

Contexts of Educational Aspirations and School Grades of Rural Students



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Youth development researchers have focused on persistent challenges facing youth in diverse urban settings; thus, we know less about youth in rural communities. Using multilevel modeling, we explored contextual factors associated with school grades and educational aspirations. We find that, on average relative to students from urban schools, students from rural schools had slightly lower school grades and substantially lower college aspirations. Latino and American Indian students from urban and rural school districts had lower school grades and educational aspirations than non-Latino and non-American Indian students. Last, developmental social and emotional skills, such as commitment to learning and positive identity, were associated with higher school grades and educational aspirations, suggesting that social and emotional learning is relevant to both urban and rural students.

Keywords: rural education, positive youth development, social and emotional learning, multilevel modeling

Over the past few decades, economic and educational indicators such as poverty level and educational attainment have improved in the United States; nevertheless, this improvement has not been equal across the population and disparities remain an issue for certain groups and communities. Although the body of evidence on the importance of education and its benefits to individuals and societies is immense, researchers have focused on urban or national populations, paying less attention to underserved groups with unique contexts, such

as rural communities. Nationally since 1976, the rural population has grown by as much as 1.5 percent annually, but in 2010 began to decline slightly; however, by 2016–2017 it again increased, largely in response to migration (Cromartie 2018). In Minnesota, the location of our work, the rural population has increased slightly since the 2010 census (less than 1 percent), whereas the urban population has increased by more than 7 percent (Economic Research Service 2020). Further, although rural communities have been typically characterized

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by their lack of racial diversity, averaging 80 percent white (Cromartie 2018), immigration has been increasing, especially in Latino communities, which have been the fastest-growing in rural America relative to those of other racial-ethnic groups (Johnson 2006). Educational attainment has also varied across racial and ethnic groups, Latinos having the lowest rate of adults with bachelor's degrees relative to American Indian, black, and white rural populations (Marré 2017). The contexts of rural areas continue to change and differences across ethnic and racial groups persist. The goal of this study was to use the Minnesota Student Survey to explore educational outcomes, such as grades and educational aspirations, of students in rural and urban schools, and to examine the role of school and community contexts for the two main racial and ethnic minorities in rural Minnesota.

PERSISTENT CHALLENGES IN RURAL COMMUNITIES AND SCHOOLS

Rural communities have higher poverty rates that affect not only students and their education, but also adults and families more likely to live in multigenerational poverty (Thiede et al. 2018; Lichter and Schafft 2016). Even when educational attainment has increased in rural areas, the differences between rural and urban communities remain; for example, 33 percent of the U.S. urban population have a bachelor's degree, but only 19 percent do in rural areas (Marré 2017). We see similar patterns regarding earnings. There is a gap between urban and rural regions where workers with similar education are offered higher earnings and more employment opportunities in urban areas (Marré 2017). Living in concentrated poverty is associated with poor housing, poor health conditions, higher school dropout rates, and employment dislocations (Economic Research Service 2020). Disparities persist between rural and urban communities in educational, economic, and social conditions.

The distribution of income and race is also a topic of recent interest because it provides an important lens for creating greater equity in opportunities for youth and families. Through a joint-distribution analysis of race and income, Sean Reardon, Joseph Townsend,

and Lindsay Fox (2017) identify a number of trends based on data from the American Community Survey. For example, black and Latino individuals and families of any income level tend to live in neighborhoods that are substantially poorer than those of white or Asian residents. They find that many low-income white households are in rural areas, and because of this, most poor white residents live in majority white neighborhoods. Much of this work addresses the trends and conditions underneath a larger trend toward segregation.

Evidence indicates that urban-rural and poverty indicators are not sufficient to understand the role of location and poverty in child and youth development. Portia Miller, Elizabeth Votruba-Drzal, and Rebekah Levine Coley (2019) argued that place, poverty, and community resources and stressors provide a richer perspective. They used data from the Early Childhood Longitudinal Study, Kindergarten class of 2010, which contained data from children's experiences and contexts while in kindergarten through second grade. Generally, they described the complex nature of ecosystems that interact. The positive role of rich cultural assets in urban communities was diminished by greater violence and disadvantage. Location had limited associations with parenting style and child achievement; nurturing supportive parenting had small positive associations with achievement. The core of their model suggested that urbanicity (location) had direct effects on cultural and community resources as well as community violence and disadvantage, which directly affected achievement and indirectly affected achievement through cognitive stimulation and parental nurturing. The associations between urbanicity and community contexts and conditions were substantial, but their effects on achievement, both direct and indirect, were small.

This complex interaction of place, poverty, and community resources and stressors also was relevant to the experiences and opportunities of individuals in different racial and ethnic communities. With respect to youth achievement, community and cultural capital have been core components of the ecology of youth development, and these characteristics have

differed across ethnic groups (see, for example, Rodriguez and Morrobel 2006, who built a case for the consideration of unique family and community characteristics relevant to Latino youth development).

SCHOOL GRADES AND EDUCATIONAL ASPIRATIONS

Educational aspirations and achievement are associated with short-term outcomes such as access to higher education, and long-term outcomes such as better occupational attainment, employment, and health status (Bohon, Johnson, and Gorman 2006). Further, aspirations are also associated with positive transition into adulthood, given that youth with clear goals and healthy behaviors tend to adapt better to transitions (Bandura et al. 2001; Eccles, Brown, and Templeton 2008).

