



# Unpacking Racial/Ethnic Differences in the Associations between Neighborhood Disadvantage and Academic Achievement: Mediation of Future Orientation and Moderation of Parental Support

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## Abstract

Despite the extensive literature on the deleterious effects of perceived neighborhood disadvantage on academic achievement, there is a dearth of information on racial/ethnic differences in the underlying roles of future orientation and parental support that may mediate or moderate this association. Using data from 3618 students in grades 6–9 (50% female,  $Mean_{age} = 12.9$  [1.3], 6.99% Black, 10.39% Hispanic/Latino, 82.61% White) in two communities in North Carolina during 2009–2014 who completed the School Success Profile, a self-report social environmental assessment, this study conducted multiple group analyses across three racial/ethnic groups (Black, Hispanic/Latino, White), revealing that perceived neighborhood disadvantage was associated with lower future orientation, which in turn was related to poorer academic achievement. The mediating effects were stronger among Black youth compared to White and Hispanic/Latino adolescents. Adolescents with high parental support were minimally affected by perceived neighborhood disadvantage. The findings identify nuanced racial/ethnic disparities in perceived neighborhood influences on academic achievement and raise important intervention targets to promote academic achievement among disadvantaged subgroups.

**Keywords** Neighborhood disadvantage · Future orientation · Academic achievement · Parental support · Multiple group analysis · Racial/ethnic disparities

## Introduction

Racial and ethnic disparities in academic achievement have been documented over the past decades in the United States, with Black and Hispanic/Latino adolescents consistently reporting poorer test scores, higher prevalence of

school dropout, and lower graduation rates than their White counterparts (Paschall et al. 2018; Turcios-Cotto and Milan 2013). During adolescence, academic achievement is important because academic accomplishments and failure at present determine an individual's future academic career and job opportunities (Rana and Mahmood 2010). For racial/ethnic minority students, achieving good academic performance is seen as an avenue of upward mobility to attain the same success as their White counterparts. There are structural characteristics; however, that play an important role in these disparities, including neighborhood characteristics such as poverty, unemployment, perceived disorganization (Leventhal and Dupéré 2019). A growing body of literature even suggests that one's perception of their neighborhood characteristics may influence adolescent academic achievement and outcomes (Shaw and McKay 1969; Leventhal 2018). For example, adolescents who perceive higher levels of neighborhood social disorganization—lack of neighborhood support, greater exposure to peer risk behavior, higher perceived crime and violence—may be more likely to report poor

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academic achievement (Daly et al. 2009; Emory et al. 2008). Examining the influence of perceived neighborhood disadvantage is important because it reflects how one's assessment of neighborhood characteristics connects with their ability to achieve, scholastically (Byrnes et al. 2011). The processes underlying the influences of perceived neighborhood disadvantage on racial/ethnic gaps in academic achievement, however, remained unclear (Patton et al. 2012; Leventhal et al. 2009). The current study proposes future orientation as a potential mediator, and parental support as the possible moderator in the association between perceived neighborhood disadvantage and academic achievement across three racial/ethnic groups—Black, Hispanic/Latino, and White adolescents.

Future orientation is defined as one's perspective about their future, including thinking about, exploring, and planning the developmental course of their life (Nurmi 1991; Seginer 2009b). Previous studies have suggested the direct impact of future orientation on academic achievement might differ across racial/ethnic groups (Xiao et al. 2018). Parental support also plays a significant role in adolescent academic achievement (Patton et al. 2012; Greenman et al. 2011). Only a few studies, however, have specifically investigated whether parental support acts as a buffer against the negative influence of perceived neighborhood disadvantage on academic achievement (Hardaway et al. 2016). This study responds to the call for more understanding of mediating mechanisms and moderators underlying the associations between perceived neighborhood disadvantage and academic achievement (Patton et al. 2012). Examining these constructs is important as parents, family, schools, and neighborhoods shape the cognitive development of adolescence (Leventhal et al. 2009). Meanwhile, an important developmental task during adolescence is self-discovery, which was a crucial dimension of future orientation (Nurmi 1991; Seginer 2009b).

Due to structural inequalities that create neighborhood disadvantage, including limited options for the purchase of fresh produce or poor public transportation, racial/ethnic minority students are likely to attend schools that are also similarly poor resourced, which impacts their academic achievement (Leventhal et al. 2009; Bowen et al. 2008; Eamon 2005). Therefore, this study further tested whether the proposed mechanisms between perceived neighborhood disadvantage and academic achievement may differ across White, Black, and Hispanic/Latino adolescents. By addressing structural inequality as a root cause (White et al. 2020), findings could offer useful information in designing tailored intervention programs for adolescents from different racial/ethnic backgrounds to effectively narrow the achievement gap across race/ethnicity (Leventhal et al. 2009).

## Neighborhood Disadvantage and Academic Achievement

From a developmental perspective, neighborhood disadvantage is especially relevant to adolescent academic achievement (Dupere et al. 2012; Leventhal and Brooks-Gunn 2000; Sampson et al. 1997). Two major approaches have been used to conceptualize and assess neighborhoods. Most studies focus on the neighborhood structure (e.g., residential segregation of poverty, unemployment), which was often measured using physical locations such as census tracts and zip codes to reflect the poverty rates and racial/ethnic composition (Burton and Jarrett 2000; Greenman et al. 2011). Another major approach investigates neighborhood processes, which typically measure adolescents' perceptions of neighborhood borders and their characteristics (Burton and Jarrett 2000). Theoretically, social disorganization is a notable example of a process variable (Kingston et al. 2009; Shaw and McKay 1969). One assertion of social disorganization theory is that disadvantaged neighborhoods are characterized by limited social cohesion and limited effective social controls, which can, in turn, lead to negative consequences on adolescent development (Sampson et al. 2002).

Past research mostly focuses on the associations between neighborhood structure and academic achievement (Greenman et al. 2011), while there is a dearth of information on the influence of neighborhood processes on adolescent academic achievement (Madyun 2011). Neighborhood processes have been operationalized as social cohesion (i.e., social support, trust, shared sense of identity, ties and belongings to the neighborhood), and informal social control (i.e., neighborhood youth behaviors, neighborhood safety; Sampson et al. 1997; Leventhal and Dupéré 2019). In particular, adolescents perceiving low neighborhood processes (Sampson 1997; Shaw and McKay 1969)—lack of social cohesion (i.e., less supportive social networks in the community (Kingston et al. 2009; Shaw and McKay 1969) and low social control (i.e., low capacity of neighbors to maintain order and safety; Johnson et al. 2014; Sampson et al. 2002; McPherson et al. 2014)—were found to report poorer academic outcomes (Emory et al. 2008; Minh et al. 2017).

This study focuses on perceived neighborhood disadvantage as it has been suggested to be more closely linked to their academic outcomes than neighborhood structures (Burton and Jarrett 2000; Byrnes et al. 2011). For example, Witherspoon et al. 2018 found that neighborhood structural disadvantage was unrelated to academic achievement, whereas neighborhood processes were associated with academic performance among 8th-grade Black adolescents. Perceived neighborhood disadvantage accounts for youths' self-reports of the extent to which

they perceive that their neighborhood is disadvantaged based on three dimensions: neighborhood support, neighborhood safety, and neighborhood youth behaviors (Bowen et al. 2008). Specifically, low social cohesion represents fewer resources for social capital (Dupere et al. 2012), reducing the trust and social support essential in facilitating shared norms and academic achievement (Leventhal and Dupéré 2019; Eamon 2005). Direct exposure to neighborhood safety problems, youth risk behaviors, and crime also are associated with adolescents' depressive symptoms (Alegría et al. 2014) and affiliation with deviant peers (Cambron et al. 2018), which also negatively affect youths' academic achievement (Leventhal et al. 2015). These studies have stressed that perceived neighborhood disadvantage is a risk factor for academic achievement of adolescents; however, *how* perceived neighborhood disadvantage affects the level of academic achievement in adolescents remains unclear. Understanding the underlying mechanisms of these relations may be a basis for intervention programs that aim to minimize the negative effect of perceived neighborhood disadvantage on adolescent academic achievement.

### Mediating Effect of Future Orientation

*Future orientation*, defined as individuals' belief about a changeable and better future (Nurmi et al. 1990; Seginer 2009a), is a unique construct that captures three essential dimensions of future self-images: *Cognitive* (e.g., belief, preference, and values about the future; discernment of internal and external causes of future events), *affective* (e.g., optimistic attitudes towards the future), and *motivational* (e.g., perceived values and expectations of future events). As an important component of identity development, future orientation is especially relevant to adolescent outcomes since the ability to envision the future initiate at birth but progresses significantly from childhood to adolescence (Johnson et al. 2014). Future orientation has been associated with numerous indicators of positive youth development, such as possible selves (i.e., images of one's future state; Oyserman et al. 2006), time perspective (i.e., ones' orientation to the past, present, and future; Adelaabu 2008; Zimbardo and Boyd 1999), hope (i.e., sense of motivation and planning to achieve goals; Snyder et al. 2000), and optimism (i.e., general attitudes towards a positive future; Scheier and Carver 1987). Nevertheless, future orientation is distinct from these concepts (Chang et al. 2013). For example, future orientation addresses a more specific belief in a changeable future, whereas optimism refers to general attitudes; future orientation focuses on actionable positive adjustment, whereas hope emphasizes perceived values to change current status and meet future goals (Johnson et al. 2014; Chang et al. 2013).

