section is to summarize the independent effect of each individual and school social environment factor on social awareness trajectory class.

Race/Ethnicity. The combined model suggests that after accounting for differences in exposure to other race/ethnicity peers, 6th grade ELA and sense of belonging, there was still an overrepresentation of Asian students in the *Improver* class. In other words, Asian students were still overrepresented in the *Improver* class even after adjusting for mean differences in the other predictors. The difference between Asian and Hispanic/Latinx, African American, or White students in terms of social awareness trajectories could be explained by differences in the nature of social environments outside of school – for example, parents of Asian students may hold higher social and academic expectations of their students (e.g., Caplan et al., 1992; Zhou and Bankston, 1998), pushing them to participate in more extracurricular activities that involve exposure to additional peers outside of their racial/ethnic group.

Economic (dis)advantage. The final demographic model (Table 11) showed that while economically advantaged students were numerically overrepresented in the *Improver* and *High* class, only the difference in representation between economically disadvantaged and advantaged females was statistically significant for the *Improver* vs *Decliner* class comparison after accounting for race/ethnicity. In the combined model (Table 16) economic (dis)advantage no longer significantly predicted whether females (or males) would be *Improvers* or *Decliners*. This

suggests that differences between economically disadvantaged and advantaged females in terms of exposure to other race/ethnicity peers, 6th grade ELA or Belong scores accounted for the disproportionalities observed in the first set of results regressing social awareness class on demographics only. This implies that if economically disadvantaged students had average 6th grade sense of belonging scores, 6th grade ELA scores, and levels of exposure to other race/ethnicity peers, then they would be equally represented across all social awareness trajectory classes. Compared to their advantaged peers, economically disadvantaged students had similar Belong scores (see Appendix V), but lower 6th grade ELA scores and levels of exposure to other race/ethnicity peers. Therefore, it appears that the numeric overrepresentation of economically disadvantaged students in the *Decliner* and *Low* classes was driven by their lower than average levels of ELA proficiency and/or the fact that they are more likely to attend middle schools with less exposure to other race/ethnicity peers (e.g., majority Hispanic/Latinx schools).

Gender. The combined model (Table 16) suggests that after accounting for differences in exposure to other race/ethnicity peers, 6th grade ELA scores, and 6th grade sense of belonging, there was still an overrepresentation of males in the *Low* class compared with the *Improver* class (which was reported in the final demographic model in Table 11) and an underrepresentation of males in the *High* and *Low 7th* classes compared with the *Improver* class (Table 9 and Table 16). In other words, even when they shared the same 6th grade sense of belonging and ELA scores, males were more likely than girls to be in a social awareness class with low 6th grade social awareness scores, and when they had low 6th grade social awareness scores, they were less likely than girls to show improvements across middle school. This suggests that variables other than the ones included in the analysis account for these gender differences. One explanation could be

that for males, even when they feel a sense of belonging in middle school, that feeling doesn't necessarily lead to the development of meaningful relationships with dissimilar peers (indeed, boys tend to struggle in building meaningful relationships at this age; Way et al, 2014; Way, 2011). It is also possible that after starting middle school, it takes longer for males to develop relationships close enough to improve their empathy and social awareness levels, which would explain why males were more likely than girls to have lower social awareness and sense of belonging scores at the end of 6th grade (i.e., be in the *Improver* vs *High* class).

The effect of gender for the other class contrasts changed after adding middle school percent other race/ethnicity peers, 6th grade ELA scores, and 6th grade sense of belonging. Unlike the results of the final demographic model (Table 11), there was no longer an overrepresentation of males in the *Decliner* class in the combined model (although this coefficient was only marginally significant at p=.06 to begin with). This suggests that if males and females had equal 6th grade ELA and sense of belonging scores, then males would be just as likely as females to be *Improvers* or *Decliners.* Because males had lower 6th grade ELA and sense of belonging scores (see Appendix V) this suggests that early improvements in ELA and sense of belonging for males may improve the chance that they report increases in social awareness across middle school.

Sense of belonging. Early sense of belonging ratings (spring of 6th grade) still predicted social awareness trajectory class after controlling for early ELA scores, race/ethnicity, gender, and percent other race/ethnicity peers (Table 16), suggesting that sense of belonging exerts an independent effect on social awareness. Coefficients for 6th grade sense of belonging were similar in size compared to the initial culture/climate model (Table 13), suggesting that culture/climate still had a relatively strong relationship with social awareness even after holding

constant the other factors in the model. In addition, the lack of race/ethnicity and gender moderation effects suggests that the relationship between sense of belonging and social awareness trajectory class is consistent across gender and race/ethnicity categories.

Percent other race/ethnicity peers. The combined model (Table 16) shows that students were most likely to be an *Improver* (versus *Low* or *Decliner*) when they were exposed to a moderate percentage of other race/ethnicity peers (ORE) in middle school. This finding is consistent with what I found when 6th grade sense of belonging and gender were not included (Table 15). After holding constant sense of belonging and gender, the effect of exposure to other race/ethnicity peers was stronger (i.e., the coefficients were larger) and more statistically significant (e.g., ORE was only marginally significant in Table 15 but significant to the $p<.05$ level in Table 16). This lends additional support to the conclusion that moderate levels of exposure to other race/ethnicity peers are associated with better odds of being an *Improver*.

When comparing *Improvers* to students in the *Low* class, the "best" percent other race/ethnicity peers was about 54% and when comparing *Improvers* to students in the *Decliner* class, the "best" percent other race/ethnicity peers was about 74%. This suggests that holding all else constant, being in a racial/ethnic group that is neither over or underrepresented in middle school is associated with higher odds of showing improvements in social awareness across middle school. The lack of race/ethnicity and gender moderation effects suggests that the relationship between percent other race/ethnicity peers and social awareness trajectory class is consistent across gender and race/ethnicity categories. However, because the sample did not include any majority African American schools (and very few majority White or Asian schools), I cannot make any generalizations about whether the effect of exposure to other race/ethnicity peers is different for African American students.

Summary of Social Awareness Trajectory Class Comparisons

In this section, I summarize the factors that predict whether students are projected to be in the *Low, Low 7th, Decliner, or High* social awareness trajectory class as opposed to the *Improver* class. I interpret the explanatory power of each predictor in the final model as well as how its effect changed depending on what other covariates were included in the model. For each statement, I therefore refer back to particular descriptive tables, plots, or tables of findings for evidence (refer back to the corresponding sections for detailed interpretations of coefficients). I do this with the intention of turning these findings into a broader narrative of how social awareness develops across middle school.

Improvers vs High. The majority of students in the sample were estimated to be in the *High* social awareness trajectory class (75%). Students in this class reported consistently high perceptions of their own social awareness across middle school, whereas students in the *Improver* class only had high perceptions of their own social awareness in 8th grade (Table 6 & Table 14). Students in the *High* class also were more likely to be female, compared with students in the *Improver* class (Table 9). Although students in the *High* class had similar levels of exposure to other race/ethnicity peers (Table 15), compared with *Improvers* they had higher average 6th grade ELA scores (Table 15 & 16), and more positive perceptions of their own sense of belonging and sense of school safety at the end of 6th grade (Table 13 & 16). Girls were still more likely to be in the *High* class at average 6th grade levels of sense of belonging and ELA (Table 16), suggesting that factors not included in the model accounted for these gender differences.

Improvers vs Low. Whereas *High* and *Improver* students had similarly high 8th grade social awareness scores, *Low* and *Improver* students had similarly low 6th grade social

awareness scores (Table 6 and Table 14). Across economically disadvantaged and advantaged race/ethnicity categories, males were overrepresented in the *Low* class (Table 11) and were predicted to still be overrepresented even if they had average ELA scores, and average 6th grade levels of sense of belonging or sense of school safety (Tables 13 & 16). Across gender, race/ethnicity, and economic (dis)advantage categories, students were more likely to be in the *Low* class when they had lower than average 6th grade perceptions of their own sense of belonging or sense of safety (Tables 13 & 16). These findings suggest that if students don't feel a sense of belonging or sense of school safety by the end of 6th grade, then they are less likely to improve their levels of social awareness across middle school. Indeed, students in the *Low* class reported consistently low average perceptions of their own sense of belonging and school safety across middle school. This suggests that they were not able to develop social awareness because they did not experience a school social environment conducive to positive social interaction with others. This also suggests that positive early social experiences in middle school can help place students on a positive trajectory in terms of how much they feel like they belong and how much they are able to develop social awareness across middle school.