For students from rural schools, Macarena Hernández and Dagmar Raczynski (2016) find in Chile that students want to achieve higher education levels and obtain good jobs. At the same time, they also identify major obstacles, including limited economic resources, school supports, and information. On a similar note, parents say that their main concern about their children's education was not having the economic resources to help them (Guerrero 2014). It is possible that developing college aspirations in rural communities might be more challenging because of the high rates of poverty relative to urban areas.

Although promoting college aspirations is important for students, it must be accompanied by social and emotional support and access to information, especially for disadvantaged students such as those from rural schools, given that they are more likely to struggle with stress, financial limitations, and the uncertainties of moving away from their communities (Cottom 2017; Hektner 1995; Silva and Snellman 2018). In one of the most comprehensive studies of rural student achievement and aspirations, based on a 2007 national sample of more than six thousand students from sixty-four rural high schools, Matthew Irvin and his colleagues (2011) explore elements of school contexts and their associations with educational achievement and aspirations among rural youth.

The focus of this effort (Irvin et al. 2011) was on the student experience in high-poverty rural schools ($n = 21$) relative to low-poverty rural schools ($n = 43$). Although high- and low-poverty communities did not differ regarding educational attainment, as expected, some student characteristics (such as disability status, grade retention, parent expectations) were associated with lower educational attainment as well as school characteristics (such as the presence of a college preparation program and postsecondary activities, as well as school-level academic self-concept). Regarding academic achievement, no reliable differences were found between high and low-poverty communities, but again student-level and school-level characteristics were associated with school grades (achievement).

In 2016, based on a national sample of rural high schools, Matthew Irvin and his colleagues explored school characteristics and their associations with aspirations among African American, Latino, and American Indian rural youth. They find that educational aspirations across racial-ethnic groups were similar, and that school experiences such as school valuing, academic self-concept, and teachers' educational expectations shaped students' educational aspirations. In addition, Latino and American Indian students attended rural schools with more race segregation and less access to resources than white rural students did. Unfortunately, the 2016 and 2011 studies had similar limitations: the authors did not properly account for the nested nature of the data, leading to miscalculated standard errors, potentially affecting inferences.

POSITIVE YOUTH DEVELOPMENT

Youth development researchers have focused on risk factors such as violence, poverty, substance use, and dropouts, namely, deficit-oriented models. As a consequence, research, policy, and practice have been misguided when the target population has been vulnerable adolescents. In contrast, the positive youth development approach addresses social and psychological factors that improve child and youth outcomes, focusing on developmental assets and positive qualities of youth (Lerner 2003; Benson 2003). These not only promote positive

outcomes and thriving, but also reduce risky behaviors. Therefore, with a purpose of taking a different perspective and creating a basis for building youth and community assets, as a way to counteract or mediate the persistent challenges facing urban and rural communities, we rely on principles of positive youth development (Damon 2004). Doing so allows us to take a positive orientation in thinking about possible futures, rather than the typical deficit-oriented medical-model approach to youth development.

At least six propositions underlie positive youth development approaches with broad consensus (Benson 2006):

youth have the inherent capacity for positive development;

positive development is enabled when youth are embedded in relationships, contexts, and environments that nurture development;

positive development is further enhanced when youth participate in multiple meaningful relationships, contexts, and environments;

all youth benefit from these opportunities, the benefits of which generalize across gender, race, ethnicity, and family income;

community is a critical delivery system for positive youth development; and

youth themselves are major actors in their own development, serving as a central resource for creating the kinds of relationships, contexts, environments (ecologies), and communities that facilitate optimal development.

The ecologies and developmental contexts where youth are located interact with the inherent capacity of youth to grow and thrive; their developmental strengths, skills, competencies, values, and dispositions (Bronfenbrenner 1979); and two related aspects of

developmental success, the reduction of high-risk behaviors and the promotion of healthy well-being or thriving (Benson 2006). Researchers are increasingly exploring many aspects of context that might influence positive youth development, including success in school and beyond—providing useful information for strong program and policy development.

SOCIAL AND EMOTIONAL LEARNING

A body of evidence and consensus (Eccles and Gootman 2002; Jones and Kahn 2017) also exists among youth development researchers and experts about the integral role of social and emotional learning. Two related definitions for social and emotional learning come from the Aspen Institute and CASEL. Aspen's definition is that "Social and emotional development comprises specific skills and competencies that people need in order to set goals, manage behavior, build relationships, and process and remember information." CASEL's is that "Social and emotional learning (SEL) is an integral part of education and human development. SEL is the process through which all young people and adults acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions and achieve personal and collective goals, feel and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions."¹

The Aspen Institute (2018, 2) argues that social, emotional, and academic development can be integrated in ways to reinforce educational equity, which it defines as a system in which "every student has access to the resources and educational rigor they need at the right moment in their education, irrespective of race, ethnicity, gender, sexual orientation, language, disability, family background, family income, citizenship, or tribal status." This suggests that SEL may play an important role in students' development, both in urban and rural settings.

1. Aspen Institute, "Pursuing Social and Emotional Development Through a Racial Equity Lens: a Call to Action," May 8, 2018, 2, <https://www.aspeninstitute.org/publications/pursuing-social-and-emotional-development-through-a-racial-equity-lens-a-call-to-action> (accessed November 5, 2021); CASEL, "Fundamentals of SEL," n.d., <https://casel.org/fundamentals-of-sel> (accessed November 5, 2021).

RESEARCH QUESTIONS

Our goal was to investigate the educational experiences and contexts of rural youth, their school grades, and educational aspirations. Using the Minnesota Student Survey from 2013, 2016, and 2019, we addressed three research questions:

Are school grades and educational aspirations different between students from rural and urban school districts?

Are developmental skills, supports, and challenges associated with school grades and educational aspirations for rural and urban students?