Future orientation could be a unique mechanism mediating the link between perceived neighborhood disadvantage and academic achievement. Theoretically, Johnson et al. (2014) integrate different conceptual and operational definitions into a future orientation conceptual framework that can inform (see Appendix 1, Fig. 4). Grounded in developmental systems theory, Johnson's future orientation model highlights the influences of an individual's developmental contexts in determining the levels of future orientation. In particular, Johnson's future orientation model demonstrates that perceived neighborhood disadvantage, as a mezzo-level environmental determinant, may influence the levels of future orientation, which can further affect academic achievement. Perceiving the neighborhood as less safe, supportive, and surrounded with more risky youth behaviors may first influence adolescents' internal self-representation, cognitively and motivationally, which in turn, affects their beliefs and motivations regarding academic achievement (Johnson et al. 2014; Culyba et al. 2018). It is worth noting that academic achievement might precede future orientation, affecting adolescents' perception of neighborhood disadvantage. To account for this possibility, this study examined the alternative directional model.

Empirically, students living in a disadvantaged neighborhood are more likely to experience low future orientation, which, in turn, harms their academic abilities (Chen and Vazsonyi 2011). As a potential changing mechanism and target of intervention, considerable studies found individuals with higher future orientation reported better academic motivation (Nurmi 1991), school engagement (Thomson et al. 2015), and academic achievement (Xiao et al. 2018; Adelaabu 2008). By examining mediational effects, this study will help shed light on the processes through which perceived neighborhood disadvantage influences academic achievement among youth.

### Moderating Effect of Perceived Parental Support

While perceived neighborhood disadvantage serves as a mezzo-level factor for adolescent future orientation and academic achievement, parental support serves as an important micro-level factor (see Appendix 1, Fig. 4) in the ecology affecting adolescent academic achievement (Johnson et al. 2014; Kerpelman et al. 2008). Thus, this study further examined the moderating role of parental support on the association between perceived neighborhood disadvantage and academic achievement. Parental support reflects the behaviors that parents practice to foster positive parent-adolescent relationships and provide emotional, instrumental, and material support (Hardaway et al. 2016; Bowen et al. 2012). More supportive parents tend to spend more time with their children and make them feel appreciated and loved (Collins et al. 2000). Adolescents who

perceived greater parental support show greater socio-emotional adjustment, stress coping skills, and develop more emotional security than those with lower parental support, which in turn, buffer against the negative effects of perceived neighborhood disadvantage (Bowen et al. 2012; Patton et al. 2012). For example, supportive parents may be more aware of adolescents' emotional needs and involve in more parent-adolescent activities. Such awareness can cultivate adolescent adaptive coping skills with stress (Aceves and Cookston 2007), promote positive socioemotional functioning (Hair et al. 2008), and thus, protect adolescent academic achievement from being negatively impacted by perceived neighborhood disadvantage.

Parental support can also act to facilitate the development of future orientation in the context of perceived neighborhood disadvantage (Xiao et al. 2018). Parents play a critical role in communicating values, goals, and interests that affect how adolescents perceive their future (Nurmi 1991). When parents were actively involved with their adolescents and communicated effectively with love and encouragement, the negative neighborhood factors that hindered a positive future orientation were buffered, particularly among Black adolescents (Hill et al. 2004). Thus, parental support might buffer the negative impact of perceived neighborhood disadvantage on future orientation, and as perceived neighborhood disadvantage decreases, adolescents who reported greater parental support may indicate greater future orientation than those who feel less supported.

To date, however, few studies simultaneously investigate the moderating effect of parental support on the associations between (1) perceived neighborhood disadvantage and academic achievement, and (2) perceived neighborhood disadvantage and future orientation. Moreover, there is a dearth of studies testing whether the mediating effect of future orientation in the associations between perceived neighborhood disadvantage and academic achievement may differ across various levels of parental support (i.e., moderated mediation effect). Considering the existing literature and theoretical explanations as a whole, with high levels of parental support, the negative influences of neighborhood disadvantage on future orientation and academic achievement may decrease. Furthermore, if future orientation mediates the relationship among perceived neighborhood disadvantage and academic achievement, and parental support moderates the relationship between perceived neighborhood disadvantage and academic achievement, then the indirect effect of perceived neighborhood disadvantage on academic achievement through future orientation is supposed to differ according to the level of perceived parental support. Clarifying this conditional indirect effect is important to inform tailored future orientation intervention that

improves academic achievement among adolescents with different levels of parental support.

### Differential Effect across Race/Ethnicity

Neighborhoods impacted by structural racism are often segregated by race and economic resources (White et al. 2018; White et al. 2020). As a result, previous research has widely detected differences in the level of perceived neighborhood disadvantage across race/ethnicity, with adolescents from racial/ethnic minority groups disproportionately reported a high level of unsafe, less supportive, and more violent neighborhoods (Leventhal and Brooks-Gunn 2000; Alegría et al. 2014). For instance, Black and Hispanic/Latino adolescents perceive their neighborhoods as more dangerous than their non-Latino Whites counterparts (Roosa et al. 2009). Black adolescents reported experiencing higher levels of community violence and concentrated disadvantage than White youth (Carlo et al. 2011; Hull et al. 2008). Hispanic/Latino individuals also reported lower neighborhood social cohesion than other racial/ethnic groups (Rios et al. 2011).

The racial differences in perceived neighborhood disadvantage reflect the segregation of economic, social, and environmental resources (Hopson et al. 2014). Such differences in perceived neighborhood disadvantage may influence academic achievement among students from different racial/ethnic groups. For example, Witherspoon et al. (2016) found that youth living in disadvantaged neighborhoods reported more barriers to achieve good academic performance due to their race/ethnicity. Lower levels of perceived neighborhood disadvantage were associated with a stronger sense of race/ethnicity, which, in turn, was related to greater academic achievement. Among Black adolescents, perceiving the neighborhoods with more positive social relationships was associated with higher academic achievement (Witherspoon et al. 2018).

Besides, prior research on levels of future orientation varies across race/ethnicity (Turcios-Cotto and Milan 2013; Xiao et al. 2018). These differences may be a result of the constant challenges (e.g., racism, historical discrimination, structural disadvantage, and economic strain) that racial/ethnic minority students have experienced, thwarting their beliefs in a changeable future (Surko et al. 2005). The direct influence of future orientation on academic achievement may also differ across racial/ethnic groups. Xiao et al. (2018) revealed that the correlation between future orientation and academic achievement was the strongest among Black adolescents than Hispanic/Latino and White adolescents. Besides, compared with adolescents with low levels of future orientation, Black students with a higher level of future orientation reported less health risk behaviors in the context of low social support (Xiao and Lu 2019). The

experiences of adolescents from different racial/ethnic backgrounds in disadvantaged neighborhoods may differentially influence the mediating effect of future orientation in the context of perceived neighborhood disadvantage and academic achievement (Wickrama et al. 2005). To date, however, little is known about whether the mediation effect of future orientation varies across race/ethnicity.

Although some evidence suggests that parental support is an especially important source of protection for racial/ethnic youth living in disadvantaged neighborhoods (Patton et al. 2012; Henry et al. 2008), the majority of studies were conducted within one racially homogeneous racial/ethnic sample (Patton et al. 2012). Among the few studies examining the moderating role of parental support across racial/ethnic groups, most have focused on psychological outcomes and yielded mixed results (Hardaway et al. 2016; Kingston et al. 2013). For example, among low-income youth exposed to neighborhood violence, no protecting effect of parental support was revealed among either Black or White adolescents (Hardaway et al. 2016). However, another study revealed that parental support moderated the association between disadvantaged neighborhood resources and socioemotional behaviors among a mixed racial/ethnic sample (Kingston et al. 2013). It is crucial, therefore, to statistically unpack the racial/ethnic differences regarding the moderating effects of parental support to inform more tailored interventions targeting more vulnerable subpopulations.

### Contextual and Psychological Factors

To capture a more comprehensive understanding of the influencing factors of academic achievement and capture the unique impact of neighborhood disadvantage, parental support, and future orientation, this study further considered additional mezzo-level (i.e., school connectedness) and individual-level (i.e., psychological distress, and demographic characteristics, including age and sex) factors. Adolescent development is influenced by three key systems (i.e., family, school, and neighborhood; Bronfenbrenner 2005). Schools can serve as a protective factor by shielding youth from community violence and lack of social cohesion in the neighborhood (Patton et al. 2012; Bowen 2009). School connectedness, in particular, is positively associated with academic achievement (Niehaus et al. 2012; Dotterer and Lowe 2011). As a mezzo-level factor, school connectedness is both associated with the levels of academic achievement and future orientation (Johnson et al. 2014).

Besides social contexts, at the individual level, there is prevailing evidence suggesting a significant association between mental health and academic achievement among adolescents (Rose et al. 2017; Ansary and Luthar 2009). Specifically, the extant literature has shown that

psychological distress is related to poor academic achievement (Ansary and Luthar 2009; Rothon et al. 2009). Furthermore, previous research has widely revealed sex and age differences in academic achievement (Xiao et al. 2018). In particular, a recent meta-analysis based on 369 samples revealed a consistent female advantage in overall academic achievement and across different course contents (Voyer and Voyer 2014). Age is another important factor because academic difficulties among adolescents were thought to increase over time (Reid et al. 2004). The academic achievement gap between economically-disadvantaged adolescents and well-off adolescents also widened with age (Morrissey et al. 2014). Therefore, the current study controlled for school connectedness, psychological distress, age, and sex.