Improvers vs Low 7th. Students in the *Low 7th* SA class had high 6th grade social awareness scores, low 7th grade scores, and moderate 8th grade social awareness scores (Table 6, Table 14, and Figure 6). There were no consistent, practically and statistically significant differences in the odds of being in the *Improver* vs *Low 7th* between males, females, Hispanic/Latinx, Asian, African American, White, economically advantaged or disadvantaged students. The only factor that distinguished between *Improvers* and students in the *Low 7th* class was culture/climate. Students in the *Low 7th* class experienced a decrease in sense of belonging between 6th and 7th grade (Table 14 and Figure 6), and these levels recovered somewhat by 8th

grade; whereas students in the *Improver* class started out with low relative perceptions of culture/climate but showed improvements across middle school (Table 14 and Figure 6). This suggests that students in the *Low 7th* class experienced a decrease in both their own perceptions of sense of belonging and their levels of social awareness in 7th grade. Students in the *Low 7th* class showed improvements in both factors by 8th grade, but they had lower 8th grade social awareness and sense of belonging scores relative to students in the *Improver* class. One potential explanation for this pattern might be class placement. Perhaps these students were placed in classes where they felt more socially isolated in 7th grade (relative to the ones they were placed in during 6th grade), meaning they may have had limited opportunities to practice the skills that are indicative of high levels of social awareness (e.g., empathy, an understanding of norms).

Improvers vs Decliners. Like students in the *Improver* class, students in the *Decliner* class had moderate levels of social awareness in 7th grade (though *Decliners* actually had slightly higher average social awareness scores according to Table 14, $p<.01$). However, instead of showing improvements in social awareness from 6th to 8th grade (like *Improvers*), they showed sharp declines in social awareness across middle school (Figure 5, Table 6, & Table 14). Students in the *Decliner* class were more likely than students in the *Improver* class to be African American, Hispanic, or White (Tables 8, 11, and 16), but equally likely to be male or economically disadvantaged (Table 16). Besides race/ethnicity, the two factors that best differentiated between *Decliners* and *Improvers* were culture/climate and exposure to other race/ethnicity peers in middle school. Although *Decliners* had higher levels of sense of belonging at the end of 6th grade (Table 13 & Table 16), their perceptions of sense of belonging declined sharply across middle school (Table 14 and Figure 6b) whereas perceptions of sense of belonging increased for students in the *Improver* class (Table 14 and Figure 6b). *Decliners* were

also more likely to either be in a majority or minority racial/ethnic group in middle school (i.e., have a non-moderate exposure to other race/ethnicity peers) relative to *Improvers.* However, the combined model projects that even if African American, Hispanic/Latinx, or White students had average perceptions of their own sense of belonging in 6th grade, average 6th grade ELA scores, and average levels of exposure to other race/ethnicity peers, they would still be overrepresented in the *Decliner* class relative to Asian students (Table 16). This suggests that, in order to be on par with their Asian peers in terms of social awareness trajectories, African American, Hispanic/Latinx, and White students need improving perceptions of sense of belonging or sense of school safety across middle school, or higher than average 6th grade ELA, sense of belonging, or school safety scores.

Across all of the descriptive tables/plots and models predicting social awareness trajectory class, there are a few consistent trends. Changes in perceptions of climate/culture were consistently linked with changes in perceptions of social awareness, and the effect of 6th grade culture/climate on social awareness class did not differ in strength across all demographic categories tested. There was also a consistent overrepresentation of males and African American, Hispanic, or White students in the worse social awareness trajectory classes (i.e., students in the *Low* or *Decliner* classes), and even if these students were on par with their female and Asian peers in terms of early culture/climate perceptions and their exposure to other racial/ethnic peers in school, these gaps are still projected to exist. For males and African American, Hispanic, or White students to be on par with their female and Asian peers, they would need *better than average* early (i.e., 6th grade) perceptions of culture/climate and/or increasing perceptions of culture/climate across middle school. Because additional analyses suggest that improvements in sense of belonging somewhat precede improvements in social

awareness, these projections suggest that equitable and effective interventions to improve culture/climate for males and African American, Hispanic, or White students would reduce gender and race/ethnicity gaps in social awareness trends.

CHAPTER 5: DISCUSSION

The purpose of this study was to understand how social awareness, defined as the "ability to understand perspectives of and empathize with others" (CASEL, 2020), develops within the context of school social environments. This study was guided by two research questions*:* (1) *What patterns of social awareness development are exhibited by students from 6th-8th grade?*, and (2) *What variables seem to explain which pattern of social awareness development students display?* Answering these questions is important because educators can only improve social awareness once they understand how it develops and under what contexts student learning occurs.

Using the most broadly administered student survey to date on social-emotional learning and school culture/climate, I was able to look beyond average grade level scores in social awareness to uncover previously undiscovered common longitudinal learning trajectories. Using a person-centered approach, I identified five likely subgroups of students: a large relatively socially aware group (labeled *High)*; a subgroup with persistently low relative levels of social awareness (labeled *Low*); a group that showed declining levels of social awareness from 6th to 8th grade (labeled *Decliners*); a group with high 6th and 8th grade social awareness scores, but lower 7th grade scores (labeled *Low 7th*); and a group that showed improving levels of social awareness (labeled *Improvers*). I then used a series of regressions to identify to what extent theoretically-based individual and school environmental factors predicted which pattern of social awareness development students displayed. Race/ethnicity, gender, patterns in perceptions of sense of belonging, and exposure to peers from different race/ethnicity groups all independently and significantly predicted which pattern of social awareness students displayed, implying that patterns of social awareness are influenced by school social environments. Taken together, these

findings support ecological models of social awareness development that emphasize the importance of social context in learning (e.g., Bronfenbrenner & Morris, 2006).

Social Awareness Trends

In this sample, social awareness grade level means appeared high across middle school (hovering close to 3 on a 0-4 scale) but slowly declined from 6th to 8th grade. This generally flat trend in social awareness mirrors those reported in other studies (West et al, 2018; 2020; Coehlo & Sousa, 2017b; Coehlo et al, 2015; Kanopka et al, 2020). Through a person centered mixture modeling approach, I show that this mean trend appears to mask the presence student subgroups with disparate patterns of social awareness across middle school. Although the mean trend (a high, stable trend in social awareness) did appear to hold true for a large percent of the sample (about 75% were in what I labeled the *High* group), I uncovered four smaller subgroups of students representing about 5-7% of the sample each with quite different patterns across middle school. Students in what I labeled the *Low* group, had consistently low scores on the social awareness scale across all three years of middle school (with scores of about 1.5 on a 4 point scale). Students in the *Low-7th* group had high levels of social awareness in 6th and 8th grade, but scores about equivalent to those in the *Low* group in 7th grade. Students in the *Improver* group had low social awareness scores in 6th grade (on par with *Low* students), but high scores by the time they reached 8th grade (on par with students in the *High* group). Finally, students in the *Decliner* subgroup started out with high social awareness scores in 6th grade but low scores by the time they reached 8th grade. These findings show that that looking at average social awareness trends by grade level hides important variation in the development of social awareness across middle school.

Variables that Predict Social Awareness Trends

Asian students, females, students with positive trends in perceptions of school culture/climate, and/or students with moderate levels of exposure to peers from different racial/ethnic backgrounds, were more likely than their counterparts to display positive social awareness trends across middle school (students predicted to be in the *Improver* or *High* group). Each of these factors appeared to exert independent effects on social awareness trajectories, meaning the effects still appeared to be present even after controlling for all other variables (e.g., economic (dis)advantage, 6th grade English/Language arts scores). Therefore, I discuss the effects of each of these variables on social awareness developmental patterns independently.

Race/Ethnicity. I included student race/ethnicity as a predictor of social awareness trajectory groups because the social experiences of students are thought to differ depending on either their treatment by others based on observed physical characteristics (i.e., presentation of racialized features like skin color; e.g., Gregory et al, 2010) or the social interactions, norms and expectations that result from being a part of a particular cultural/ethnic group (Carter et al, 2016). When looking at raw means only, students in all four race/ethnicity categories showed declining trends in social awareness across middle school, consistent with prior research (West et al, 2018; 2020). Like West and colleagues (2018; 2020), it appeared as if trends in social awareness differed across racial/ethnic categories. However, the trends displayed by West and colleagues appeared to show similar moderately negative trends for Asian, White, and Hispanic students and worse trends for African Americans whereas my results showed African American, Hispanic, and White students had similar moderately negative trends and Asian students had the least steep downward grade level trend in social awareness. The reason trends across racial/ethnic categories appeared different from those reported by West and colleagues may be

due to differences in sampling methodology (I used more stringent analytic sampling criteria, which resulted in an oversampling of Asian students, for example).

There were also important differences in methodology between the present study and the one conducted by West et al (2018; 2020). At the time of their study, they only had access to two consecutive survey timepoints, so they imputed estimates for future grade level social awareness scores based on historical patterns. Thus, they reported only estimated trends whereas I report observed trends across three years. The fact that these imputed trends did not show the same differences in patterns of social awareness across race/ethnicity reinforces the importance of corroborating predictions with actual observations before making conclusions about group differences.