Do school grades and educational aspirations differ for American Indian and Latino students in rural and urban communities (as these are the two larger nonwhite communities in rural Minnesota)?

First, we sought to provide insights about educational outcomes in underserved youth groups in the United States, including rural, American Indian, and Latino communities. Second, we investigated the potential role of SEL skills and supports and developmental challenges that could be addressed by school personnel to promote rural students' educational aspirations and potentially improve school grades. Finally, we examined risk factors that could undermine educational outcomes of these students.

METHODS

The data were from the Minnesota Student Survey (MSS), administered triennially and anonymously to students in grades five, eight, nine, and eleven statewide. Designed by the Minnesota Departments of Education, Health, Human Services, and Public Safety, the survey has been used to monitor trends in students' behaviors and experiences regarding education, health, risky behaviors, beliefs, social and emotional skills, and more. Data from public school districts in the 2013, 2016, and 2019 administrations were used in this study. The MSS is voluntary, that is, districts, schools, parents, and students can choose to opt out. Nevertheless, in 2013, 84 percent of public school districts par-

ticipated, 85 percent in 2016, and 81 percent in 2019 (Minnesota Department of Education 2020). Additional data were taken from the Census Bureau's American Community Survey, including information about the communities in which school districts were located. The most recent data available were collected in 2018. The data, aggregated for Minnesota school districts, were obtained from the Metropolitan Council (2019), a Minnesota regional policymaking body and planning agency.

Participants

Questions about educational aspirations were asked only of secondary school students. For this reason, the participants included students in grades eight, nine, and eleven. Also, only regular public school districts were included, excluding five charter schools (where students and families self-selected attendance) and forty-eight school cooperatives (primarily providing special education services). After linking the data with the American Community Survey, 301 school districts (of 371, where charter schools were counted as independent school districts) and 369,692 students (of 374,423) remained, namely, 81 percent and 99 percent, respectively. These school districts accounted for 95 percent of the state's population (5.4 million of 5.6 million residents).

In total, 369,692 students participated from the selected 301 districts from 2013 to 2019. Of the students, 59 percent attended urban school districts and 41 percent attended rural districts. This sample included 50 percent female and 71 percent white students, which closely matched the state student population. A more complete description of student characteristics by school district location is presented in table 1.

Several interesting differences were apparent regarding the racial-ethnic diversity of urban and rural participants. Far fewer Asian (1.3 percent) and black (1.4 percent) students were in rural than in urban districts (5.5 and 7.4 percent respectively). Rural districts had higher percentages of American Indian students than urban districts (5.7 percent versus 3.3 percent) and lower percentages of Latino students (7.6 percent versus 9.3 percent), and both were more represented in rural districts than Asian and black students. Slightly more students in

Table 1. Student Characteristics by School District

	Urban	Rural	Total
American Indian	3.4	5.7	4.3
Asian	5.5	1.3	3.8
Black	7.4	1.4	4.9
White	63.6	81.2	70.8
Multiracial	4.5	1.8	3.4
Latino	9.3	7.7	8.6
Somali	2.3	0.7	1.7
Hmong	4.1	0.3	2.5
Grade eight	35.7	35.0	35.4
Grade nine	35.5	35.7	35.6
Grade eleven	28.9	29.4	29.1
Male	50.2	50.4	50.3
Female	49.8	49.6	49.7
Free or reduced-price lunch	26.9	27.7	27.2
Special education	10.0	11.4	10.6
Trauma	35.9	39.8	37.5

Source: Authors' calculations based on the Minnesota Student Survey (Minnesota Department of Education 2020).

Note: Numbers in percentages.

rural than urban districts received free or reduced-price lunch (27.8 percent versus 26.8 percent) and special education services (11.4 percent versus 10.0 percent). Also, 39.8 percent of rural participants reported having experienced at least one trauma, versus 35.9 percent of urban participants.

Based on the 2018 American Community Survey, on average for the communities involved in this study, rural communities were 81 percent white and urban were 64 percent. This difference (of 17 percent) mirrored the magnitude of difference in student participants; however, both rural and urban schools were more diverse than their community populations.

DEFINING RURAL AND URBAN SCHOOL DISTRICTS

A rural location indicator was created for school districts outside the Twin Cities metropolitan area and with community populations of less than fifty thousand. School districts within the metropolitan area were included as urban school districts. In addition, five school districts outside the metropolitan area had community populations larger than fifty thousand (from sixty-five thousand to one hundred

twenty thousand, consistent with the Census Bureau's definition of urbanized areas). We identified forty-eight urban districts (representing 63 percent of the state population) and 253 rural districts (37 percent of the state population). Rural districts had an average high school district enrollment (grades eight to twelve) of 478 students ($SD = 466$) and urban districts had an average of 3,889 ($SD = 3,355$) students.

Outcomes

Education leaders and policymakers have focused great attention on educational achievement and postsecondary aspirations of students in their schools. Measures of these two outcomes were available in the MSS. Regarding educational aspirations, students were asked about their plans after finishing high school. An indicator was created to identify students with higher education aspirations (wanting to attend a four-year college or university). Regarding school achievement, students self-reported their school grades on a 4-point grade scale. Based on previous conversations with several school districts regarding the grade distributions of students with different characteristics (race-ethnicity, free and reduced-price

lunch status, special education status), the student self-reported grades in the MSS closely reflected school reports of student GPA.