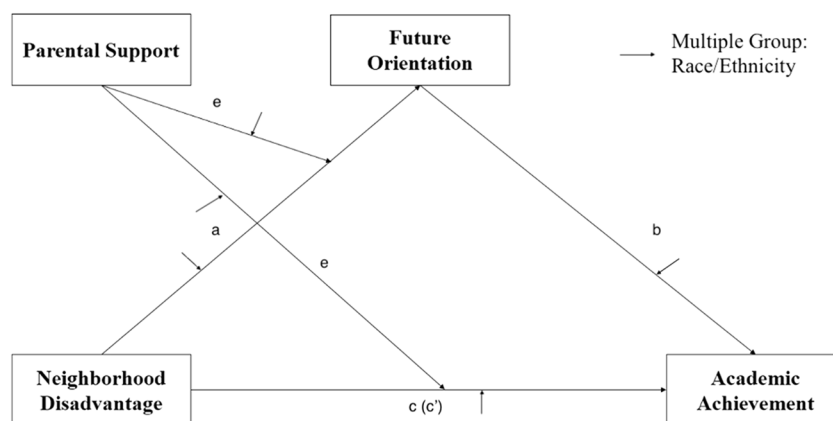
### Current Study

Although previous studies identified the direct influence of perceived neighborhood disadvantage on academic achievement, few examined the mechanisms and conditions by which perceived neighborhood disadvantage relates to academic achievement. This study examined future orientation and parental support as a potentially malleable individual- and parent-level factors that influence academic achievement among students in grades 6 through 9 (see Fig. 1 for conceptual model). Future orientation was considered as a potential mediator, and parental support as a potential moderator. This study also tested the potential differences in the proposed direct, indirect, and moderating paths from perceived neighborhood disadvantage to academic achievement across racial/ethnic groups using multiple group analyses.

It was hypothesized that: (1) perceived neighborhood disadvantage would be negatively associated with academic achievement (Hypothesis 1: Perceived Neighborhood Disadvantage → Academic Achievement) [PATH c]; (2) perceived neighborhood disadvantage would undermine adolescents' future orientation which, in turn, would undermine academic achievement (Hypothesis 2: Perceived Neighborhood Disadvantage → Future Orientation → Academic Achievement) [PATH c']; (3) under higher levels of parental support, the negative effect of perceived neighborhood disadvantage on academic achievement will be less detrimental (Hypothesis 3: Parental Support × Perceived Neighborhood Disadvantage → Academic Achievement) [PATH d]; (4) under higher levels of parental support, the negative effect of perceived neighborhood disadvantage on future orientation will be less detrimental (Hypothesis 4: Parental Support × Neighborhood Disadvantage → Future Orientation) [PATH e]. Given the lack of pertinent research, the hypotheses related to the influence



**Fig. 1** Conceptual model of perceived neighborhood disadvantage and academic achievement



of racial/ethnic differences on the mediating and moderating path were exploratory, including the mediating effect of future orientation in the association between perceived neighborhood disadvantage and academic achievement; the moderating effect of parental support in the associations between perceived neighborhood disadvantage and academic achievement; the moderating effect of parental support in the associations between perceived neighborhood disadvantage and future orientation; and the moderated mediation role of parental support on the mediating path of future orientation.

## Methods

### Participants and Procedures

Data were derived from surveys conducted among 5147 students in grades 6 through 9 from 17 middle and high schools in two communities in North Carolina during 2009–2014. Schools were included in this dataset if at least 50% of their students were completed the School Success Profile (SSP; Bowen et al. 2005), a self-report questionnaire measuring the contextual and individual profiles of students' perceptions and attitudes about the social environment and their well-being (Bowen et al. 2020; Bowen et al. 2003). Thirteen of the schools were in one community, and four were from another. Participants from the schools in the first community were 6th, 7th, 8th, and 9th graders (70.6% of the overall sample) and completed the hard-copy OpScan forms during the fall of the 2009–2010 school year. Participants from the schools in the second community (29.4% of the overall sample) completed the online version of SSP during the 2012–2013 school year (three schools) and 2013–2014 school year (one school). For both communities, students completed the SSP in school settings. The reliability, validity, and measurement invariance of most SSP scales have been well-established in a psychometric monograph (Bowen et al. 2005) and empirical studies

(Bowen et al. 2001; Xiao et al. 2018). Participating schools joined the projects voluntarily using SSP data to enhance their understanding of students' experiences and guide school-level intervention efforts to address student needs. In the year of the data collection, the first community had approximately \$35,000 median household income, \$20,000 per capita income, and about 20% of the population lived below the poverty line; the second community had approximately \$45,000 median household income, \$25,000 per capita income, and about 20% of the population lived below the poverty line. In the second community, where free lunch participation was available, 897 (59.9%) student sample was enrolled in the free lunch program. De-identified data were provided by Professor Gary L. Bowen of the University of North Carolina at Chapel Hill (UNC-Chapel Hill) and developer, with J.M. Richman. The Institutional Review Board at UNC-Chapel Hill, The Ohio State University, and New York University designated analysis of this secondary data analysis as exempt from review.

According to the school population data from the school-level “report cards” for the years of data collection published online by the North Carolina Department of Public Instruction (North Carolina Department of Public Instruction 2017), the student sample with SSP data in the current study largely represented the student population in their respective schools ( $\geq 80\%$ , except for two schools with around 60% representation). Appendix 2 presented the number and characteristics of students per school (Table 4). In the first community, the number of students sampled per school ranged from 73 (School 6) to 722 (School 5). Student sample represented 76 to 100% student population, with 0 to 7% of racial/ethnic discrepancies (i.e., differences in the percentage distributions between the sample and school population in each school) between the percentages of Black, Hispanic/Latino, and White students, respectively, in each school and the corresponding percentages in the school population. In the second community, the number of students sampled per school ranged from 257 (School 11) to

526 (School 4). Students represented 56 to 87% of students in the school population, and racial/ethnic discrepancies ranged from 0 to 16%.

For the purpose of multiple group analysis, this study used a subset of the total sample, which included students who identified as Black ( $n = 253$ , 6.99%), Hispanic/Latino ( $n = 376$ , 10.39%), and White ( $n = 2,989$ , 82.61%). Students who self-identified their racial/ethnic status as Asian, Native Hawaiian or other Pacific Islander, American Indian or Alaskan Native, mixed-race, or others ( $n = 422$ ) were excluded, as were students who did not report their grades (21.49%) and reported being 18 or older ( $n = 1$ ). The Hispanic/Latino category includes adolescents who identified as Hispanic or Latino descent on the SSP questionnaire, regardless of their responses to the follow-up question about the race. Since the sample sizes for students who identified as both Hispanic/Latino and Black ( $n = 33$ , 0.69%) or White ( $n = 70$ , 1.47%) were too small for multiple groups path analyses (Meade et al. 2008), further categorization of Hispanic/Latino subgroups was not included in this study (Pendergast et al. 2017). The final analytic sample included 3618 participants (50% female, age range 11 to 16 years old,  $Mean [M]_{age} = 12.9$ ,  $SD = 1.3$ ).

## Measures

### Academic achievement

To measure academic achievement, students indicated their most recent grades from the report card. The five responses included the standard SSP options of 1 (*Mostly D's and F's*), 2 (*Mostly C's and F's*), 3 (*Mostly C's*), 4 (*Mostly B's and C's*), and 5 (*Mostly A's and B's*). This item has been widely applied to capture students' recent academic achievement (Wretman 2017; Bowen et al. 2008).

### Neighborhood disadvantage

Neighborhood disadvantage was computed as the mean of 23 items in the three domains of perceived neighborhood disadvantage—neighborhood support (an indicator of social cohesion), neighborhood youth behaviors, and neighborhood safety (indicators of informed social control). Sample items of neighborhood support (reverse-coded seven items) included “Adults in my neighborhood are interested in what young people in the neighborhood are doing” and “People in my neighborhood really help one another out”, which were rated on a 4-point scale (1 = *strongly agree* to 4 = *strongly disagree*). Sample items of neighborhood youth behaviors (eight items) included “get in trouble with the police”, “use drugs”, and “join a gang”, which were rated on a 4-point scale (1 = *very unlikely* to 4 = *very likely*). Sample items of neighborhood safety (eight items) included

“robbed or mugged”, “heard gunshots”, “selling illegal drugs”, and “threatened with a weapon”, which were measured by a 3-point scale (1 = *never* to 3 = *more than twice*). Items were standardized before computation of the summed mean scores to reflect the difference in the response scales. Reliability (Cronbach's  $\alpha$ ) for warmth was  $\alpha = 0.87$ . The psychometric property of the neighborhood quality scales was supported in a prior study (Bowen and Richman 2008; Bowen et al. 2005). A second-order confirmatory factor analysis was also conducted to examine the measurement model of neighborhood disadvantage, and the results showed that the three subscales could well capture this latent construct.

### Future orientation

Future orientation was computed as the mean of 12 items about the extent to which students expect themselves to complete high school, go to college, feel positive toward the future, and believe they can be successful (Bowen and Richman 2010). Sample questions included, “When I think about my future, I feel very positive” and “I see myself accomplishing great things in life”. Each item was rated on a 4-point scale (1 = *strongly disagree* to 4 = *strongly agree*). The psychometric property of the future orientation scale and measurement invariance across racial/ethnic groups have been established in a prior study (Xiao et al. 2018) and showed great reliability in the current study (Cronbach  $\alpha = 0.93$ ).

### Parental support

Parental support was computed as the composite score of the mean of five indicators asking students if adults in their home support them in the following ways: (1) let you know you were loved; (2) make you feel appreciated; (3) tell you that you did a good job; (4) make you feel special; and (5) spend free time with you. Response options were on a 3-point scale (1 = *never* to 3 = *more than twice*), and higher scores indicated higher parental support. The psychometric property across racial/ethnic groups has been established previously (Bowen and Richman 2008; Bowen et al. 2005) and showed good reliability in the current study ( $\alpha = 0.89$ ).

### School connectedness

School connectedness was computed as the mean of the composite score of seven items assessing the satisfaction of students towards school climate and personnel, such as “enjoy going to this school”, “feel close to other students at this school”, “feel like I belong at this school”, and “I am getting a good education at this school”. Response options were 3-point scale (1 = *not like me* to 3 = *a lot like me*), and

higher scores indicated greater school connectedness. Previous studies supported the psychometric property of this scale across racial/ethnic groups (Bowen et al. 2005). In the current study, the internal consistency of the school connectedness scale was good (Cronbach  $\alpha = 0.87$ ).