The present study shows that Asian students were more likely than Hispanic/Latinx, African American, and White students to show a positive trend than a negative one in social awareness development across middle school, even after controlling for levels of economic (dis)advantage. There are several potential explanations for why Asian students appear to have more positive social awareness trends. One potential explanation is that parents of Asian students impose higher expectations for academic and social success compared with parents of White, African American, or Hispanic/Latinx students (e.g., Caplan et al., 1992; Zhou and Bankston, 1998), which could motivate Asian students to study harder, read more, and pursue academic experiences (Hsin & Xie, 2014) that increase their exposure to the norms or worldviews of people from other backgrounds (either through literature or peer/teacher interaction). More research is needed to identify which (if any) of these experiences lead students to become more socially aware. If participation in certain extracurricular activities is linked to increases in social awareness, making these activities more available or appealing to

other students could improve social awareness among African American, Hispanic, and White students.

Economic disadvantage. In line with what West and colleagues projected, grade level social awareness means appeared to decline more precipitously for economically disadvantaged students than for economically advantaged students (2018; 2020). However, contrary to my hypothesis, being economically disadvantaged did not appear to affect trajectories of social awareness after controlling for their degree of exposure to other race/ethnicity peers and 6th grade English/Language Arts scores. This suggests that the disproportionate percentage of economically disadvantaged students showing declining trends in social awareness could be explained by either their lower 6th grade ELA scores or their exposure to a non-moderate proportion of other race/ethnicity peers in middle school. Results suggest that if economically disadvantaged students were to attend schools with an average percent of other race/ethnicity peers (46%) and performed at an average level on 6th grade standardized English/Language Arts tests, they would be just as likely as more advantaged students to show improvements in social awareness.

Gender. Descriptive statistics for the sample used in this study show females had higher grade level social awareness scores than males, which is consistent with what West et al reported (2018; 2020). Compared with males, West and colleagues projected that females would have steeper negative trends in social awareness over time (2018; 2020). Based on those results, I expected to find that females would be more likely than males to show declining trends in social awareness. Instead, descriptive statistics for my sample shows that average social awareness levels declined at a similar rate for males and females. The reason trends for males and females appeared different from those reported by West and colleagues may be due to my stringent

sampling criteria (e.g., perhaps females with the steepest downward trends in social awareness were eliminated from my sample due to strict attendance requirements), or the fact that (as mentioned in the previous section on race/ethnicity) West et al reported projected and not actual grade level means. Because I had access to three years of consecutive survey scores, I was able to simply use observed scores to calculate grade level means by gender.

In this study, males were overrepresented in social awareness trajectory classes that were characterized by low early social awareness levels, even after controlling for all other variables. For students who reported low social awareness scores in 6th grade, males were also more likely than females to continue to report low scores across middle school even when males and females shared the same average 6th grade sense of belonging and ELA scores. Thus, in addition to males having lower average levels of social awareness, the present study shows male scores were more likely to remain low over time compared with females.

My finding that males were less likely than females to report improvements in social awareness across middle school suggests that unmeasured aspects of the social environments experienced by males (for example, social norms that dictate males should not express empathy for others) were at play. Indeed, as boys enter adolescence, they become more aware of and adherent to gender norms such as the expectation that boys are tough and indifferent to the needs of others (Chu, 2018; Eccles, 1987; Hill & Lynch, 1983; Kågesten et al., 2016). At the same time, compared with elementary years, adolescent boys report fewer close relationships, and thus fewer opportunities to get to know peers with different backgrounds and viewpoints (Way et al, 2014; Way, 2011). Therefore, providing more opportunities for boys to develop close friendships with peers from different backgrounds (e.g., through sports, clubs) may improve boys' social awareness levels across middle school. Based on this analysis, however, even when

male students experience environments conducive to fostering positive relationships with peers from different backgrounds, average levels of social awareness do not tend to improve like they do for girls. One explanation is that it might take more time and effort for males than for females to develop close friendships that improve social awareness levels. If this is because of a fear of appearing too "feminine", then boys would likely benefit from the increased representation of empathetic, vulnerable male adults in school (teachers, principals, or coaches) who can model how to develop and maintain close interpersonal relationships (Biddulph, 2014).

Culture/climate. Trends in student perceptions of school culture/climate appeared to correspond to changes in social awareness across middle school, and early perceptions of culture/ climate were predictive of social awareness trajectory class even after controlling for other factors. Students who showed improving trends in social awareness also showed average improvements in sense of school safety and sense of belonging across middle school, a trend that was not observed for any other social awareness trajectory classes. Conversely, students who had low or decreasing levels of social awareness across middle school also showed steep declines in sense of belonging or sense of safety. Sense of school belonging appeared to have the largest effect on social awareness trajectories, and the positive relationship between sense of belonging perceptions and social awareness was consistently strong for males, females, Hispanic/Latinx, White, Asian, African American, economically disadvantaged and economically advantaged students.

Although there was some evidence of bidirectionality, additional analyses suggested that improvements in perceptions of sense of belonging preceded improvements in social awareness. This shows that when students experience improvements in their sense of belonging at school (e.g., through participation in activities that build positive relationships and help students feel as

if they are a part of a community or team) they become more aware of the viewpoints, norms, and issues concerning students who come from different backgrounds (i.e., they learn how to be more socially aware). If social awareness can be improved by increasing sense of belonging, then the next question to consider is how schools might improve levels of school belongingness. A recent meta-analysis found that the two strongest predictors of sense of belonging were levels of teacher support and student characteristics (both the presence of positive characteristics like conscientiousness and the absence of negative characteristics like mental illness; Allen et al, 2018). The types of teacher support most related to sense of belonging included giving students autonomy in the classroom, treating students fairly, and interacting with students in caring and friendly ways (Allen et al, 2018). Therefore, giving teachers additional training, time and resources needed to promote the development of caring relationships with students could be particularly helpful in promoting social awareness.

Although the research is still emerging, there are several promising school programs that have improved student sense of belonging by increasing the incidence of positive social interactions between students and between students and adults within schools (Allen et al, 2022). Examples of programs shown to improve sense of belonging include the Secondary Schools Demonstration Project (Wright et al, 2007), a Canadian program that increased sense of school belonging among low-risk 9th graders through classroom interventions like peer tutoring and mentoring, and the Achievement Mentoring Intervention (Holt et al, 2008), which showed improvements in school belonging for 9th graders at risk of academic failure who were assigned to meet weekly with adult school-based mentors (either teachers or counselors).

Students also tend to have higher levels of school belonging when they are emotionally stable and free from mental illness (Allen et al, 2018; Shochet et al, 2011). Thus, early

identification and support of mentally or emotional instable students (i.e., universal screening and a multi-tiered system of support) could prevent students from feeling increasingly isolated in school, thus improving sense of belonging and social awareness. However, to my knowledge, none of the evaluations of school-based mental health interventions of that nature have explicitly looked at impacts on sense of belonging (Allen et al, 2022).

Exposure to other race/ethnicity peers. Results show that holding constant 6th grade ELA and sense of belonging scores, students had the highest chance of improving their social awareness (versus having low or declining levels of social awareness) when attending middle schools with a moderate percent of other race/ethnicity peers (between about 55% and 75%). There appeared to be a curvilinear relationship between the percent of peers in a student's middle school from other racial/ethnic groups and a students' odds of showing an improving (versus low or declining) social awareness trend across middle school, with the highest odds in the range of about 25-45% same race/ethnicity peers and the lowest odds as that percent approached 100%. This suggests that students with a moderate percent of other race/ethnicity peers tend to have better social awareness trajectories than students in the racial/ethnic majority or minority in their middle school.

Although there was no evidence that the effect of exposure to other race/ethnicity peers was different for African American, Asian, or White students (compared with Hispanic/Latinx students), because the schools in the sample varied most in terms of the percent of Hispanic/Latinx and Asian students, I am most confident about the consistency of this effect for Hispanic/Latinx and Asian students, and least confident about the consistency of this effect for African American and White students. Indeed, prior research has shown that culturally specific schools (e.g., Afrocentric schools) can be beneficial for Black or African American students

(e.g., Kifano, 1996). It is important that future studies on the development of social awareness use samples more representative of these types of schools.

