

The Development of Critical Consciousness and its Relation to Academic Achievement in Adolescents of Color

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Critical consciousness, the process by which individuals come to understand, analyze, and take action against systems of oppression, is associated with several positive youth outcomes. However, little research has considered how the core components of critical consciousness (critical reflection, political agency, critical action) are associated with academic achievement. The present study explored the extent to which the developing critical consciousness of adolescents of color ($N = 364$) over 4 years of high school predicted academic achievement, as measured by grade point average (GPA) and the Scholastic Aptitude Test (SAT). Results demonstrated that adolescents' critical reflection and critical action intercepts predicted SAT scores whereas critical reflection and critical action slopes predicted GPAs. Political agency was not predictive of either academic outcome.

Critical consciousness refers to the processes by which individuals come to understand, analyze, and take action against systems of oppression (Freire, 1970). Rooted in the work of Brazilian philosopher educator Paulo Freire (1970), contemporary models of youth critical consciousness development have conceptualized critical consciousness as consisting of critical reflection, political agency, and critical action (Watts & Flanagan, 2007; Watts, Diemer, & Voight, 2011).

For youth from marginalized racial and economic groups, critical consciousness is associated with a host of positive outcomes including school motivation and engagement (O'Connor, 1997), resilience (Ginwright, 2010), occupational attainment (Rapa, Diemer, & Bañales, 2018), civic activism (Watts, Diemer & Voight, 2011), and voting behavior (Diemer & Li, 2011). In explaining these positive relations, scholars have posited that critical consciousness serves as an "antidote" to oppression by replacing marginalized adolescents' feelings of

isolation and self-blame for challenges they are encountering with a sense of agency and engagement in a broader collective struggle for social justice (Watts, Griffith, & Abdul-Adil, 1999). In so doing, critical consciousness serves as a form of "psychological armor" for youth against the negative effects of oppressive social forces such as racial injustice (Phan, 2010). Accordingly, one might also expect to find a positive relationship between critical consciousness and various measures of academic achievement.

Evidence of such a relationship would be consequential because perhaps the most substantive issue facing the educational system in the United States is the so-called "achievement gap" (or "opportunity gap") between youth from marginalized racial and economic groups and their more privileged peers (Duncan & Murnane, 2011). Such gaps exist between youth from marginalized and privileged groups in many other countries as well (Carnoy & Rothstein, 2013). For this reason, there is great value in exploring whether critical consciousness significantly predicts the academic achievement of marginalized youth, and, even more importantly, whether the development of critical consciousness predicts growth in such youths' academic

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achievement. If such a relationship exists, programming fostering youth critical consciousness may have a useful role to play in narrowing pernicious racial and economic achievement gaps in the United States and elsewhere.

As described in the following section, a handful of studies have suggested a relation between youth critical consciousness and academic achievement (e.g. Cabrera, Milem, Jacquette, & Marx, 2014; Dee & Penner, 2017; O'Connor, 1997); however, relatively few studies have explored this topic, and none that we are aware of have done so longitudinally over adolescents' high school years. Accordingly, this study sought to investigate potential associations between youth critical consciousness and academic achievement over the course of high school in a sample of adolescents of color from predominantly low-SES families ($n = 364$) attending secondary schools explicitly committed to fostering youth civic development.

Critical Consciousness

Paulo Freire (1970) is the key source for contemporary scholarship on critical consciousness. In his work as a literacy teacher with migrant laborers in Brazil, Freire realized that the adult workers in his literacy program were motivated to learn to read in order to understand and challenge the social forces impacting their social status and opportunities. Freire concluded that a primary goal of education should be to engage students in learning to decode and challenge their social conditions, and he coined the term *conscientização*, or critical consciousness, to refer to this combination of reflection and action by oppressed groups upon the world in order to transform it. He came to believe critical consciousness should be the ultimate purpose of education for oppressed peoples.