### Psychological distress

Psychological distress was measured using six indicators asking students if they often (1) think about running away from home; (2) wonder whether anyone really cares about them; (3) feel sad; (4) feel lost or confused; (5) feel alone in the world; and (6) worry about their future. Response options were 3-point scale (1 = *not like me* to 3 = *a lot like me*), and higher scores indicated higher psychological distress. The psychometric property of the psychological distress scale across racial/ethnic groups has been established previously (Bowen et al. 2005). The mean of the summed score of the six items was computed and showed good reliability in the current study (Cronbach  $\alpha = 0.87$ ).

### Demographic variables

Adolescents reported their age (ranged from 9 to 16 years old), sex (0 = female, 1 = male), and race/ethnicity (1 = non-Hispanic Black, 2 = Hispanic/Latino, 3 = non-Hispanic White).

### Statistical Analyses

#### Missing data and multiple imputations

Although the overall percentage of item-level missing values was low (ranges from 0 to 1.6%), this study used multiple imputations to reduce the likelihood of biased parameter estimates and increase power (Little and Rubin 1989; White et al. 2011). The Little's test Little 1988 for missing completely at random (MCAR) was used in Stata version 14.0 (StataCorp 2015; Li 2013) with 200 iterations in the expectation-maximization (EM) estimation to test the pattern of missingness. The test was statistically significant ( $\chi^2 [35] = 51.82, p = 0.033$ ), which indicated that the missing data in the six variables of interest are not MCAR under significance level 0.05. The Little's covariate-dependent missingness (CDM) test was further tested by adding three auxiliary variables (i.e., age, sex, and race/ethnicity) with EM estimation. Results showed that adding the three covariates can pass the CDM test ( $\chi^2 [175] = 115.85, p = 0.9998$ ), indicating that the data were missing at random (MAR) since CDM is a special case of MAR (Fitzmaurice et al. 2008; Li 2013). Thus, multiple imputations were proceeded to impute missing observations using Mplus software version 8 (Muthén and Muthén 1998–2017).

This study used an unrestricted covariance model, included student demographic characteristics (e.g., sex, age), clustering variables (to preserve nested data structure, e.g., students clustered in schools) as auxiliary variables, and imputed 50 datasets to maximize statistical power (Baraldi and Enders 2010; Asparouhov and Muthén 2010). All analyses were performed using each imputed data, and estimates were pooled, according to Rubin's (1987) rules (Asparouhov and Muthén 2010; Muthén and Muthén 1998–2017). Multiple imputations over full information maximum likelihood (FIML) estimator was used since multiple imputations are compatible with estimation using the diagonally-weighted least squares estimator (WLSMV) in Mplus, which accounted appropriately for the non-normal and ordinal nature of much of our data and provided more unbiased parameter estimates than robust maximum likelihood (Asparouhov and Muthén 2010; Li 2016). WLSMV also outperformed maximum likelihood with robust standard errors (MLR) when the sample size exceeded 200 (Li 2016).

#### Preliminary analyses

Descriptive statistics and bivariate analyses across racial/ethnic groups for each key constructs were performed using Stata version 14.0 (StataCorp 2015). Differences in the prevalence of academic achievement, perceived neighborhood disadvantage, future orientation, parental support, school connectedness, psychological distress, sex, and age were assessed using cluster-adjusted  $\chi^2$  tests for frequency differences and ANOVA for mean differences (Table 1). Effect sizes for categorical and continuous variables were calculated using Cramer's  $V$  and  $\eta^2$ , respectively.

#### Indirect effect to test future orientation as a mediator

The unconstrained path models for all racial/ethnic groups combined were first estimated (see Fig. 1 for the conceptual model) using Mplus version 8 (Muthén and Muthén 1998–2017). WLSMV estimator was used to account for the ordered categorical nature of scales with less than five-point responses and non-normal nature of dependent variables (Flora and Curran 2004; Bowen and Guo 2012). The model indirect command (IND) in Mplus was used to test the mediation effects of future orientation (Muthén and Muthén 2015; Sobel 1982), providing both overall and specific path coefficients for the indirect effect.

#### Interaction effect to test parental support as a moderator

To examine the moderating effect of parental support, an interaction term (Parental Support  $\times$  Perceived Neighborhood Disadvantage) was created and employed in the



**Table 1** Descriptive statistics and bivariate analysis

	Overall ( <i>n</i> = 3618)	Black ( <i>n</i> = 253, 6.99%)	Hispanic/Latino ( <i>n</i> = 376, 10.39%)	White ( <i>n</i> = 2,989, 82.61%)	<i>F</i> / $\chi^2$	$\eta^2$ /Cramer's <i>V</i>	
	Min–Max	<i>M</i> ( <i>SD</i> )/%	<i>M</i> ( <i>SD</i> )/%	<i>M</i> ( <i>SD</i> )/%			<i>M</i> ( <i>SD</i> )/%
Academic achievement	1–5	4.33 (1.06)	4.39 (0.96)	4.34 (1.00)	4.32 (1.07)	0.45	0.00
Mostly D's and F's		111 (3.1%)	4 (1.6%)	8 (2.1%)	99 (3.3%)		
Mostly C's and D's		254 (7.0%)	17 (6.7%)	22 (5.9%)	215 (7.2%)		
Mostly C's		212 (5.9%)	13 (5.1%)	29 (7.7%)	170 (5.7%)		
Mostly B's and C's		812 (22.4%)	65 (25.7%)	92 (24.5%)	655 (21.9%)		
Mostly A's and B's		2229 (61.6%)	154 (60.9%)	225 (59.8%)	1850 (61.9%)		
Perceived neighborhood disadvantage <sup>a</sup>	–1.92 to 4.77	0.00 (1.00)	0.15 (1.09)	0.18 (1.04)	–0.03 (0.98)	10.29***	0.01
Future orientation	1–4	3.38 (0.52)	3.52 (0.47)	3.3 (0.58)	3.37 (0.51)	13.74***	0.01
Parental support	1–3	2.63 (0.51)	2.63 (0.51)	2.49 (0.58)	2.65 (0.49)	15.87***	0.01
School connectedness	1–3	2.43 (0.49)	2.40 (0.48)	2.38 (0.52)	2.44 (0.49)	3.38*	0.00
Psychological distress	1–3	1.43 (0.52)	1.39 (0.48)	1.53 (0.53)	1.42 (0.52)	7.89***	0.00
Sex (0 = female, 1 = male)	0–1	0.50 (0.50)	0.45 (0.50)	0.50 (0.50)	0.50 (0.50)	2.75	0.03
Age (years)	11–16	12.86 (1.26)	13.09 (1.2)	12.98 (1.31)	12.82 (1.25)	7.42***	0.00

$\chi^2$  Chi-square test,  $\eta^2$  partial eta squared

<sup>a</sup>Perceived neighborhood disadvantage was measured by the composite score of the mean of 23 items of three domains (neighborhood support, neighborhood safety, and neighborhood youth behaviors). Items were standardized (i.e., using z-score) before computation to account for the different response scales

\**p* < 0.05; \*\**p* < 0.01; \*\*\**p* < 0.001

proposed model to regress on academic achievement and future orientation, respectively. All continuous variables were centered at mean before creating an interaction term, as suggested by Aiken and colleagues (Aiken et al. 1991; Cohen et al. 2013).

**Multiple group analyses to test variations by race/ethnicity**

To determine whether parameter estimates reliably differed across Black, Hispanic/Latino, and White students, this study conducted multiple group analyses where students' race/ethnicity was the grouping variable in Mplus version 8 (Muthén and Muthén 1998–2017). First, the unconstrained path model across race/ethnicity was estimated. Second, all structural paths were constrained to be equal across racial/ethnic groups. The fully constrained model was then compared with the unconstrained model using the Satorra-Bentler  $\chi^2$  difference test by the "DIFFTEST" command in Mplus. A statistically significant  $\chi^2$  value indicates group differences and significant decrement in model fit. If there existed statistically significant differences, each path was freed at a time. If freeing a path did not lead to significant changes in the model fit, a more parsimonious model was selected. The path constraint was released for each racial/ethnic subgroup at a time to identify the subgroup contributing to the path differences sequentially. The prior model with less freely estimated paths served as the comparison group for testing a subsequent path. The orders of the hypothesized paths (see Fig. 1) were used to determine the order of each released path. The significant level (i.e.,  $\alpha$ )

was adjusted to 0.01 (instead of 0.05) to account for Type I error rates due to multiple comparisons across groups (Bender and Lange 2001). For significant paths, differences of path parameters were further tested, and strengths of indirect effect across pairs of racial/ethnic groups were compared (e.g., Black vs. Latino youth; Latino vs. White youth; Black vs. White youth) using the "MODEL TEST" Command in Mplus. The final structural model retained the path constraints that yield a nonsignificant worse fit—all analyses controlled for school connectedness, psychological distress, adolescent sex, and age.

**Model fit indices**

Multiple indices were used to evaluate the goodness of fits of measurement and structural model. These indices include Chi-square ( $\chi^2$ ), Comparative Fit Index (*CFI*), and Root Mean Square Error Approximation (*RMSEA*). Since  $\chi^2$  is considered sensitive to a large sample size (Marsh et al. 1988), alternative fit indices based on principals of parsimony were adopted (Browne and Cudeck 1992). Good model fit was indicated by *Chi-square* values less than three times of the degree freedom ( $\chi^2/df < 3$ ), *CFI* > 0.95, *RMSEA* point estimate and upper confidence interval (*CI*) values lower than 0.06 (West et al. 2012; Hu and Bentler 1999; Bentler 1990). The ratio of  $\chi^2/df$  (or *normed Chi-square*) was used to adjust the influence of a large sample size. *RMSEA* values ranging from 0.08 to 0.10 were considered as mediocre fit, with values over 0.10 considered as unacceptable (MacCallum et al. 1996). If the adequate fit was

not obtained, residual correlations of 0.10 or higher were used to guide modifications (Kline 2015; Brown 2015). The models were accepted and rejected based on the majority of the indices, which is consistent with previous practices (Beaujean et al. 2012; Hu and Bentler 1999).