To my knowledge, this is the first time the relationship between school racial/ethnic composition and social awareness has been modeled using a quadratic form, though there is some precedent for this modeling decision in sociology literature (e.g., Moody, 2001). In his 2001 paper, Moody found that school racial heterogeneity had a curvilinear relationship with student preference for same-race (versus other-race) friends. Preference for same-race peers was highest at moderate levels of heterogeneity but lower at both low and high levels of heterogeneity. The findings presented in this dissertation are reminiscent of his work and help explain the seemingly contradictory effects of exposure to other race/ethnic peers. While exposure to people from different backgrounds is thought to decrease prejudice and increase social awareness (Allport, 1954; Pettigrew et al, 2011; Blalock, 1967; Coenders & Scheepers, 2008), too much exposure to other race/ethnicity peers means students are in a racial/ethnic minority, which is associated exposure to discrimination and feelings of social exclusion (Benner et al, 2018; Seaton & Yipp, 2009). The association between increasing exposure to other race/ethnic peers and improvements in social awareness is consistent with intergroup contact theory (Allport, 1954; Pettigrew et al, 2011; Blalock, 1967; Coenders & Scheepers, 2008) which asserts that exposure to people from other backgrounds is beneficial; and the association between increasing representation of same race/ethnicity peers for students in the racial/ethnic minority is consistent with current literature on racial/ethnic numerical minority status (e.g., Kogachi & Graham, 2020; Graham, 2022).

Indeed, there may be a certain degree of same race/ethnicity representation that is necessary for students in a racial/ethnic minority to feel a sense of safety and affirmation, but the

literature has not settled on a universal "critical mass" point (Graham, 2022). In one study, being a racial/ethnic minority in middle school was only detrimental when students shared their race/ethnicity with 20% or fewer of their peers (Kogachi & Graham, 2020). In this study, the proportion of other race/ethnicity peers at which students start becoming "likely Decliners" in social awareness depends on student race/ethnicity and ELA scores. For Hispanic/Latinx students with normative 6th grade sense of belonging and English/Language Arts scores, the level appears to be about 95%. However, students were even more likely to be *Decliners* when attending a school with nearly all same-race/ethnicity peers.

Although these results seem consistent with previous studies, they should be interpreted with some caution. In this sample, students at both ends of the scale in terms of exposure to other race/ethnicity peers tended to attend the same types of schools: schools with one large majority racial/ethnic group, and one smaller racial/ethnic minority. Racially/ethnically "diverse" schools (defined by Kogachi & Graham, 2020 as having three or more roughly proportionate racial/ethnic groups) were exceedingly rare in this sample. In order to complete the picture, future studies need to purposively sample schools where students experience different degrees of exposure to other race/ethnicity peers *within* racially/ethnically diverse schools. It could be that in racially/ethnically diverse schools, there is no projected "upper limit" in terms of the best percent of racial/ethnically different peers in middle school. Indeed, scholars studying the benefits of school racial/ethnic diversity assert that having a balance of more than two racial/ethnic groups decreases power differentials and helps students feel more like they belong relative to when they are the only minority in a school (e.g., Graham, 2016, 2018, 2022; Nishina et al., 2019; Yip et al., 2019).

Assumptions and Limitations

I followed current best practices for mixture modeling by conducting empirical tests of model comparison (Nylund et al, 2007; Henson et al, 2007), but when these tests did not clearly point to one model being superior, I chose among candidate models via evaluations of model usefulness and consistency with existing theory (Collins & Lanza, 2010; Hickendorff et al, 2018; Nylund-Gibson, 2023). Because this decision involved some degree of subjectivity, any future use of social awareness trajectory classes would require cross validation using additional samples as well as an evaluation of validity and reliability for that particular purpose (Jo et al, 2016). In addition, it is important to remember that the labels given to students in each of the social awareness trajectory classes (*High* vs *Improver*) were not independently tested for validity and should be interpreted with caution (and certainly not used to label students).

The lack of availability of methods to test the association between change in culture/climate perceptions and social awareness scores within the mixture modeling framework was also a limitation. Because the social awareness trajectory classes were estimated using 6^{th}, 7^{th}, and 8^{th} grade social awareness scores, I was not able to predict class assignment with culture/climate trajectories (i.e., the pattern of change in culture/climate across 6^{th}, 7^{th}, and 8^{th} grade) because it would mean that 7^{th} and 8^{th} grade culture/climate scores would be used to predict 6^{th} grade social awareness scores, which is not theoretically possible. Because of this, I had to rely on a combination of descriptive and statistical methods to examine the association between culture/climate and social awareness trajectories. New methods for testing the association between longitudinal mixture models and time-varying covariates need to be developed to streamline this type of analysis.

Generalizability. It's important to note that the sample I used, though large, represents a specific population of students in one region (California), and doesn't necessarily generalize to other areas or populations. Due to strict analysis criteria, students in the sample had low school mobility, high rates of school attendance, and higher social awareness and ELA scores relative to the total possible population within participating districts. Schools in participating districts also did not vary much in terms of their distribution of students from different racial/ethnic or socio-economic groups. Underrepresented were schools with a majority of students from affluent families, or schools with a majority of students with White or African American race/ethnicity designations, for example. At the time of this study, the CORE PACE dataset used here represents (to my knowledge) the largest, most complete longitudinal dataset documenting trends in SEL. As more districts and schools begin to consistently administer social-emotional learning surveys, replication studies with more populations will be possible.

Practical and Methodological Contributions

Person centered theory building. This study demonstrates how mixture modeling and person centered methodologies more generally can be leveraged to help build theories of development for understudied social constructs like social awareness. As mentioned in the introduction, the underlying assumption behind variable-centered regression approaches is that the same combination of independent variables can be used to predict a particular outcome across subgroups in a population (Magnussen, 2003). It is now common practice in educational research to test whether the effects of independent variables are moderated by demographic variables like gender or race/ethnicity, however, there may be hidden subgroups that are more relevant for learning. In this case, mixture modeling was used to uncover five hidden subgroups of students based on their patterns of social awareness development across middle school.

Multinomial logistic regression models revealed that some predictors differentiated only between certain pairs of social awareness trajectory classes (e.g., degree of exposure to other race/ethnicity peers only differentiated between students in the *Improver* and *Decliner* or *Low* classes), whereas others showed consistent effects across class comparisons and demographic groups (e.g., 6th grade sense of belonging perceptions). Predictors with consistent effects are more likely to be universally important, whereas predictors with inconsistent effects may help build theories that only hold true for certain populations. Understanding whether a factor is universally or conditionally important is an important first step in theory building.

Mixture modeling in evaluation. This study demonstrates how mixture modeling might be used in longitudinal evaluations when random assignment is not tenable (as is often the case in education). In this study, participants across the five estimated social awareness trajectory classes might have shared similar 6th grade (as was the case for *Improvers* and students in the *Low* class) or 8th grade mean social awareness scores (as was the case for *Improvers* and students in the *High* class). Thus, comparisons could be made between students who started at a similar level of social awareness (to see what factors preceded improvements) or between students who ended up at the same level of social awareness (to see how different patterns of development might lead to the same outcome). Thus, classifications based on mixture models can be used for a variety of comparisons that could shed light on factors that hinder or facilitate development.

Mixture models can be used to help identify treatment effects in non-randomized studies by matching participants across treatment and control groups based on pre-treatment outcome trajectories (Jo, Wang, & Ialongo, 2009). Instead of matching students across control and treatment groups based on demographic and risk factors, for example, students are instead

matched based on their pattern of development for the outcome of interest before an intervention was implemented. Any post-treatment discontinuity in patterns of change on the outcome of interest could signal evidence of a treatment effect. For both randomized and non-randomized evaluation designs, treatment effects could also be calculated differentially depending on pre-treatment outcome class, as demonstrated by Muthen et al, (2002), thus potentially identifying subpopulations with different responses to interventions (Brown et al, 2008; Peer & Spaulding, 2008; Jo, Wang, & Ialongo, 2009). The bottom line is that person centered approaches can help evaluators build theories of change grounded in individual patterns. Evaluations that start at the person level can help determine not just which intervention produces the best average treatment effect, but which interventions work for whom and under what conditions.

Future Research

Future research is needed to better understand the role of schools in fostering school belongingness and social awareness. A handful of school-based interventions have been shown to improve sense of belonging for middle school students (Allen et al, 2022), however it's unclear whether improvements in sense of belonging attributed to these programs benefit social awareness trajectories. Future program evaluations could leverage mixture modeling to see how belongingness interventions affect social awareness trajectories differentially by trajectory class. Larger scale quasi experimental or experimental studies are also needed to test the effectiveness of belongingness interventions across different regions in the US and across different types of schools (e.g., under resourced schools, racially/ethnically segregated schools).

It is important that future evaluations of school-based belongingness interventions pinpoint specific program components that have the greatest impact on student sense of belonging for specific subgroups of students (e.g., males). Are intensive, sustained interventions

needed (e.g., school-based mentoring) or are short-term or intermittent activities sufficient for building deeper connections between adults and students? Can supportive relationships be adequately developed during classroom instruction, or do schools need to set aside specific time periods for mentoring and relationship building? How important is it that students develop supporting relationships with teachers versus school counselors, who already are dedicated to supporting students in more non-academic ways? What are the benefits and costs to targeting specific groups of students (e.g., students at risk of academic failure, as many existing programs do; Allen et al, 2022) versus offering programs to all students? Knowing which components are most effective is important because schools may need to invest a substantial amount of time and resources to belongingness interventions.