Independent Variables

In addition to student characteristics (sex, free or reduced-price lunch, special education status, and Latino and American Indian student identities, as they are the main racial/ethnic groups in rural Minnesota), we included measures associated with positive youth development, including developmental skills and supports, as well as challenges. Based on the developmental asset framework (Search Institute 2013), several measures were created from MSS items. These measures were evaluated with confirmatory factor analysis (Mplus) and scaled with the Rasch model (Winsteps). Measures had adequate fit; items fit the Rasch model well; and differential item functioning results indicated adequate measurement invariance across sex, grade, and racial-ethnic groups (Rodriguez 2021).

Two developmental skills included Commitment to Learning (caring about doing well in school, paying attention in class, going to class prepared, interested in learning, finding school learning useful, and being a student is an important part of who I am) and Positive Identity and Outlook (having a sense of control of one's life, feeling good about self and future, dealing well with disappointment and life's challenges, and thinking about one's purpose in life).

Two developmental supports included Family-Community Support (feeling cared for by parents, other adult relatives, friends, and other adults in the community) and Teacher-School Support (reporting that adults at school treat students fairly and listen to students, that school rules are fair, that teachers care about students and care about and are interested in you).

Among the developmental challenges were Bullied (student experiences as a victim of bullying, such as being harassed or bullied on social media because of race, religion, gender, gender expression, sexual orientation, disabilities, weight or physical appearance; being

pushed around or hit, threatened, lied about, the recipient of inappropriate jokes or comments, or excluded from friends and activities), and trauma, coded 0 for none and 1 for the presence of at least one adverse experience (such as being homeless, having parents in jail, living with alcohol or drug abuser, living with verbally or physically abusive parents-adults, experiencing domestic abuse from parents-adults, and experiencing sexual abuse from family or nonfamily person). All student SEL measures and Bullied were centered at 10, the middle or neutral position of the response scale in each measure. Scores below 10 suggested that students felt that the characteristic was less like them; scores above 10 suggested that students felt that the characteristic was more like them.

Two district variables included the percentage of the population in the district with income at 185 percent of the poverty threshold (the level that qualifies families for reduced-price lunch) and percentage of the population with a bachelor's degree or higher.

ANALYSES

To appropriately describe the differences in school district communities located in rural or urban settings, we provided a series of statistical summaries on a number of characteristics, including student and community characteristics. In each case, we also reported a standardized effect size to estimate the magnitude of differences in these for rural and urban school districts. For continuous data, we estimate the standardized mean difference as the difference between the two means divided by the pooled standard deviation (Cohen's d). For differences in proportions, assuming an underlying normal distribution, d_{probit} was used as an unbiased estimator of the population standardized proportion difference; this estimator behaved well under controlled simulation in comparison to six other estimators (Sánchez-Meca, Marín-Martínez, and Chacón-Moscó 2003). The standardized proportion difference effect size (d_{probit}) was computed using the practical meta-analysis effect size calculator.²

2. David B. Wilson, "Practical Meta-Analysis Effect Size Calculator," George Mason University, <http://www.campbellcollaboration.org/escalc/html/EffectSizeCalculator-SMD10.php> (accessed November 5, 2021).

Table 2. Student Outcomes by Urban and Rural School District

Outcome	Urban		Rural		Total	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>SD</i>	<i>M</i> Difference
School grades	3.18	0.94	3.08	0.98	0.96	0.10
College goals	0.74		0.61			0.36

Source: Authors' calculations based on the Minnesota Student Survey (Minnesota Department of Education 2020).

Note: School grades are based on the 4-point grade scale; college goals are the proportion of students with college goals. *SD* = standard deviation. *M* = mean.

We used hierarchical linear modeling (HLM) to take into account the nested structure of the data (Raudenbush and Bryk 2002), where students (level 1) were nested within school districts (level 2). The variation in grades and educational aspirations were less than 4 percent between school districts. Nevertheless, HLM models were used to correctly estimate the standard errors of the school district effects because districts were far fewer than students (this approach used the correct degrees of freedom to account for more than 150,000 students from 253 rural districts and 218,000 students from forty-eight urban districts when estimating student and districts effects). All analyses were conducted using HLM 8 (Raudenbush et al. 2019). The HLM equations were presented in appendix 1. We estimated both models for rural and urban districts separately to support clearer interpretation, but did test a combined model using the rural indicator in interaction terms to test the significance of the rural effect on each student-level characteristic in a single model, rather than a series of post hoc tests of differences in coefficients from the separate rural and urban models (appendix 2). We standardized ($M=0$, $SD=1$) the SEL and Bullied measures and all district-level continuous variables to support clearer interpretation.

RESULTS

We first examined the distribution of study variables by school district location (table 1). Summary statistics and effect sizes for grades and college goals are presented in table 2. Overall, students from rural districts had lower grades

and were less likely to have college goals than students from urban districts; however, the effect size for college goals was more than three times (0.36) the effect size for school grades (0.10), showing that the college aspiration gap was bigger. This was similar to what Jessica Drescher and her colleagues (2022, this issue) find for school grades—not a large difference in standardized test scores between students from U.S. rural and nonrural schools.

Only 61 percent of students from rural districts aspired to go to a four-year college, versus 74 percent from urban districts. Even though the effect size was small according to Cohen's interpretation (Cohen 1988), the numbers were substantial.³ If we consider these values as good estimates of the population, then given the population of the 301 districts with 307,000 students, nearly forty-seven thousand rural and forty-eight thousand urban students did not have college goals.

The correlation between school grades and college aspirations was 0.35 in urban districts and 0.38 in rural districts. Student-level measures are presented in table 3. On average, students reported scores above 10 for developmental skills and supports (students felt the characteristics were more like them) and scores below 10 for Bullied (students felt the characteristic was less like them).