### Adjustment for clustering of data

Since students were nested within schools, the non-independence of observations due to cluster sampling (students within the same schools) were adjusted using the “CLUSTER” option in conjunction with the “TYPE = COMPLEX” option in Mplus (Muthén and Muthén 2017).

### Sensitivity analysis

Multiple group analyses were also performed using different methods (i.e., listwise deletion and FIML with MLR estimator). Results with alternative estimation methods were. The final model was also tested using unimputed data, yielding similar parameter estimates. Therefore, results using imputed datasets were presented.

### Alternative models

In addition to the model described in Fig. 1, an alternative model was tested (Appendix 3, Fig. 5) to explore the bidirectional effects between academic achievement and perceived neighborhood disadvantage (e.g., low academic achievement may be associated with low perceived neighborhood disadvantage). Each bidirectional relationship was tested sequentially by adding the hypothesized bidirectional path into the model one at a time. No significant reciprocal influences were detected. Thus, results based on our hypothesized model was reported (Fig. 1).

## Results

### Preliminary Analyses

Descriptive statistics for all study variables are presented in Table 1. All the key constructs showed significant differences across racial/ethnic groups ( $p < .05$ ), while no significant differences in academic achievement were detected ( $F [2] = 0.45, p > 0.05$ ). Hispanic/Latino ( $M = 1.75$ , standard deviation [ $SD$ ] = 0.37) and Black ( $M = 1.74, SD = 0.39$ ) adolescents reported higher levels of perceived neighborhood disadvantage than White adolescents. Black adolescents reported higher levels of future orientation ( $M = 3.52, SD = 0.47$ ) than White ( $M = 3.37, SD = 0.51$ ) and Hispanic/Latino ( $M = 3.30, SD = 0.58$ ) groups. The differences had a small effect size based on the  $\eta^2$ . White

students had higher parental support ( $M = 2.65, SD = 0.49$ ) than their counterparts.

Correlations among the main variables are presented in Table 2. In the total sample, all the constructs were significantly correlated ( $p < 0.05$ ). Specifically, academic achievement was negatively correlated with perceived neighborhood disadvantage ( $r = -0.25$ ) and psychological distress ( $r = -0.22$ ), while positively correlated with future orientation ( $r = 0.30$ ), parental support ( $r = 0.21$ ), and school connectedness ( $r = 0.38, p < 0.05$ ). The direct association between academic achievement and parental support, however, was not statistically significant among Black adolescents.

### Mediating Effect of Future Orientation

The model of all racial groups combined achieved good model fit ( $CFI = 1.00, RMSEA = 0.00$ ). Future orientation significantly mediated the associations between perceived neighborhood disadvantaged and academic achievement among the total sample (indirect effect:  $b = -0.05, SE = 0.01, p < 0.001$ ).

### Moderating Effect of Parental Support

When combining the racial/ethnic groups together, parental support significantly moderated the link between perceived neighborhood disadvantage and academic achievement ( $b = -0.29, SE = 0.05, p < 0.001$ ), but not the link between perceived neighborhood disadvantage and future orientation ( $b = -0.02, SE = 0.04, p = 0.610$ ). Figure 2 displayed the significant interactive effect of parental support in buffering the effect of perceived neighborhood disadvantage on academic achievement.

### Multiple Group Path Analyses and Racial/ethnic Differences

The unconstrained paths were tested. This model displayed adequate model fit:  $\chi^2 = 58.03, df = 12; CFI = 0.94; RMSEA = 0.06$ . However, constraining all the path parameters showed a statistically significant decrease in model fit ( $\Delta\chi^2 = 39.46, df = 22, p = 0.013$ ). Thus, a series of independent difference tests were conducted by gradually testing and constraining paths to be equal to determine which specific path parameters varied across groups. The final partial constrained model (Fig. 3) achieved good model fit:  $\chi^2 = 71.82, df = 24; \chi^2/df = 2.98; CFI = 0.94; RMSEA = 0.04$ . The results indicated that three paths differ across race/ethnicity: from parental support to academic achievement ( $\Delta\chi^2 = 62.43, df = 28, p = 0.02$ ); from future orientation to academic achievement ( $\Delta\chi^2 = 60.36, df = 22, p = 0.036$ ); and from psychological distress to future orientation ( $\Delta\chi^2 = 59.17, df = 22, p = 0.044$ ). The final structural model was

**Table 2** Zero-order correlations among study variables among total sample and across racial/ethnic groups

	1	2	3	4	5	6	7	8
Total sample								
1. Academic achievement	–							
2. Perceived neighborhood disadvantage	–0.25***	–						
3. Future orientation	0.30***	–0.33***	–					
4. Parental support	0.21***	–0.34***	0.34***	–				
5. School connectedness	0.28***	–0.35***	0.41***	0.34***	–			
6. Psychological distress	–0.22***	0.31***	–0.28***	–0.41***	–0.26***	–		
7. Sex (0 = female, 1 = male)	–0.17***	0.08***	–0.10***	–0.03*	–0.15***	–0.09***	–	
8. Age (years)	–0.14***	0.17***	–0.10***	–0.12***	–0.12***	0.10***	0.04*	–
Black								
1. Academic achievement	–							
2. Perceived neighborhood disadvantage	–0.24***	–						
3. Future orientation	0.33***	–0.26***	–					
4. Parental support	0.09	–0.24***	0.21**	–				
5. School connectedness	0.23***	–0.25***	0.22***	0.22***	–			
6. Psychological distress	–0.23***	0.23***	–0.04	–0.24***	–0.21**	–		
7. Sex (0 = female, 1 = male)	–0.11	0.07	–0.12***	–0.04	0.03	–0.16**	–	
8. Age (years)	0.02	–0.01	0.05	–0.07	0.02	–0.14*	0.02	–
Hispanic/Latino								
1. Academic achievement	–							
2. Perceived neighborhood disadvantage	–0.15**	–						
3. Future orientation	0.24***	–0.29***	–					
4. Parental support	0.12*	–0.27***	0.39***	–				
5. School connectedness	0.25***	–0.40***	0.45***	0.39***	–			
6. Psychological distress	–0.13*	0.32***	–0.19***	–0.44***	–0.19***	–		
7. Sex (0 = female, 1 = male)	–0.09	0.05	–0.04	0.11*	–0.07	–0.19***	–	
8. Age (years)	–0.06	0.14**	–0.15**	–0.06	–0.12**	0.03	0.11***	–
White								
1. Academic achievement	–							
2. Perceived neighborhood disadvantage	–0.26***	–						
3. Future orientation	0.31***	–0.35***	–					
4. Parental support	0.23***	–0.36***	0.35***	–				
5. School connectedness	0.29***	–0.35***	0.42***	0.33***	–			
6. Psychological distress	–0.23***	0.31***	–0.30***	–0.42***	–0.27***	–		
7. Sex (0 = female, 1 = male)	–0.18***	0.09***	–0.11***	–0.06**	–0.18***	–0.08***	–	
8. Age (years)	–0.16***	0.18***	–0.10***	–0.13***	–0.13***	0.13***	0.04***	–

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

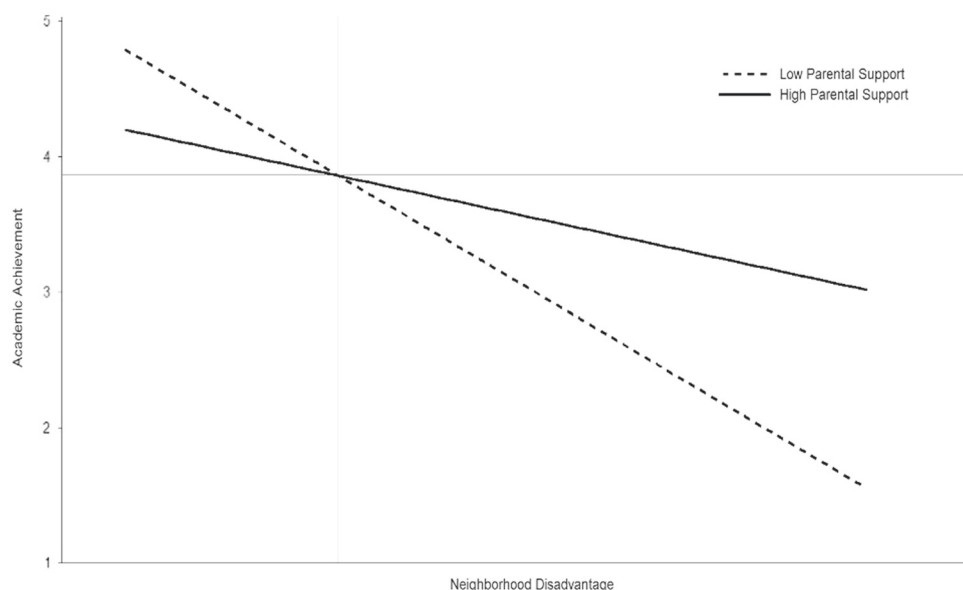
established with the three constraints released, while still constraining other structural model paths. This model did not differ from the model with unconstrained structural parameters:  $\Delta\chi^2 = 1.87$ ,  $df = 1$ ,  $p = 0.171$ ).