This study shows that students attending schools with a moderate percentage of other race/ethnicity peers are more likely to show improving than declining or low trends in social awareness over time. The role of exposure to other race/ethnicity peers for improving social awareness needs to be explored in diverse schools as well as schools with White or African American majorities in order to parse out racial/ethnic representation versus school social and financial capital. It is unclear whether the relationship between degree of exposure to other race/ethnicity peers and social awareness is causal or merely relational. Future studies could leverage natural experiments (e.g., using changes in school zoning) or quasi experimental designs (e.g., matching) to better estimate how changes in school racial/ethnic composition affects social awareness. In addition, other categories of difference (e.g., differences based on gender identity, political beliefs, socioeconomic status) and their impact on social awareness are yet to be explored. Future studies could help parse out the relative importance of exposure to different social or demographic groups.

Noting the benefits of grouping students based on their patterns of learning over time, this study also begs the question of whether person centered methods can be made more accessible for districts and state education agencies with limited sample sizes and analytic capabilities. Rigorous mixture modeling using longitudinal data requires a large sample, multiple measurements over time, and a lot of time and knowledge. If districts and state education agencies are going to leverage these methods, guidance needs to be simple, and techniques need to be cost-effective and produce valid classifications using smaller sample sizes.

Conclusion

This dissertation contributes to the emerging body of research on social awareness development by uncovering common trends in social awareness development across middle school and exploring how they relate to characteristics of students and their middle school social environments. Compared with females and Asian students, males and African American, Hispanic/Latinx, or White students were more likely to show low or declining trends in social awareness. Findings suggest that these gaps might be closed through interventions that create positive school social environments and instill a sense of belonging in all students. Therefore, schools are positioned to play a critical role in helping to build bridges across the experiences, beliefs, and backgrounds that too often divide us.

APPENDIX I: IMPUTATION OF MISSING DATA

I imputed culture/climate and ELA grade level scores for students missing 6th grade ELA scores (n=5500), 6th grade culture/climate scores (n = 300), or 8th grade culture/climate scores (n=4,000). I considered using FIML or multiple imputation but those options are not yet available for mixture models in MPlus. Instead, I predicted values based on multiple regression models. Predictors used included other grade level scores, change in scores across middle school years, and any significant demographic variables. I also included any significant interactions between demographic variables and the other predictors if they improved model r-squared significantly and by more than 1 percentage point. The prediction equations used are displayed in Table 17:

Table 17

Regression Equations Used for Missing Data Imputation

Variable	Equation	Model Fit
ELA Score (6th Grade)	2962 + -.5074*ELA_7 + -.6813*ELA_8 + .0003965*ELA_7*ELA_8 + -2.632*Af.Am. + 4.979*White + -1.634*Econ.Dis.	r^2 = .76, p<.001
Sense of Safety (6th Grade)	1.67402 + 0.16531*Safe_8 + 0.39527*Safe_7 + -0.10914*Male + -0.07188*Asian + -0.08738*Af. Am.	r^2 = .32, p<.001
Sense of Belonging (6th Grade)	- 2.13886 + 0.14279*Belong_8 + 0.36768*Belong_7 + -0.07479*Male + -0.05988*Asian + 0.07070*White + 0.04837*Econ.Dis.	r^2 = .26, p<.001
Sense of Safety (8th Grade)	1.519688 + 0.293128*Safe_7 + 0.096819*Male + 0.056189* Econ.Dis.+ 0.063071*Safe_6*Safe_7 + 0.063061*Male*White + 0.127015*Safe_7*White + -0.015983*Safe_7*Safe_6*White	r^2 = .36, p<.001
Sense of Belonging (8th Grade)	- 1.895452 + 0.263550*Belong_7 + 0.110131*Male + 0.046994*Belong_6*Belong_7 + -0.054417*Af.Am. + -0.053469*Asian	r^2 = .29, p<.001

The plots in Figures 10a-10d show grade level patterns in culture/climate (CC) by social awareness trajectory class using the imputed sample (10a and 10c) and a smaller sample of students with complete grade level data (10b and 10d). The overall patterns appear to be the

same, however, the differences across classes are less severe in the imputed sample (especially looking at Decliners vs. Improvers). This shows that the regression-based approach is a conservative method for filling in missing values and is more likely to under- than over-estimate investigated effects.

Figure 10 (a-d)

Imputed vs Actual Culture/Climate Scores by Class

APPENDIX II: PSYCHOMETRIC PROPERTIES OF CORE SOCIAL AWARENESS CONSTRUCT

Relative to the culture/climate scales, a considerable amount of research has addressed validity and reliability of the CORE social-emotional learning scales. Validity evidence is based on relationships with other student measures/criteria, factor analyses and IRT models. As expected, social awareness is moderately correlated with two other SEL CORE constructs: self-management (.5 to .6 between 4th -12th grade) and self-efficacy (roughly between .3 and .5 between 4th and 12th grade; West et al, 2018). Although they are related, structural analyses show that the constructs are also distinct and seem to measure different things (Meyer, Wang, & Rice, 2018). The social awareness scale has the lowest correlation with test scores compared with other SEL CORE constructs, with correlations around .2 or less from 4th through 11th grade (as reported in West et al, 2018). This supports validity because self-efficacy, self-management, and growth mindset are theorized to be more predictive of academic performance.

When looking at social emotional learning aggregate scores, as expected, researchers have found strong positive relationships with student and staff reports of school climate (see Table 6), which is hypothesized to improve SEL (Hough et al., 2017; Kraft, Buckley, Ruzek, Schenke, & Hulleman, 2018). There are also positive relationships between SEL and indicators of persistence on tests (Soland, Jensen, Keys, Wolk, & Bi, 2019), teacher reports of student SEL (Scharer, West, & Dow, 2017), student grade point averages, math and English test scores (West, 2017; Hough et al., 2017). Conversely, strong negative correlations were found between SEL scores and school suspension and absence rates (West, 2017; Hough et al., 2017).

Researchers have examined the potential for biases to impact scores on SEL scales. In 2018, Meyer and colleagues performed differential item functioning (DIF) analyses on SEL

items by male vs. female, White vs. African American, White vs. Hispanic/Latinx, and English language learns vs. their peers and at each grade level found no evidence of moderate to large DIF at the elementary and middle school levels for social awareness items. There was evidence that one item functioned differentially for African American students at the high school level. The item with the prompt: "During the past 30 days, how much did you care about other people's feeling?", disfavored African American students in the White vs. African American DIF analysis at Grade 10. The authors conclude that there is strong evidence that items are functioning similarly across groups but caution that it is still possible students are responding to ALL items in different ways. For example, students from different cultural backgrounds might interpret item scales differentially or have different frames of reference in mind while responding (Gelbach and Hough, 2018). Another possibility is that all students are evaluating themselves based on "white frame of reference" (Gregory & Fergus, 2017), and therefore students from minoritized groups (e.g., African American or Latinx) view themselves less favorably in response to negative stereotypes.

Other biases examined by researchers were social desirability and reference bias. Reference bias refers to the tendency of respondents to rate themselves less favorably when in schools with higher-than-average mean levels of performance (West et al, 2016). This did not appear to be the case, as students did not rate their own SEL lower when in a high performing school (West et al, 2016). There is some potential for social desirability to affect SEL scores, as students tended to select responses that reflect high levels of social emotional skills (Meyer et al, 2018); however, to date no one has conducted qualitative interviews with student respondents to explore its effect. It has been hypothesized that social desirability biases scores more for certain students. For example, girls rate themselves higher in terms of self-efficacy in elementary school

and their ratings decline more rapidly than boys as they get older. It may be more socially desirable for girls to be modest in reporting, and girls may become more in tune with gender norms as they age, explaining this phenomenon (Tourangeau, Rips, & Rasinski, 2000).

Research has found the social awareness scale, as with other CORE SEL scales, to be reliable in terms of internal consistency, stability, and its ability to distinguish between students. Internal consistency was found to be above .8 from 6th to 12th grade (Meyer, Wang, & Rice, 2018), which is deemed adequate. Noting high levels of variation across students, Meyer and colleagues concluded that all four SEL scales were good at distinguishing between students with high versus low SEL skills (Meyer, Wang, & Rice, 2018). IRT-based social awareness scale scores are also normally distributed with a very small ceiling effects relative to other Likert-based surveys (West et al, 2018). There is also evidence that the measurement characteristics of the social awareness construct do not shift with time. Soland et al (2019) found evidence of longitudinal measurement invariance for middle and high school students on the social awareness construct, and other research on the social awareness construct (though with different items) has found it to be stable across measurement timepoints (i.e., grade levels) and the factor structure to be invariant across time (the middle school years; Ross & Tolan, 2017).