Students from rural districts had lower scores in developmental skills (0.05 to 0.09 *SD* lower) and supports (0.04 to 0.07 *SD* lower) than students from urban districts, and higher Bullied scores (0.10 *SD* higher). We find small differences on each measure; perhaps most no-

3. As a reference: small effect size ($d=0.2$), medium effect size ($d=0.5$), and large effect size ($d=0.8$).

Table 3. Summary Statistics and Effect Sizes for Student-Level Measures by School District

Measure	Urban <i>M</i>	Rural <i>M</i>	Total <i>SD</i>	Effect Size
Commitment to learning	12.05	11.92	1.51	0.09
Positive identity and outlook	11.03	10.94	1.85	0.05
Family-community support	12.57	12.47	2.36	0.04
Teacher-school support	11.66	11.51	2.21	0.07
Bullied	6.98	7.12	1.38	-0.10

Source: Authors' calculations based on the Minnesota Student Survey (Minnesota Department of Education 2020).

Note: Effect size is the standardized mean difference.

Table 4. Summary Statistics and Effect Sizes for School-District-Level Measures by School District

Measure	Urban <i>M</i>	Rural <i>M</i>	Effect Size
Proportion of population with income below 185 percent poverty threshold	0.18	0.25	-0.24
Proportion of population with a bachelor's degree or higher	0.42	0.21	0.59

Source: Authors' calculations based on the Minnesota Student Survey (Minnesota Department of Education 2020).

Note: Effect size is the standardized mean or proportion difference.

tably, rural students reported lower commitment to learning (0.09 *SD*) and higher levels of being bullied (0.10 *SD*).

Descriptive statistics for the district measures are presented in table 4. The proportion of the population with incomes below 185 percent the poverty threshold was higher in rural districts (0.25 compared to 0.18); and the proportion of adults with bachelor's degree or higher in rural communities (0.21) was half the proportion of urban areas (0.42).

Modeling School Grades

In modeling school grades as the outcome (table 5), we find several student and school-community characteristics that explain variation in school grades. First, among students from rural districts, significantly lower school grades were reported by Latinos (-0.25) and American Indians (-0.22) than by their counterparts. Further, Latino students from rural districts who attended districts with a larger proportion of Latino students tended to have even lower grades (0.05 lower grade points for a 1 *SD* increase in proportion of Latino students); a similar context effect existed for American In-

dian students (also 0.05 lower grade points for 1 *SD* increase in proportion of American Indian students). However, these interaction effects with district composition were smaller in urban districts and not significant for American Indian students.

Regarding developmental assets, significantly higher grades were reported by students from rural districts with more Commitment to Learning (0.31 higher grade points for a 1 *SD* increase in Commitment to Learning) and Positive Identity (0.07). Lower grades were reported by students who had been the victim of bullying (-0.02). Likewise, students that had experienced trauma reported lower grades (0.20 lower grade points than students who did not experience trauma). Among students from urban districts, we found similar results, where Commitment to Learning had the highest coefficient across the developmental assets measures.

A combined model using both rural and urban data was estimated to test whether the differences between rural and urban coefficients were significant. The interaction between rural and Commitment to Learning was. With respect to the other student variables (see appen-

Table 5. Fixed-Effects Results of HLM for Grades

	Rural		Urban	
	Coefficients	SE	Coefficients	SE
Intercept	3.09**	0.01	3.21**	0.01
Latino	-0.25**	0.02	-0.22**	0.01
Latino × proportion of Latinos	-0.05*	0.01	-0.03*	0.01
American Indian	-0.22**	0.02	-0.23**	0.02
American Indian × proportion of American Indians	-0.05**	0.01	-0.01	0.02
Commitment to Learning	0.31**	0.00	0.27**	0.01
Positive Identity	0.07**	0.00	0.06**	0.00
Family-community support	-0.01**	0.00	-0.01**	0.00
Teacher-school support	0.02**	0.00	0.01	0.00
Bullied	-0.02**	0.00	-0.02**	0.00
Trauma	-0.20**	0.01	-0.19**	0.01

Source: Author's calculations using the Minnesota Student Survey (Minnesota Department of Education 2020).

Note: All fixed-effects results are in the appendix. SEL measures and Bullied are standardized.

* $p < .01$, ** $p < .001$.

dix 2), the rural and urban coefficients were significantly different for female students, and students receiving free or reduced-price lunch (based on significant interactions in the combined model).

Although the ICCs for school grades were small for urban (0.035) and rural districts (0.034), the full model was relatively successful in explaining a majority of the variance between rural (54 percent) and urban (76 percent) districts, and a fair amount of variance within rural (34 percent) and urban (33 percent) districts.

Modeling Educational Aspirations

In modeling educational aspiration as the outcome (table 6), we find for rural districts that Latino students were less likely to have college aspirations (0.85 OR) than non-Latino students. American Indian students were less likely to have college aspirations as well (0.84 OR). We also found this pattern for urban districts; however, both Latino (0.68 OR) and American Indian (0.75 OR) students were even less likely to have college aspirations in urban districts.

Students who had higher levels of developmental skills and supports were more likely to have college aspirations in both urban and rural districts. Commitment to Learning (1.67 OR

in rural and 1.66 OR in urban settings, for 1 *SD* increase in Commitment to Learning), Positive Identity and Outlook (1.05 OR in both settings), and Family and Community Support (1.06 in rural OR and 1.08 OR in urban settings) were all positively associated with college aspirations, particularly Commitment to Learning. Conversely, students from urban (0.69 OR) and rural (0.75 OR) districts who experienced trauma were less likely to have college aspirations. A combined model using both rural and urban data was estimated. We find that the Latino students in rural areas had higher educational aspirations than in urban areas, suggesting that the difference between Latinos and non-Latinos is larger in urban settings. Likewise, students who suffered trauma in urban areas had lower educational aspirations than in rural areas.