**Direct paths to academic achievement across race/ethnicity**

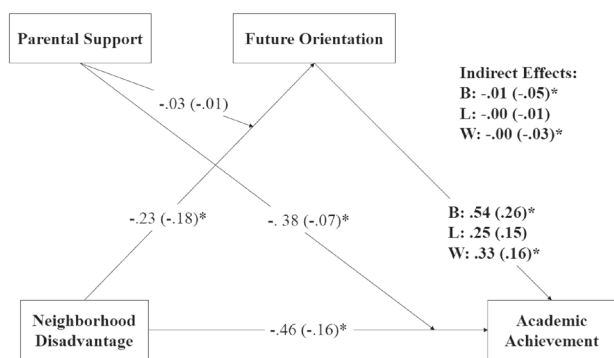
Figure 3 and Table 3 present the path coefficients from the final multiple group model, where the bolded coefficients indicated freely estimated paths. Among the invariant direct

paths, perceived neighborhood disadvantage had statistically significant and negative associations with academic achievement ( $b = -0.46$ , Standard Error [SE] = 0.07,  $p < 0.001$ ) and future orientation ( $b = -0.23$ , SE = 0.02,  $p < 0.001$ ) among students across all racial/ethnic groups. Among the paths of covariates, psychological distress was negatively associated with future orientation across racial/ethnic groups ( $b = -0.32$ , SE = 0.06,  $p < 0.001$ ), where school support was positively associated with future orientation among students across racial/ethnic groups ( $b = 0.37$ ,

**Fig. 2** Moderating effect of parental support in the association between perceived neighborhood disadvantage and academic achievement



Note. Low parental support = one standard deviation below the sample mean; high parental support = one standard deviation above the sample mean.



Note. B: Black, L: Hispanic/Latino, W: White; Unstandardized coefficients are presented with standardized coefficients in parentheses; Sex, age, psychological distress, and school connectedness were controlled. Bold paths significantly differed across groups. \* $p < .05$ .

**Fig. 3** Final multiple group path model

$SE = 0.04, p < 0.001$ ). These associations were equal in magnitudes for adolescents from different racial/ethnic groups.

Among non-invariant direct paths, the associations between (1) future orientation and academic achievement, and (2) parental support and academic achievement were statistically different across race/ethnicity. Specifically, future orientation was only positively associated with academic achievement among Black and White students. The strength of this association was greater for Black adolescents ( $b = 0.54, \beta = 0.26, SE = 0.20, p = 0.006$ ) than for their White counterparts ( $b = 0.33, \beta = 0.16, SE = 0.04, p < 0.001$ ). Greater parental support was only associated with better academic achievement for White adolescents ( $b = 0.15, SE = 0.02, p = 0.049$ ), but not other groups.

**Indirect paths of future orientation to academic achievement across race/ethnicity**

Significant differences in the indirect paths across racial/ethnic groups were further detected. Specifically, future orientation significantly mediated the associations between perceived neighborhood disadvantaged and academic achievement among Black and White adolescents, but not Hispanic/Latino adolescents ( $p = 0.223$ ). Besides, the indirect effect was stronger among Black students ( $b = -0.01, \beta = -0.05, SE = 0.00, p = 0.003$ ) than White students ( $b = -0.00, \beta = -0.03, SE = 0.00, p < 0.001$ ). The total effect, which accounted for the moderated mediation effect of parental support and future orientation, differed across racial/ethnic groups, and was the stronger among Black adolescents ( $b = -0.46, \beta = -0.05, SE = 0.07, p < 0.001$ ) than White adolescents ( $b = -0.46, \beta = -0.03, SE = 0.07, p < 0.001$ ), but not statistically significant among Hispanic/Latino adolescents ( $p = 0.254$ ).

**Moderated paths of parental support across race/ethnicity**

Our results indicated that the interaction effect between parental support and perceived neighborhood disadvantage on academic achievement was significant and invariant across racial/ethnic groups ( $b = -0.38, SE = 0.04, p < 0.001$ ). Parental support was a positive predictor of academic achievement and buffered the negative effect of perceived neighborhood disadvantage. The interaction concerning parental support, however, did not differ significantly by race/ethnicity. Similar to the results using the total sample, no

**Table 3** Multiple group analysis predicting academic achievement across three racial/ethnic groups

Paths	Black			Hispanic/Latino			White		
	<i>b</i>	S.E.	<i>p</i>	<i>b</i>	S.E.	<i>p</i>	<i>b</i>	S.E.	<i>p</i>
Direct links									
Perceived neighborhood disadvantage → academic achievement	−0.46*	0.07	0.000	−0.46*	0.07	0.000	−0.46*	0.07	0.000
Parental support → academic achievement	<b>0.01</b>	<b>0.13</b>	<b>0.958</b>	<b>−0.12</b>	<b>0.10</b>	<b>0.216</b>	<b>0.15*</b>	<b>0.08</b>	<b>0.049</b>
Future orientation → academic achievement	<b>0.54*</b>	<b>0.20</b>	<b>0.006</b>	<b>0.25</b>	<b>0.13</b>	<b>0.056</b>	<b>0.33*</b>	<b>0.04</b>	<b>0.000</b>
Perceived neighborhood disadvantage → future orientation	−0.23*	0.02	0.000	−0.23*	0.02	0.000	−0.23*	0.02	0.000
Parental support → future orientation	0.16*	0.02	0.000	0.16*	0.02	0.000	0.16*	0.02	0.000
Indirect effect of future orientation									
Indirect <sup>a</sup>	<b>−0.01*</b>	<b>0.00</b>	<b>0.008</b>	<b>−0.00</b>	<b>0.00</b>	<b>0.223</b>	<b>−0.00*</b>	<b>0.00</b>	<b>0.000</b>
Total effect	<b>−0.46*</b>	<b>0.07</b>	<b>0.000</b>	<b>−0.00</b>	<b>0.02</b>	<b>0.254</b>	<b>−0.46*</b>	<b>0.07</b>	<b>0.000</b>
Moderation effect of parental support									
Parental support × perceived neighborhood disadvantage → academic achievement	−0.38*	0.04	0.000	−0.38*	0.04	0.000	−0.38*	0.04	0.000
Parental support × perceived neighborhood disadvantage → future orientation	−0.03	0.03	0.355	−0.03	0.03	0.355	−0.03	0.03	0.355
<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> = 0.13			<i>R</i> <sup>2</sup> = 0.17			<i>R</i> <sup>2</sup> = 0.23		

Bold paths significantly differed across groups ( $p < 0.05$ )

*b* unstandardized coefficients, *S.E.* standard error

<sup>a</sup>Indirect and total effects included the moderating effect of parental supports

\* $p < 0.05$

significant interaction effect of future orientation was detected in the link between perceived neighborhood disadvantage and future orientation.

## Discussion

Neighborhood disadvantage has been shown to have a significant negative impact on the gap in academic achievement among adolescents from different racial/ethnic backgrounds (Ainsworth 2002; Leventhal et al. 2009). Yet, the mechanisms and conditions by which perceived neighborhood disadvantage relates to academic achievement have been largely unexplored. The current study addressed this gap in a diverse sample and examined the mediating role of future orientation, and moderating role of parental support in the link between perceived neighborhood disadvantage and academic achievement across Black, Hispanic, and White students. The study model is grounded in the future orientation framework (Johnson et al. 2014) and supported by empirical studies suggesting the protective role of parental support (Hardaway et al. 2016; Bowen et al. 2012). This study further unpacked the racial/ethnic differences in the direct, mediating, and moderating effects. Findings of the present study have intervention implications. Targeted interventions to promote future orientation (e.g., cognition and behaviors) and parental

support have the potential to improve academic achievement among disadvantaged adolescents.

## Perceived Neighborhood Disadvantage and Academic Achievement

Extensive research has suggested that lack of supportive social networks, adult supervision, positive role models, safe environment, high-quality schools, and belongingness to communities are the possible explanations for the influence of perceived neighborhood disadvantage on academic achievement (Ainsworth 2002; Daly et al. 2009). Findings of our study were consistent with previous findings and Hypothesis 1, indicating that perceived neighborhood disadvantage was negatively linked to academic achievement, even after accounting for a various individual (e.g., psychological distress, future orientation), familial/micro-level (e.g., parental support), and mezzo-level contextual (e.g., school connectedness) factors. Furthermore, this study extended previous work and demonstrated that the relationship between perceived neighborhood disadvantage and academic achievement was significant for adolescents from all racial/ethnic groups. It should be noted that most youths in this study did not perceive their neighborhood as being disadvantaged, which may be due to the fact that the majority of the sample was White adolescents who might



have received support and resources, while having less exposure to violence and youth risk behaviors.

### Mediating Roles of Future Orientation

Additionally, besides the widely examined direct association (Ainsworth 2002; Leventhal et al. 2009), the current study sheds light on the underlying mechanism linking perceived neighborhood disadvantage and academic achievement by identifying future orientation as a mediator. As hypothesized, our results indicated that greater perceived neighborhood disadvantage (e.g., adolescents perceived their neighborhood less supportive, mistrust of neighbors, delinquent youth behaviors) was related to decreased future orientation, which in turn, was associated with poorer academic achievement (Hypothesis 2). While consistent with previous studies (McPherson et al. 2014; Dupere et al. 2012), our findings further revealed that the magnitude of the mediating effect of future orientation among Black adolescents was nearly two times as large as that among their White counterparts. This was partially explained by the significant differences in the direct association between future orientation and academic achievement across racial/ethnic groups, where Black adolescents benefited the most from greater future orientation in explaining their academic achievement.

Among Black students, in particular, previous studies have indicated that their future orientation was uniquely related to a “gonna-make-it” mentality (Harley 2015). That is, despite the adversities and challenges, Black adolescents may still demonstrate “mental toughness” (Harley 2015; Clayton 2007). When experiencing a negative impact from a disadvantaged neighborhood, Black students may tend to “tough it out” and be self-reliant (Lindsey et al. 2017). This “tough” mentality and determination may explain future orientation as a unique trait among Black adolescents in promoting their academic achievement (So et al. 2018; Xiao et al. 2018). Additionally, previous research found that Black students with greater levels of future orientation also reported higher levels of self-efficacy, maternal support, and ethnic identity (Kerpelman et al. 2008), and these factors were closely linked to better academic achievement (Bowen et al. 2012). Furthermore, past research on grit, defined as “perseverance and passion for long-term goals” (Duckworth et al. 2007), also revealed that Black adolescents with effort and interest over the years despite current disadvantage and adversity were more likely to have a better academic achievement (Strayhorn 2014).