Taken together, the research to date on validity and reliability of CORE social awareness scale scores supports its use for improvement and research. However, we don't yet know whether differences in means across demographic categories can be interpreted as gaps in ability or differences in frame of reference or social desirability. We are also unable to rule out the influence of stereotype threat or reference bias, but considerable efforts have been made to reduce or eliminate them. Another concern is that ICCs were lower for social awareness than school climate (see Table 5), suggesting that more of the variance can be explained by within-

school differences relative to differences in school effects on social awareness. However, students within schools vary based on which schools they attended previously as well as how well their race/ethnicity matches the school's racial composition (for example); therefore, it's possible these estimates are attenuated.

APPENDIX III: PSYCHOMETRIC PROPERTIES OF CORE CULTURE/CLIMATE CONSTRUCTS

The use of the CORE culture/climate measures are supported by quantitative and qualitative evidence of validity. In 2016, Marsh and colleagues interviewed district and school administrators to address whether the surveys resulted in fair judgements of school quality, whether they were implemented with fidelity, and whether there was evidence that educators were "gaming" them for accountability reasons (2016). They found no evidence of survey manipulation or "gaming" and administrators reported they found the survey measures to be fair and accurate. Additionally, measures of culture/climate were moderately correlated with measures of social-emotional learning, including social awareness, as expected (see Table 6; Hough et al, 2017). At the school level, school culture/climate was not significantly related to the percent of students who were economically disadvantaged; however, it was negatively correlated with percent of students who were African American, English language learners, or students with disabilities, as these students reported lower levels of culture/climate relative to their peers (White & Polikoff, 2019), though it's important to note that they focused on elementary instead of middle or high schools because the larger school sample size.

Evidence of reliability was based on assessments of school mean stability, inter-rater reliability, and internal consistency. In 2017, Hough and colleagues reported that sense of belonging and sense of safety measures demonstrated high (above .8) levels of internal consistency based on Chronbach's alpha (see Table 18). They also examined the proportion of variance in scores within versus between schools and found that though most of the variation was within schools, a non-negligible amount was between schools (see Table 19 for intraclass correlation coefficient estimates or ICCs). Student, staff, and parent reports of culture/climate

were also positively correlated, showing evidence of inter-rater reliability. Correlations between students and parents and between students and staff were highest at the high school level (.7 and .66 respectively) and slightly lower at the middle school level (.7 and .34 respectively).

White and Polikoff later reported on the quantitative properties of the CORE culture/climate measures. The authors compared how schools ranked in terms of performance on the CORE School Quality Improvement Measures, including measures of culture/climate, across three years (2014-14, 2015-16, and 2016-17). They found that mean school performance on culture/climate measures improved somewhat within the first two years of implementation, but not as much as test-based indicators (i.e., academic performance). However, from 2015-16 to 2016-17, most schools either declined (30%) or stayed the same (43%) in terms of school culture/climate, representing a decline in mean school culture/climate. Therefore, the authors conclude that the measures are relatively unstable from year to year and suggest that school averages be taken across multiple years as is planned in the present study.

Table 18

Scale Reliabilities of CC Surveys by Respondent Group

Measure	Student	Staff	Parent
School Culture/Climate			
Sense of Belonging (Climate)	.84	.89	.93
Sense of Safety (Climate)	.81	.86	.81
N	293,703	43,225	186,971

Source: Hough et al, 2017

Table 19

ICCs for SEL and CC Surveys, by Respondent Group

Respondent	Grade Level	SEL	School Culture/Climate
Student	Middle	7%	12%
	High	3%	7%
Parent	Middle	-	9%
	High	-	7%
Staff	Middle	-	30%
	High	-	35%

Source: Hough et al, 2017

Table 20

Correlations between Measures of Social Awareness, and Culture/Climate (CC), by School Level

		Social Awareness	Sense of Belonging	Sense of Safety
Middle	Social Awareness	1		
	Sense of Belonging (CC)	.59	1	
	Safety (CC)	.12	.46	1
High	Social Awareness	1		
	Sense of Belonging (CC)	.51	1	
	Safety (CC)	.33	.53	1

Source: Hough et al, 2017

Taken together, there is modest evidence that once categorized into three levels, school level measures of CORE culture/climate scales used in this study are valid and reliable. One potential issue is that we don't know the degree to which school racial, socio-economic, and gender composition is correlated with school culture/climate, as existing reports have only looked at younger samples (White & Polikoff, 2019). This is something I plan to explore and account for during analysis and interpretation.

APPENDIX IV: DETAILED STUDENT LEVEL MIXTURE MODELING RESULTS

Tables 21-23 display results of three, four and five class latent profile models with differing specifications related to item variances and covariances.

Table 21

Three Class LPA Models

Variant Name	Item Var Constraints	Item Cov Estimated	Item Cov Constraints	LL	aBIC	BIC	N par	LRT p-value (vs. previous)
EEI	=	None	None	-29553.2	59192.87	59237.36	14	
EEE-67	=	67	=	-29444.3	58981.14	59028.81	15	<.001
EEE-67f	=	67	Free	-29213	58530.98	58585	17	<.001
EEE-678	=	67, 78	=	-29188.3	58475.47	58526.31	16	<.001 compared with EEE-67
EEE 678 C13	=	67, 78	= for 2 classes	-29005.1	58121.47	58178.67	18	<.001
EEE-678 Free	=	67, 78	Free	-29003.3	58130.02	58193.58	20	p = .15
EEE	**=**	**all**	**=**	**-28922.1**	**57949.24**	**58003.26**	**17**	**<.001 compared with EEE-678**
EEE 2c	=	all	= for 2 classes	-28597.3	57318.13	57381.69	20	<.001
EEE allfree	=	all	Free	-28593.7	57329.48	57402.57	23	p = .07
VVI-0	Free	None	None	-28579.3	57282.14	57345.7	20	<.001 compared with EEE
VVI-67	Free	67	=	-28422.4	56974.41	57041.14	21	<.001
VVI-67f	Free	67	Free	-28410.9	56963.79	57036.88	23	<.001
VVI-678	Free	67, 78	=	-28311.8	56759.48	56829.4	22	<.001 compared with VVI-67
VVI-678f	Free	67, 78	Free	-28288.3	56737.11	56819.73	26	<.001
VVI all	Free	all	=	-28239.4	56620.76	56693.85	23	<.001 compared with VVI-678
VVV	Free	all	Free	-28224.3	56627.73	56719.89	29	<.001

Notes: Equal Across Class (=) or Freely Estimated (Free); **bold:** has slope heterogeneity and all classes >5% based on posterior probabilities

Table 22

Four Class LPA Models

Variant Name	Item Var Constraints	Item Cov Estimated	Item Cov Constraints	LL	aBIC	BIC	Npar	LRT p-value (vs. previous)
EEI	=	None	None	-29357.9	58826.95	58884.15	18	
EEE-67	=	67	=	-29199.9	58517.14	58577.52	19	<.001
EEE-67f	=	67	Free	-29014.8	58165.49	58235.4	22	<.001
EEE-678	=	67, 78	=	-28975.3	58074.09	58137.64	20	<.001 compared with EEE-67
EEE C12	=	67, 78	= for 2 classes	-28851.2	57838.28	57908.19	22	<.001
EEE C123	=	67, 78	= for 3 classes	-28848.9	57833.76	57903.67	22	<.001 compared with EEE-678
EEE-678 Free	**=**	**67, 78**	**Free**	**-28827.5**	**57815.58**	**57898.2**	**26**	**<.001**
EEE	=	all	=	-28689.3	57508.34	57575.08	21	<.001 compared with EEE-678
EEE C12	=	all	= for 2 classes	-28511	57170.21	57246.48	24	<.001
EEE C123	=	all	= for 3 classes	-28478.4	57105.08	57181.35	24	<.001 compared with EEE
EEE allfree	=	all	Free	-28460.8	57106.93	57202.27	30	<.001
VVI-0	Free	None	None	-28304.2	56775.13	56860.93	27	<.001 compared with EEE c123
VVI-67	Free	67	=	-28245.9	56664.7	56753.68	28	<.001
VVI-67f	Free	67	Free	-28218.7	56628.76	56727.27	31	<.001
VVI-678	Free	67, 78	=	-28201	56581.08	56673.24	29	<.001 compared with VVI-67
VVI-678f	Free	67, 78	Free	-28129.4	56474.92	56586.15	35	<.001
VVI all	**Free**	**all**	**=**	**-28155.5**	**56496.31**	**56591.65**	**30**	**<.001 compared with VVI-678, but sig. worse than VVI-678f at .001**
VVV	Free	all	Free	-28137.8	56516.52	56640.46	39	<.001