Regarding student characteristics, students were substantially less likely to have college aspirations if they were receiving special education (0.32 OR in rural districts, 0.36 OR in urban districts) and participating in free or reduced-price lunch (0.62 in rural districts, 0.58 in urban districts). Female students from rural districts were more likely to have college aspirations (2.24 OR) than males, significantly more so than females in urban districts (1.87 OR). This

Table 6. Fixed-Effects Results of HLM for Educational Aspiration

	Rural			Urban		
	Coefficients	SE	OR	Coefficients	SE	OR
Intercept	0.48**	0.01	1.62	1.36**	0.02	3.91
Latino	-0.16**	0.03	0.85	-0.38**	0.03	0.68
Latino × proportion of Latinos	-0.04	0.02	0.96	-0.06	0.03	0.94
American Indian	-0.17**	0.03	0.84	-0.28**	0.04	0.75
American Indian × proportion of American Indians	0.04	0.02	1.04	—	—	—
Commitment to Learning	0.51**	0.01	1.67	0.51**	0.01	1.66
Positive Identity	0.09**	0.01	1.10	0.10**	0.01	1.10
Family-community support	0.06**	0.01	1.06	0.08**	0.01	1.08
Teacher-school support	0.00	0.01	1.00	-0.04**	0.01	0.96
Bullied	0.01	0.01	1.01	-0.02	0.01	0.98
Trauma	-0.29**	0.02	0.75	-0.38**	0.02	0.69

Source: Authors' calculations based on the Minnesota Student Survey (Minnesota Department of Education 2020).

Note: All fixed-effects results are in the appendix. The interaction between American Indians and proportion of American Indians could not be tested in urban settings because the model would not converge due to the small proportion of American Indians in urban districts. SEL measures and Bullied are standardized.

* $p < .01$, ** $p < .001$.

could be explained by parental encouragement, given that Ashley Niccolai, Sarah Damaske, and Jason Parker (2022) find that working-class women from rural areas reported that their parents emphasized the importance of college for girls, whereas working-class men reported that their parents emphasized that the decision was up to them. In the combined model, we also find that the rural and urban coefficients are significantly different for female students and students receiving special education.

Further, students from rural as well as from urban districts living in a district with more highly educated adults (bachelor's degree or higher) were more likely to have college aspirations (1.13 OR in rural districts and 1.21 OR in urban districts, for a 1 *SD* increase in proportion with bachelor's degrees). Likewise, as the district average Commitment to Learning increased, students were more likely to have college aspirations.

The ICCs for college aspirations were 0.048 for rural and 0.025 for urban districts. The final model was successful in explaining about 60 percent of the variance between rural districts and 92 percent of urban districts.

DISCUSSION AND PATHWAYS FORWARD

Rural communities tend to have troubling well-being indicators such as high poverty rates, low educational attainment, employment rates, and earnings relative to urban communities, yet researchers tend to focus on urban or national populations. In this study, we explored the educational experiences of rural youth. We used the positive youth development framework to highlight the social and emotional factors that are positively associated with youth outcomes as opposed to a deficit-oriented framework focused on risk factors. We also used an ecological approach and considered school and community supports and characteristics to more fully understand student educational outcomes, including school grades and college aspirations. This allowed us to explore some malleable factors that are available to school leaders and policymakers. We used a sample of nearly 152,000 rural and 218,000 urban secondary school students in 301 Minnesota school districts (253 rural and forty-eight urban) and used multilevel modeling to properly account for the nested structure of the data and differences in degrees of freedom for esti-

mating the effects of student and district characteristics.

The first research question addresses the difference in school grades and educational aspirations between students from rural and urban districts. We find that students from rural district schools have lower grades than urban schools; however, this difference is small, about 0.1 on a 4-point scale (table 2). In contrast, for educational aspirations, the difference between students from rural and urban district schools is not negligible, effect size of 0.36 (table 2), even after controlling for students and school districts characteristics. This could be because cultural factors beyond school characteristics shape educational aspirations of rural students. For instance, rural students typically have to move away from home to go to college and face a conflict between staying in their community or continuing their education, which is not as common for students from urban areas, who often have more choices (Hektner 1995). As Nichole Bernsen and her colleagues (2022, this issue) find, rural students who have positive views of their community reported lower educational aspirations because they feel more attached to their communities. Likewise, social mobility in rural areas is associated with emotional and social costs that are different than in urban areas, as found by Ryan Parsons (2022, this issue). Further, traditional employment opportunities in rural areas such as agriculture and farming might not require college education, unlike those found in urban areas (Rojewski 1999). These factors might result in larger educational aspiration gaps between groups.

The results also show that male students, and those receiving special education services or participating in free or reduced-price lunch, have lower school grades and educational aspirations. This is consistent with what Matthew Irvin and colleagues (2011) find: students with disabilities tend to have lower grades and educational attainment than students with no disabilities in rural districts.

Our second question addresses the role of developmental skills, supports, and challenges. Having experienced trauma or being a victim of bullying can have detrimental effects on educational outcomes, for rural and urban

students. Youth with higher levels of Commitment to Learning and Positive Identity and Outlook have higher grades and educational aspirations, and students with more Family and Community Support have higher educational aspirations for rural and urban students, suggesting that promoting SEL skills and supports can improve educational outcomes for all students.