The association between future orientation and academic achievement among White adolescents was weaker than that among Black adolescents. It is possible that for White adolescents, structural factors such as neighborhood quality, rather than individual self-identity, were more related to their academic achievement. From a system’s level, the ability to thrive and adapt developmental regulation between social contexts

and individuals is informed by youth’s experiences within larger systems of privilege and oppression (Tyler et al. 2020). White adolescents may benefit more from the privilege of living in better-off neighborhoods that promote desirable social and emotional outcomes (Jost et al. 2012). Hence, White youth may be less likely to use future orientation as a viable path to understand their lived experience in a privileged system. On the contrary, Black adolescents may experience more oppression in the neighborhood, and thus, relying more on internal resources structures to thrive in academic achievement (Tyler et al. 2020). Given the context of neighborhood disadvantage, greater future orientation may help Black adolescents make sense of their marginalization experiences, identify structural reasons associated with academic achievement, and develop strategies alleviating the negative effect of perceived neighborhood disadvantage. Future research should further examine the racial/ethnic differences in the mediating role of future orientation, particularly on the influences of different contextual supports within systems of privilege and oppression on academic achievement.

For Hispanic/Latino adolescents, no main effect or mediation effect of future orientation on academic achievement was detected in the current study. Previous research has suggested that future orientation among Hispanic/Latino adolescents was linked to job-related expectations and motivations, rather than educational outcomes (Gao and Chan 2015; Xiao et al. 2018). While there have been few research studies on the relationship between perceived neighborhood disadvantage, future orientation, and academic achievement, unmeasured constructs such as ethnic composition among the members in the community (Rios et al. 2011) may be a stronger mediator among Latino/Hispanic individuals. Future research should examine other underlying mechanisms (e.g., peer relationships, ethnic identity, racial/ethnic composition) to understand the racial/ethnic differences in the mediating role of future orientation when linking perceived neighborhood disadvantage and academic achievement.

### Moderating Role of Parental Support

In addition to the mediation process, our finding also supported Hypothesis 3, revealing a significant buffering effect of parental support on the association between perceived neighborhood disadvantage and academic achievement. By fostering a trustful, caring, and emotionally supportive family dynamic, parental support emerged as an important protective factor in predicting better academic achievement in the context of perceiving neighborhood disadvantage (Eamon 2005; Lorenzo-Blanco et al. 2012). Likewise, adolescents with high levels of parental support may learn more adaptive coping skills; thus, perceiving the threat of perceived neighborhood disadvantage as less dangerous

than their peers who lack this positive parental support (Aceves and Cookston 2007; Hardaway et al. 2016).

The significant moderating effect of parental support, however, did not vary across race/ethnicity. This pattern coincides with that found in previous studies emphasizing the role of parents in protecting adolescents from adverse neighborhood effects (Bowen et al. 2008; Eamon 2005), and supports the generalizability of the buffering role of parental support. For racial/ethnic minority adolescents, parental support is a salient protective factor against the negative impact of neighborhood disadvantage (Henry et al. 2008; Lindsey et al. 2010). For example, among Hispanic/Latino students, unique buffering effects of traditional Latino cultural values, such as *familismo* (i.e., interdependence, loyalty, high value of family in life obligation; Bacallao and Smokowski 2007) and *respeto* (e.g., respect for self and family members to maintain harmony in the family; Valdés 1996), have been widely identified in previous research (Eamon 2005; Hardaway et al. 2016). Similarly, parental support has been identified as a developmental asset factor against the negative neighborhood effect among White adolescents (Bowen et al. 2012).

The lack of racial/ethnic differences may be due to the measurement of parental support, which only covered a general relationship with adolescents, rather than an academic-focus or a combination of different parental involvement. For instance, Day and Dotterer (2018) found no racial/ethnic difference in the influences of a combination of greater academic socialization and school-based involvement on adolescents' grade point averages. However, Black and Hispanic adolescents reported better academic achievement with a combination of greater academic socialization and home-based involvement, where White adolescents are not benefited. Since adolescents are influenced by different forms of social support (Rueger et al. 2016), there may be racial/ethnic differences in the moderating effect of peers, mentors, teachers, and neighbors that can be explored in future research.

Contrary to Hypothesis 4, this study did not find a significant moderating effect of parental support in the association between neighborhood disadvantage and future orientation. This suggests that youth perceiving high neighborhood disadvantage is not having low future orientation due to low parental support. Other types of social support may be more important in linking the perception of neighborhood disadvantage and future orientation. For example, developmentally, adolescents may spend more time with peers (Cambron et al. 2018), and lack of peer support may serve as a vulnerability factor in reducing future orientation. It is important to note that the measure of parental support does not specifically address situations of perceived neighborhood disadvantage, and perhaps a measure that includes items that tap into specific perceptions of neighborhood support, neighborhood safety, and neighborhood

youth behaviors may be necessary to understand future orientation levels associated with disadvantage.

Furthermore, no moderated mediation effect was detected. It is possible that under the circumstances of high perceived neighborhood disadvantage, the mediating mechanism of future orientation on academic achievement was not conditioned on parental support, but other factors. Given that future orientation and adolescents may be more influenced by peers and neighborhood norms, the next step of this line of research would be including different levels of social support and determining the possible differences by these factors. While the measure of parental support in this study was mainly affective (e.g., let adolescents know they were loved and appreciated) and behavioral (e.g., spend time with adolescents) aspects in the general domain, it could be useful to include other aspects (e.g., motivational) in specific domains (e.g., academic achievement).

### Strengths and Limitations

This study is one of the first to articulate the racial/ethnic differences the direct, indirect, and moderating mechanisms linking perceived neighborhood disadvantage and academic achievement. Findings identified the unique mediating effect of future orientation linking perceived neighborhood disadvantage and academic achievement in a diverse population. The current study further revealed a minimal effect of parental support in the associations between perceived neighborhood disadvantage, future orientation, and academic achievement. Notably, we identified the nuanced racial/ethnic differences in the mediation role of future orientation, which was stronger among Black students.

Limitations of the study must be considered when interpreting findings. First, the cross-sectional nature of the data prevents the causal inference of the examined associations. It is possible that reported academic achievement occurred before future orientation, which then increased the level of perceived neighborhood disadvantage. Thus, future studies might use a longitudinal design to better understand the direction of associations linking perceived neighborhood disadvantage and academic achievement. Second, the measures in the model were based on adolescents' self-reports, which may introduce the threat of shared-method variance. Academic achievement was measured by a single item based on a student report, which may be associated with the low reliability of our outcome. Future research should assess multiple items, objective academic outcomes (e.g., Grade Point Average), and responses from multiple informants (e.g., teachers, parents, peers). The measurement of psychological distress was not based on a clinical scale, which may be related to measurement bias. Although the measures have been substantiated as reliable, valid, and invariant across racial/ethnic groups, researchers should

address the measurement issues in future research by incorporating multiple informants or additional scales with the dimensions of the construct. Third, this study only explored the racial/ethnic differences across White, Black, and Hispanic/Latino adolescents. The link from perceived neighborhood disadvantage to academic achievement may differ for other racial/ethnic groups such as Asians and mixed-race students. Fourth, the measure of parental support reflected more emotional support than instrumental and material support from parents. Future research should include multidimensional measures of parental support. Besides, this study was not able to include family socioeconomic status (e.g., family income, parental education) in the model as the information was not available in the current data. Finally, the current study focuses on the influence of perceived neighborhood disadvantage, parental support, and future orientation on academic achievement, while adjusting for school connectedness, psychological distress, and student demographic characteristics. The selection of these factors was supported by a previous study indicating family, school, and neighborhoods as the most important individual-level and structural-level factors for academic achievement (Witherspoon et al. 2018). The future orientation framework (Johnson et al. 2014), however, suggests a complex set of factors contributing to adolescent outcomes. It is possible that other social contexts, such as macro-level (e.g., unemployment, poverty, policies), mezzo-level (e.g., school quality), and micro-level (e.g., peer behaviors, family socioeconomic status) affect academic achievement among adolescents. Nevertheless, this information was not available in the data collection. Future research might examine the multi-level effects of neighborhood, school, families, peers, and self on academic achievement. More research on the interactive effects across levels, and between neighborhood processes and neighborhood structure, may shed light on how different dimensions of social contexts influence adolescent academic achievement.

### Implications for Intervention and Policy

The results of this study have substantive implications for developing prevention and intervention programs. Given the mediating role of future orientation, intervention programs at the school level may promote students' ability to set goals, build the necessary steps to accomplish these goals, including the identification of ego strengths and support networks. Capitalizing on the strength of future orientation, cultivating school climates that foster self-confidence, and leveraging community-level resources that provide support for positive youth development may be promising next steps to address the negative impact of perceived neighborhood disadvantage. Targeting future orientation may improve academic achievement among

students exposed to perceived neighborhood disadvantage (Johnson et al. 2015; Oyserman and Fryberg 2006). For example, at the school level, the Possible Selves intervention (Oyserman et al. 2006) was found to improve academic achievement, depressive symptoms, and school attendance by facilitating students to create actionable goals and identify barriers to achieve their hoped-for future self. Schools can also utilize social and emotional learning programs, such as MindOut (Dowling et al. 2019). At the clinical level, the Healthy Futures intervention (Johnson et al. 2015) conducted at the clinics among Black youth was also shown to improve career readiness and reduce involvement in risk behaviors by facilitating adolescents to identify and overcome environmental barriers to future orientation and improving self-efficacy through skill-building activities, such as researching on career choices, exploring jobs and educational programs, developing resumes, completing applications, and linking students to community resources. At the community level, structural interventions may be particularly important to improve future orientation by creating an environment that positively influences adolescents. Community-based structures and organizations can be leveraged to engage and support students. For example, organized after-school activities were found to be especially effective in providing additional experiences that contribute to academic achievement among less-resourced high school students (Camacho and Fuligni 2015). More studies are needed to identify fine-tuned targets for policies and programs seeking to promote positive future orientation among disadvantaged adolescents. Ultimately, interventions that address the structural inequality across race/ethnicity and multiple barriers that may simultaneously affect adolescents' chance to academic success, including the perception of the disadvantaged neighborhood, lack of social support, and few family resources, are needed.