Notes: Equal Across Class (=) or Freely Estimated (Free); **bold:** has slope heterogeneity and all classes >5% based on posterior probabilities

Table 23

Five Class LPA Models

Variant Name	Item Var Constraints	Item Cov Estimated	Item Cov Constraints	LL	aBIC	BIC	Npar	LRT p-value (vs. previous)
EEI	=	None	None	-29129.4	58394.69	58464.6	22	
EEE-67	=	67	=	-29029.8	58201.59	58274.68	23	<.001
EEE-67f	=	67	Free	-28817.9	57802.59	57888.39	27	<.001
EEE-678	=	67, 78	=	-28819.3	57786.9	57863.17	24	<.001 vs EEE-67
EEE-678 c12	=	67, 78	= for 2 classes	-28736.8	57634.25	57716.87	26	<.001
EEE-678 c123	=	67, 78	= for 3 classes	-28721.5	57603.54	57686.17	26	<.001 vs EEE-678
EEE-678 c1234	=	67, 78	= for 4 classes	-28717.7	57595.9	57678.53	26	<.001 vs EEE-678
EEE-678f	=	67, 78	Free	-28673.9	57545.41	57647.1	32	<.001
EEE	=	all	=	-28592.6	57339.56	57419.01	25	<.001 vs EEE-678
EEE c12	=	all	= for 2 classes	-28444.8	57062.43	57151.41	28	<.001
EEE c123	=	all	= for 3 classes	-28392.5	56957.88	57046.86	28	<.001 vs EE-67f
EEE c1234	**=**	**all**	**= for 4 classes**	**-28401.8**	**56976.52**	**57065.5**	**28**	**<.001 vs EE-67f**
EEE allfree	=	all	Free	-28348.6	56925.64	57043.22	37	<.001

Notes: VVI and VVV 5-class models are not presented due to model estimation errors

After eliminating models with small, estimated class sample sizes (less than about 5%, which eliminated most models with 5 or more classes) or little or no heterogeneity in slopes, three candidate models were chosen (see Table 24). I then evaluated these three models in more depth by calculating approximate weight of evidence criterion (AWE), class homogeneity and separation at each timepoint, and LMR-LRT and BLRT p-values.

Table 24

Student Level Mixture Model Detailed Results for Candidate Models

Model	***Specification***	***nPar***	***aBIC***	***BIC***	***AWE***	***Entropy***	***AvePP***	***LMR-LRT & BLRT***
A. LPA with 4 subgroups	equality constraints imposed on timepoint variance, and free covariance between 6^{th}-7^{th} grade and 7^{th}-8^{th} grade scores	26	57815.57	57898.2	58219.4	.637	.69, .73, .83, .75	<.001, <.001
B. LPA with 5 subgroups	equality constraint imposed on timepoint variance, covariance estimated between all timepoints but constrained to be equal for 4 subgroups	28	56976.52	57065.5	57411.4	.725	.695, .708, .73, .68, .875	<.001, <.001
C. LPA with 4 subgroups	free timepoint variances covariances constrained to be equal	30	56496.31	56591.6	56962.2	.482	.776, .7, .616, .695	<.001, <.001

Notes: LPA = latent profile analysis; nPar = number of free parameters; aBIC = sample size adjusted BIC; BIC = Bayesian information criterion; AWE = average weight of evidence; AvePP = average posterior probability for each subgroup; BLRT = Bootstrap likelihood ratio test; LMR-LRT = Lo, Mendell, and Rubin (2001) likelihood ratio test)

Information criteria values were best for the 4-class VVI model with timepoint variances unconstrained and freely estimated and all timepoint covariances estimated but constrained to be equal across classes. However, not placing constraints on variance parameters resulted in lower class homogeneity. The variance for class 1 (the low group) was estimated to be 4x larger than class 4 (the high group) and this class also had the lowest homogeneity. The two remaining models had higher homogeneity values but neither would be characterized as having "high" homogeneity. The 4-class EEE-678 Free model does come close, with values hovering just above or below the threshold of .6. However, information criteria values are considerably worse than for the 5-class EEE c1234 model. The difference in specification between these two models

is that the former estimates fewer classes and covariance parameters but imposes no covariance equality constraints. The latter estimates one more class and covariance (adding the covariance between 6th and 8th grade scores) but covariances are constrained to be equal for 4 of 5 of the classes. The class with freely estimated covariances ended up being class 4 (the class with the highest estimated mean). For students in this class, timepoints were moderately positively correlated whereas the other classes showed weaker positive correlations (though still statistically significant). This is likely due to the fact that correlations are higher when scores are more reliable. Students who tended to score higher on social awareness each year were likely more careful selecting their responses, resulting in higher precision.

To evaluate face and criterion validity for the remaining candidate models, I calculated descriptive statistics for each class based on most likely class membership. Estimated means for 9th grade social awareness, school racial diversity, school racial integration, and sense of belonging seemed consistent with what we would expect (e.g., students in more diverse schools were more likely to increase in social awareness or have consistently high social awareness scores). Student demographic proportions also seemed consistent with overall trends in social awareness (e.g., that males and FRL students score lower on average).

I then counted the number of students estimated to be in each class based on intersections of race/ethnicity, free or reduced lunch status, and gender to see if one model had a better representation of students in each focal subgroup. The 4-class model had one empty cell, and two cells with only 2 students. The five class model had no empty cells, but two cells with one student in them. For the five-class model, these low-count cells were both for non-FRL African American students. This would be easier to address because I could just leave out the interaction between FRL-status and African American for further analyses. For the 4-class model, there

were low cell counts for multiple subcategories, making decisions for further analyses more difficult. Therefore, I decided that the 5-class model was best because it fit the data better and had more adequate cell counts.

APPENDIX V: DESCRIPTIVE STATISTICS AND RELATIONSHIPS BETWEEN PREDICTORS

Table 25

Social Awareness, ELA and Percent Other Race/Ethnicity Peers by Demographic Group

	Social Awareness			***English Language Arts z-Score***			***% Other Race/Ethnicity Peers***
Student Group	***6th***	***7th***	***8th***	***6th***	***7th***	***8th***	
Gender							
Female	2.94	2.84	2.71	0.14	0.14	0.16	0.46
Male	2.78	2.70	2.56	-0.13	-0.12	-0.14	0.46
Economic (Dis)advantage							
Non FRPL	2.88	2.81	2.75	0.54	0.54	0.51	0.61
FRPL	2.85	2.76	2.59	-0.24	-0.24	-0.22	0.39
Race/Ethnicity							
African American	2.89	2.73	2.64	-0.24	-0.19	-0.17	0.84
Asian	2.76	2.71	2.67	0.49	0.52	0.52	0.62
Hispanic	2.85	2.75	2.58	-0.27	-0.27	-0.26	0.28
White	3.00	2.92	2.82	0.66	0.61	0.57	0.68
ALL	2.86	2.77	2.64	0.01	0.01	0.01	0.46

Table 26

Correlation Matrix

	ELA 6th	**ELA 6th-8th**	**Belong 6th**	**Belong 6th-7th**	**Belong 7th-8th**	**Safe 6th**	**Safe 6th-7th**	**Safe 7th-8th**	**ORE**
ELA 6th	1.00								
ELA 6th-8th	0.04	1.00							
Belong 6th	0.08***	-0.02	1.00						
Belong 6th-7th	0.01	0.01	-0.42***	1.00					
Belong 7th-8th	-0.03***	0.03***	-0.12***	-0.44***	1.00				
Safe 6th	0.09***	0.01	0.41***	-0.09***	-0.08***	1.00			
Safe 6th-7th	-0.03***	-0.02	-0.14***	0.28***	-0.10***	-0.39***	1.00		
Safe 7th-8th	-0.05***	0.02	-0.07***	-0.14***	0.27***	-0.09***	-0.41***	1.00	
ORE	0.28***	0.09***	0.03***	0.01	-0.02***	-0.04***	-0.04***	0.01	1.00

Notes: ORE = percent other race/ethnicity peers in middle school.