Finally, our third question addresses the unique contexts of the two larger nonwhite communities in rural Minnesota. We find that Latino and American Indian students tend to have worse outcomes than their peers, and these disparities were larger for students attending districts with higher enrollments of Latino or American Indian students. These results are in rural and urban school districts, showing that these groups face more challenges in both settings. Likewise, the difference in educational aspirations between Latino students and their peers was larger in urban schools, suggesting that Latino students have less of a negative effect in rural schools.

Some limitations of the study include the fact that because the questionnaire was anonymous, we were not able to link students across years and use the MSS as a longitudinal dataset, or link survey responses to administrative data. And, as always from cross-sectional studies, we must be careful to not infer causation from these models. Last, the MSS is a self-reported anonymous survey; we therefore cannot corroborate the responses. Nevertheless, these results provide important insights about educational outcomes for underserved and more isolated groups in the United States, whereas school districts differ considerably between rural and urban locations on a number of community context characteristics. We find that student populations across settings do not differ much in developmental skills, supports, and challenges (table 3), including measures of SEL. It appears that schools in both urban and rural areas have students with relatively similar SEL skills, indicating students in both areas on average have some of the skills and supports needed to be successful in school. The conditioned associations between SEL measures and school grades and educational aspirations were remarkably

similar for rural and urban school districts: SEL is relevant in both contexts.

We recognize that promoting college aspirations in rural settings is particularly challenging because, as mentioned, college attendance often involves students moving away from their rural communities and families, which may be less of a concern in urban settings (Hektner 1995; Elder 1996). College aspirations in rural communities are also challenging given the higher rates of poverty and lower family incomes. However, promoting SEL skills and supports is one promising approach available to schools and communities that could be addressed by both rural and urban schools. This should be of particular interest to rural school districts. Last, these results illuminate the additional challenges that communities of color face, particularly Latino and American Indian youth who have lower school grades and educational aspirations in urban and rural school districts. We ascribe to the principles of targeted universalism; universal goals may be achieved by targeting services and supports to those facing unique contexts, such as Latino and American Indian youth. Indeed, addressing unique community contexts is the pathway to greater educational equity.

APPENDIX. HIERARCHICAL LINEAR MODEL EQUATIONS

Based on notation from Stephen Raudenbush and his colleagues (2002) notation, the model estimated for grades was as follows.

Level-1 model

$$\text{Grades}_{ij} = \beta_{0j} + \sum_{p=1}^{11} \beta_{pj} (X_{p ij} - \bar{X}_{p \cdot j}) + r_{ij}$$

Level-2 model

$$\beta_{0j} = \gamma_{00} + \sum_{p=1}^{11} \gamma_{0p} (\text{Mean} X_{pj} - \overline{\text{Mean} X_{p \cdot}}) + \gamma_{012} (\text{pov}_j - \overline{\text{pov}}) + \gamma_{013} (\text{edu}_j - \overline{\text{edu}}) + u_{0j}$$

$$\sum_{p=1}^{11} \beta_{pj} = \gamma_{p0} + u_{pj}$$

Grades_{ij} was the typical school grades earned by student i in school district j ; β_{0j} was the intercept or mean grades of school district j when other variables were group-mean centered; β_{pj} was the slope for the X_p variables included in level 1 such as sex, Latino, American Indian,

and SEL measures. Level 1 variables were group-mean centered and r_{ij} was the within-district student-level residual, normally distributed with a mean of zero and variance of σ^2 . There was one level 2 equation for the intercept and each predictor p in the level 1 model (eleven in total); thus we had twelve level 2 equations. The intercept equation included aggregated versions of the level 1 variables (proportion of Latinos at the school district, proportion of American Indian, and so on), which were grand-mean centered, as well as the proportion of the population with incomes at 185 percent of the poverty threshold (pov) and the proportion of the population with a bachelor's degree or higher (edu) in district j . We also included an interaction between being Latino and the proportion of Latinos in the district and an interaction between being American Indian and the proportion of American Indians in the district (not seen in the model statements). Last, u_{0j} denoted the between-district district-level residuals and was normally distributed with a mean of zero and variance of τ_{00} .

The proportion of variance between districts was estimated in the form of the intraclass correlation coefficient, $\text{ICC} = \frac{\tau_{00}}{\tau_{00} + \sigma_2}$

For educational aspirations, the same predictors were used; however, because it was a dichotomous variable, a logit HLM model was estimated (for logistic regression). The logit link was specified as

$$\text{EducationalAspiration}_{ij} = \log\left(\frac{\varphi_{ij}}{1 - \varphi_{ij}}\right)$$

Level-1 model was

$$\text{EducationalAspiration}_{ij} = \beta_{0j} + \sum_{p=1}^{11} \beta_{pj} (X_{p ij} - \bar{X}_{p \cdot j}) + r_{ij}$$

where $\text{EducationalAspiration}_{ij}$ was the log-odds of success and φ_{ij} was the probability that the student aspired to go to a four-year college or university. The level-2 model was the same as that for school grades. Because of the log-link function, the ICC was estimated based on the assumed level-1 variance due to a standard logistic distribution ($\frac{\pi^2}{3}$), $\text{ICC} = \frac{\tau_{00}}{\tau_{00} + (\frac{\pi^2}{3})}$. We then estimated the variance explained at level-2 (between districts) only.