Given the moderating effect of parental support in the total sample, involving parents in the lives of teens and school may be crucial. School intervention programs could provide parents with parenting skills and positive social networks to (Hilley et al. 2019) to become even more effective in protecting against the negative impact of living in a disadvantaged neighborhood (Woolley and Bowen 2007). In particular, previous research supported that for more disadvantaged students, intervention programs encouraging parents to be involved in school-based activities may be important for promoting academic achievement (Benner et al. 2016). In addition to instill future orientation for their children, parents shall further provide material resources and remove barriers in education to effectively facilitate their academic achievement (Hilley et al. 2019). At the system levels, structural interventions should be implemented by schools to support parents engaging in the academic activities of their children.

Since Black and Hispanic/Latino youth reported lower levels of neighborhood support and safety and higher levels of neighborhood violence, policymakers should make efforts to improve the neighborhood quality for all youth and reduce the inequality of education across school systems, particularly for Black and Hispanic/Latino students who live in disadvantage neighborhoods. Our findings also support the development of culturally relevant interventions that meet the needs of racial/ethnic minority youth (Turcios-Cotto and Milan 2013). For example, interventions that focus on strengthening parental support and family cohesion are likely to help adolescents achieve academic success (Stanard et al. 2010). Likewise, interventions that work to build supportive networks among families, educators, and the community for Black and Hispanic/Latino youth may be especially effective in promoting their future orientation and academic achievement (Goldsmith 2004). For Black adolescents, specifically, enhancing their future orientation could be a unique asset in supporting their adjustment to perceived neighborhood disadvantage and successful transition to school success (Oyserman et al. 2006; Oyserman and Fryberg 2006; Xiao et al. 2018).

Notably, since the sample in this study contained early and middle adolescents, interventions should consider the differences across the developmental stages. In particular, early adolescents still spend most of the time with their parents. They might benefit from interventions targeting increasing parental support. Mitigating the negative effect of perceived neighborhood disadvantage on academic achievement through improving parental support may be more effective in improving their academic achievement. Since older adolescents tend to have greater levels of future orientation than their younger counterpart (Hilley et al. 2019; Steinberg et al. 2009), interventions involving parents, schools, and communities are encouraged to target on adolescents in the early stage to promote future orientation in the long term. Lastly, since the effect sizes identified in the significant paths were moderate to low, there is a need for more research in this area to further substantiate the findings of this study to leap more fine-grained intervention development and policy.

## Conclusion

Despite decades of research documenting the neighborhood effects on adolescent development (Sampson et al. 2002; Leventhal and Brooks-Gunn 2003), the mechanisms linking perceived neighborhood disadvantage and academic achievement are largely unexplored. No studies have comprehensively examined how future orientation might mediate the association between perceived neighborhood disadvantage and academic achievement, whether parental

support moderates the mediating relationship and, most importantly, whether these mediation effects are different across race/ethnicity (Dupere et al. 2012). From a developmental perspective, it is important to better understand how adolescent academic achievement is shaped by neighborhood disadvantage, future orientation, parental support (Steinberg and Morris 2001).

Using multiple group analysis among middle and high school students, this study filled an important gap in the literature and identified racial/ethnic differences in the mediating path of future orientation linking perceived neighborhood disadvantage and academic achievement, as well as the moderating effect of parental support against the negative impact on academic outcomes. Results of the current study highlight future orientation as a unique feature for Black adolescents in explaining their academic achievement. Preventive approaches targeting future orientation may be promising in protecting adolescents against perceived neighborhood disadvantage and academic failure. In particular, culturally relevant intervention programs that simultaneously address the particular socio-cultural dynamics of families, enhance parental support, and increase future orientation might be promising to improve academic achievement among students perceiving their neighborhoods as disadvantaged.

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**Authors' Contributions** Y.X., M.R., and M.A.L. conceived of the initial idea; Y.X. designed the study, undertook out the data analyses, interpreted the data, drafted the initial manuscript, reviewed, and revised the manuscript; M.R. and C.V.-G. contributed to interpreting the data, reviewed and revised the manuscript; M.A.L. contributed to the conceptualizations of the study, interpretation of the data, and revised the manuscript. All authors contributed to and approved the final manuscript.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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## Appendix 1

**Table 4** Sample size and selected characteristics of SSP sample and school population per school in each community

Schools	SSP ( <i>n</i> )	Test-takers at school ( <i>n</i> )	SSP <i>n</i> as % of Test takers at school	% White/Black in SSP sample <sup>b</sup>	% White/Black in test-takers at school <sup>b</sup>	Free lunch in SSP sample	% Free lunch in test-takers
Community 1							
School 1	136	142	0.96	94.1	95.1	–	–
School 2	117	121	0.97	94.9	99.0	–	–
School 3 <sup>a</sup>	210	236	0.89	69.9	70.3	–	–
School 5	722	784	0.92	88.6	93.0	–	–
School 6	73	74	0.99	87.7	94.0	–	–
School 7	477	478	1.00	60.0	65.0	–	–
School 8	595	664	0.90	86.2	93.0	–	–
School 9 <sup>a</sup>	215	282	0.76	75.3	78.4	–	–
School 10 <sup>a</sup>	58	72	0.81	86.2	94.4	–	–
School 12 <sup>a</sup>	351	427	0.82	86.6	92.0	–	–
School 14	537	553	0.97	65.0	69.0	–	–
School 15	74	75	0.99	94.6	94.6	–	–
School 17 <sup>a</sup>	85	86	0.99	85.7	84.0	–	–
Community 2							
School 4	526	604	0.87	35.6	47.6	64.5	72.5
School 11 <sup>a</sup>	257	444	0.58	27.3	40.5	26.3	51.4
School 13	389	486	0.80	66.5	77.0	62.3	71.0
School 16	349	621	0.56	53.6	68.3	75.4	79.0

School population is defined as the students represented in end-of-year state standardized testing reports. The test-taker data were chosen as a reference for school population because it was expected that students were eligible to take standardized tests to most likely to be included in the SSP data collection and can be comparable on test-takers in state databases

SSP sample completed the School Success Profile

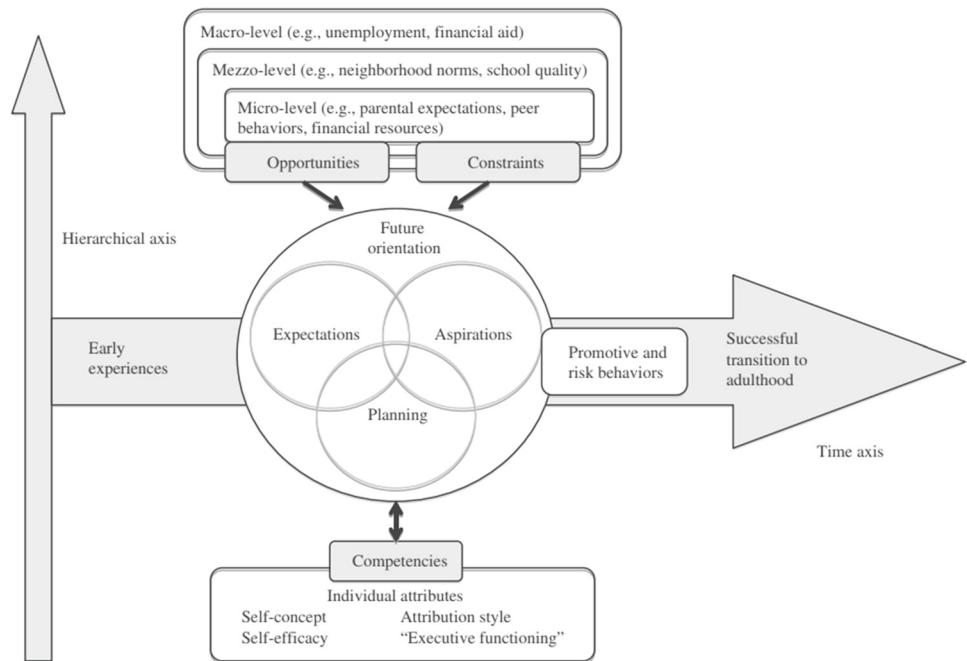
<sup>a</sup>Schools that collected data from 9th graders besides middle school students (i.e., 6th–8th graders)

<sup>b</sup>Community 1 had few Black students, and free lunch data were not obtained from students; information is presented on the percentage of Whites in the sample and the percentage of Whites who took standardized tests at the school in the Spring of 2010. Community 2 had a more racially/ethnically diverse population; information is presented on the percentage of Black students in the sample and among test-takers as well as on the percentages of free/reduced lunch program participants among SSP respondents compared to the test-takers



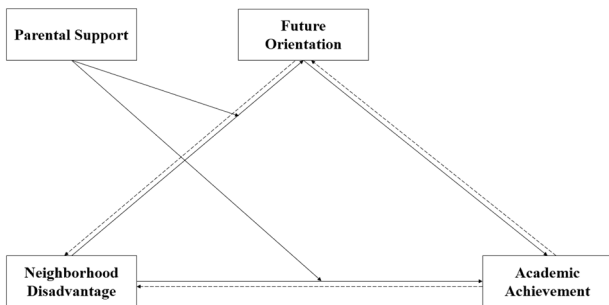
## Appendix 2

**Fig. 4** Conceptual model of future orientation



Note. Adapted from Johnson et al. (2014) and modified from Glass and McAtee (2006).

## Appendix 3



**Fig. 5** Alternative model: bidirectional relationship

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