Table 27

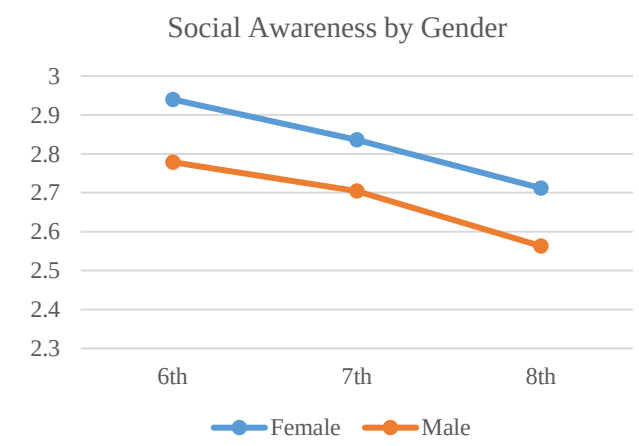
Culture/Climate by Demographic Group

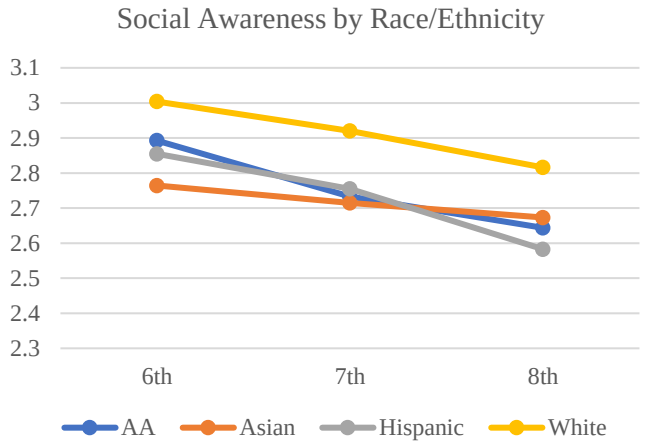
	Belong			Safe		
Student Group	***6th***	***7th***	***8th***	***6th***	***7th***	***8th***
Gender						
Female	4.07	3.84	3.65	3.53	3.43	3.34
Male	4.00	3.82	3.73	3.40	3.35	3.38
diff	**0.08***	**0.02***	**-0.09***	**0.13***	**0.08***	**-0.04***
Economic (Dis)advantage						
Non FRPL	4.03	3.83	3.67	3.45	3.34	3.27
FRPL	4.04	3.83	3.70	3.48	3.41	3.40
diff	**-0.01**	**0.00**	**-0.03**	**-0.03**	**-0.07***	**-0.12***
Gender & Economic (Dis)advantage						
ED Female	4.08	3.83	3.65	3.54	3.45	3.37
ED Male	4.00	3.83	3.75	3.42	3.38	3.42
diff	**0.08**	**0.01**	**-0.10**	**0.12**	**0.07**	**-0.05**
Non ED Female	4.07	3.85	3.64	3.52	3.38	3.26
Non ED Male	3.98	3.81	3.70	3.37	3.29	3.29
diff	**0.09***	**0.05**	**-0.06**	**0.15****	**0.09***	**-0.02**
Race/Ethnicity						
African American	3.96	3.71	3.57	3.35	3.25	3.24
Asian	3.93	3.71	3.57	3.41	3.33	3.31
Hispanic	4.04	3.84	3.70	3.51	3.44	3.41
White	4.16	3.97	3.79	3.46	3.33	3.29
diff Hispanic/Af.Am.	**0.09***	**0.13***	**0.14****	**0.16****	**0.19****	**0.17****
diff Hispanic/Asian	**0.12***	**0.12***	**0.13****	**0.11***	**0.11***	**0.10***
diff Hispanic/White	**-0.12***	**-0.13***	**-0.09***	**0.05**	**0.11***	**0.12***

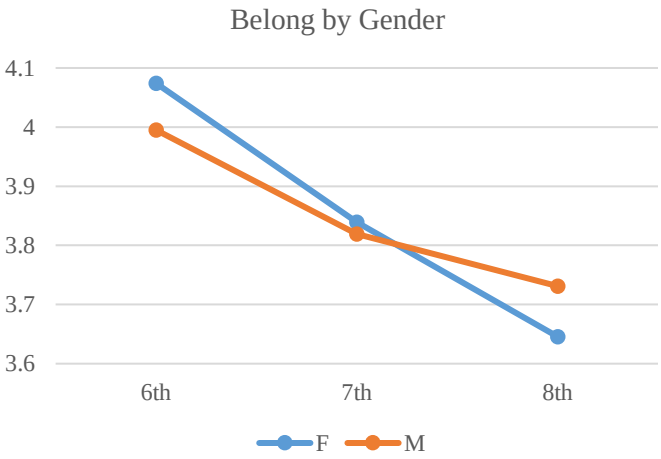
Notes: * p<.01; ** p<.01; ** p<.01 ***and*** Cohen's *D* >.2 (small effect)

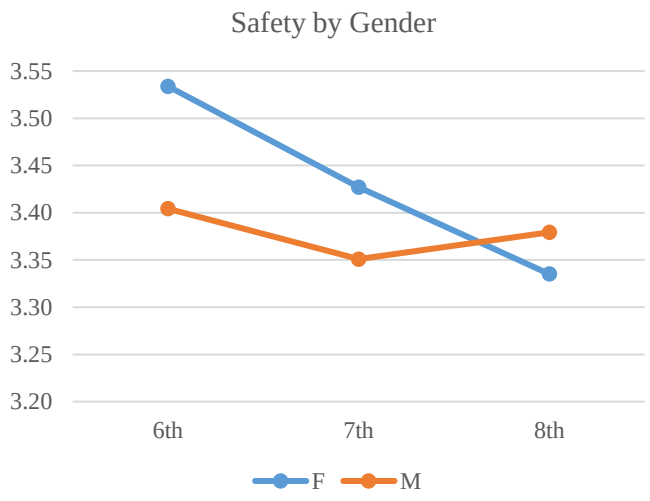
Figure 11 (a-i)

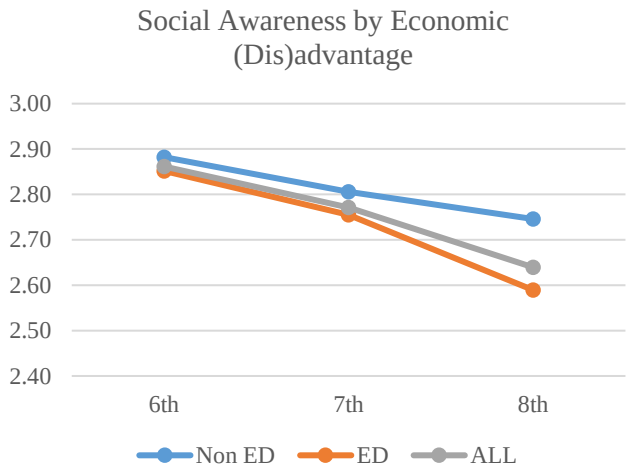
Social Awareness and Culture/Climate Trends by Demographic Group

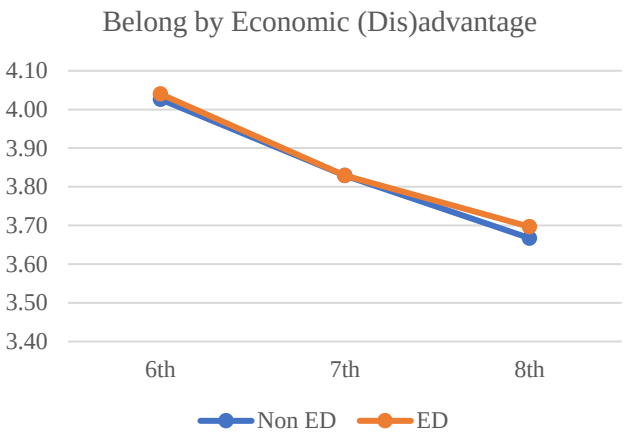









Social Awareness by Economic (Dis)advantage
3.00
2.90
2.80
2.70
2.60
2.50
2.40
6th
7th
8th
Non ED
ED
ALL


Belong by Economic (Dis)advantage
4.10
4.00
3.90
3.80
3.70
3.60
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6th
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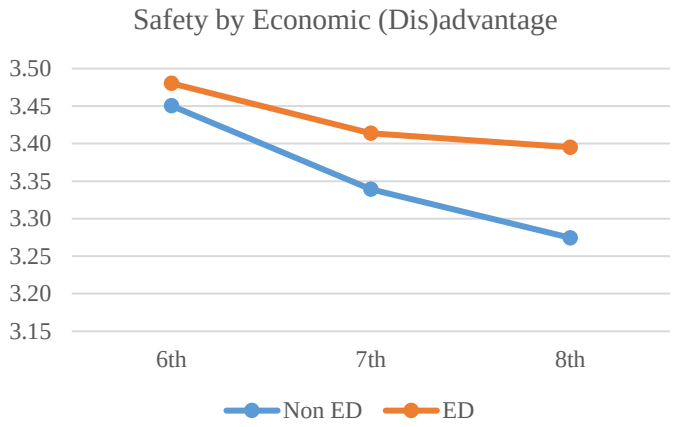
Non ED
ED


Safety by Economic (Dis)advantage
3.50
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ED

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