Table A.1. Fixed-Effects Results of HLM for Grades—Full Model

	Rural		Urban		Interactions from Combined Model	
	Coefficients	SE	Coefficients	SE	Coefficients	SE
Intercept effects						
Intercept	3.09**	0.01	3.21**	0.01	-0.06*	0.02
Proportion at 185 percent poverty rate	-0.01	0.01	-0.02	0.02		
Proportion with a BA degree or greater	0.01	0.01	0.01	0.02		
Proportion American Indian in school	-0.02	0.01	0.00	0.01		
Proportion Latino in school	0.00	0.01	-0.02	0.02		
Proportion female in school	0.02	0.01	-0.01	0.02		
Proportion special education in school	-0.02*	0.01	-0.08*	0.02		
Proportion FRL in school	-0.04	0.02	-0.07	0.03		
Mean BD for school	-0.01	0.01	-0.02	0.01		
Mean trauma for school	-0.01	0.01	-0.01	0.03		
Mean CTL for school	0.00	0.01	0.03	0.02		
Mean TSS for school	0.01	0.01	0.01	0.02		
Mean FCS for school	0.02	0.01	-0.03	0.04		
Mean PI for school	0.00	0.01	-0.03	0.04		
Slopes effects (student level)						
Latino	-0.25**	0.02	-0.22**	0.01	-0.04	0.02
Latino*proportion of Latinos	-0.05*	0.01	-0.03*	0.01	-0.04**	0.01
American Indian	-0.22**	0.02	-0.23**	0.02	0.02	0.02
American Indian*proportion of American Indians	-0.05**	0.01	-0.01	0.02	-0.05**	0.01
Female	0.30**	0.01	0.24**	0.01	0.06**	0.01
Free/reduced lunch	-0.27**	0.01	-0.36**	0.01	0.10**	0.02
Special education	-0.48**	0.01	-0.44**	0.02	-0.04	0.02
Commitment to Learning	0.31**	0.00	0.27**	0.01	0.04**	0.01
Positive Identity	0.07**	0.00	0.06**	0.00	0.01	0.00
Family-community support	-0.01**	0.00	-0.01**	0.00	0.00	0.00
Teacher-school support	0.02**	0.00	0.01	0.00	0.01	0.01
Bullied	-0.02**	0.00	-0.02**	0.00	0.00	0.00
Trauma	-0.20**	0.01	-0.19**	0.01	-0.01	0.01

Source: Author’s calculations using the Minnesota Student Survey (Minnesota Department of Education 2020).

Note: The coefficients from the combined model represent the interaction terms between each student variable and the rural variable that show the difference between urban and rural settings.

* $p < .01$, ** $p < .001$.

Table A2. Fixed-Effects Results of HLM for Educational Aspirations—Full Model

	Rural			Urban			Interactions from Combined Model	
	Coefficients	SE	OR	Coefficients	SE	OR	Coefficients	SE
Intercept effects								
Intercept	0.48**	0.01	1.62	1.36**	0.02	3.91	-0.28**	0.04
Proportion at 185 percent poverty rate	-0.02	0.02	0.98	-0.10	0.04	0.91		
Proportion with a BA degree or greater	0.13**	0.02	1.13	0.19**	0.04	1.21		
Proportion American Indian in school	0.06*	0.02	1.06	-0.03	0.04	0.97		
Proportion Latino in school	0.09**	0.02	1.09	0.00	0.04	1.00		
Proportion female in school	-0.01	0.02	0.99	0.05	0.05	1.05		
Proportion special education in school	-0.06*	0.02	0.94	0.01	0.06	1.01		
Proportion FRL in school	-0.09*	0.03	0.91	0.04	0.08	1.05		
Mean BD for school	0.02	0.02	1.02	0.06	0.03	1.06		
Mean trauma for school	-0.07	0.03	0.93	-0.18*	0.06	0.83		
Mean CTL for school	0.07*	0.02	1.08	0.13*	0.04	1.14		
Mean TSS for school	-0.03	0.02	0.97	0.04	0.04	1.04		
Mean FCS for school	0.00	0.03	1.00	-0.05	0.10	0.95		
Mean PI for school	0.04	0.03	1.04	0.02	0.10	1.02		
Slopes effects (student level)								
Latino	-0.16**	0.03	0.85	-0.38**	0.03	0.68	0.20**	0.04
Latino*proportion of Latinos	-0.04	0.02	0.96	-0.06	0.03	0.94	-0.05	0.02
American Indian	-0.17**	0.03	0.84	-0.28**	0.04	0.75	0.12	0.05
American Indian*proportion of American Indian	0.04	0.02	1.04	—	—	—	—	—
Female	0.81**	0.02	2.24	0.62**	0.02	1.87	0.17**	0.03
Free or reduced lunch	-0.48**	0.02	0.62	-0.54**	0.03	0.58	0.05	0.04
Special education	-1.12**	0.03	0.32	-1.02**	0.03	0.36	-0.10*	0.04
Commitment to Learning	0.51**	0.01	1.67	0.51**	0.01	1.66	0.00	0.02
Positive Identity	0.09**	0.01	1.10	0.10**	0.01	1.10	-0.01	0.01
Family-community support	0.06**	0.01	1.06	0.08**	0.01	1.08	-0.02	0.02
Teacher-school support	0.00	0.01	1.00	-0.04**	0.01	0.96	0.04*	0.01
Bullied	0.01	0.01	1.01	-0.02	0.01	0.98	0.03*	0.01
Trauma	-0.29**	0.02	0.75	-0.38**	0.02	0.69	0.08**	0.02

Source: Author's calculations using the Minnesota Student Survey (Minnesota Department of Education 2020).

Note: The coefficients from the combined model represent the interaction terms between each student variable and the rural variable that show the difference between urban and rural settings.

* $p < .01$, ** $p < .001$.

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