Building on Freire's (1970) foundational work, Watts et al. (2011) conceptualized critical consciousness as consisting of three distinct yet overlapping components: (a) critical reflection; (b) political agency (or political self-efficacy); and (c) critical action. *Critical reflection* refers to the ability to name and analyze forces of inequality. It includes both recognition of interpersonal forms of oppression such as stereotypes, biases, and discrimination as well as the ability to analyze the root causes of oppression as situated in structural and institutional forces. *Political agency* is the internal belief that one has the capacity to effect social change (Diemer, Rapa, Voight, & McWhirter, 2016). Political agency

serves as the bridge between an individual's understanding of oppressive social forces (critical reflection) and a willingness and desire to act (critical action). Finally, *critical action* refers to an individual's actual engagement in events and activities intended to challenge these oppressive forces and structures, and the unequal conditions they perpetuate. This action can take a wide range of forms and can be individual or collective (Watts & Hipolito-Delgado, 2015). Given that adolescents often do not possess the autonomy to determine their involvement in critical action activities, civic action was measured, in part, in the present study through participating adolescents' commitment to present and future social and political activism (Corning & Myers, 2002). Importantly, research has indicated that expressing a high commitment to activism in adolescence correlates with greater involvement in such activist roles in adulthood (Stryker, 2000).

The combination of the various components of critical consciousness was what Freire (1970) referred to as *praxis*. That is, although each component of critical consciousness has its own distinct meaning and purpose, they are theorized to mutually reinforce one another (Diemer et al., 2016). Drawing on Freire's work on critical consciousness and praxis, Watts and Flanagan (2007) proposed a conceptual model of youth sociopolitical development that features a bi-directional relationship between critical reflection and critical action. In other words, growth in adolescents' ability to engage in social analysis of oppressive social forces leads to growth in their commitment to social action challenging these forces, and vice-versa. A handful of empirical studies offer support for this proposed reciprocal relationship between critical reflection and critical action (e.g., Diemer, Rapa, Park, & Perry, 2017; Hope & Jagers, 2014).

Additional theoretical and empirical scholarship supports a key perspective underlying Watts and Flanagan's (2007) conceptual model that critical consciousness generally increases during adolescence. First, adolescence has been theorized to be a critical period for the development of the critical reflection and critical action capacities that comprise critical consciousness, as adolescents are actively seeking out new and different ways of understanding the world and their role in it (Erikson, 1968). For youth from marginalized racial and economic groups, such exploration includes recognizing the effects of sociopolitical forces such as racism, prejudice, and oppression upon their lives and communities (Garcia Coll et al., 1996). Moreover, young people's growing cognitive abilities between early

and late adolescence increase their ability to analyze these sociopolitical forces (Flanagan, 2013; Hughes & Bigler, 2011).

Finally, it should be noted that the adolescents in this study attended secondary schools with explicit goals around fostering students' civic development. Consequently, these adolescents were likely to have engaged in pedagogical practices such as community service learning and classroom discussions of controversial issues that have been found to foster adolescents' commitment to critical action (e.g., Campbell, 2008). For all of these reasons, the extant research literature suggested that the youth in this study might demonstrate growth in their critical consciousness over their 4 years of high school. However, there was less evidence in the extant literature about whether the development of adolescents' critical consciousness would be predictive of their academic achievement.

Critical Consciousness and Academic Achievement

As noted earlier, youth critical consciousness has been found to be predictive of a number of positive outcomes, but few studies have considered the relationship between critical consciousness and academic achievement. In a seminal study in this area, O'Connor (1997) reported that six high achieving, low-income African American adolescents characterized their recognition of racial and economic injustice as a motivational factor contributing to their academic achievement. This study challenged the dominant perspective in the extant research literature (e.g., Ogbu, 2003) that recognition of such systemic injustice predicted disengagement and hopelessness in youth from racially and economically marginalized groups.

Also relevant to the present investigation, Diemer (2009) and Diemer et al. (2010) have reported on adolescents' academic achievement as a predictor of critical consciousness. Specifically, Diemer (2009) reported in a study of low-income adolescents of color ($n = 1,052$) from a nationally representative sample that self-reported academic grades in 10th grade significantly predicted adolescents' 10th-grade scores—but not their 12th-grade scores—on a composite of survey items assessing participants' critical consciousness or sociopolitical development. However, in a study involving low-income adolescents ($n = 2,627$) drawn from a different nationally representative sample of American high school students, Diemer et al., (2010) found that

10th grade academic achievement (as measured by math and reading standardized test scores) was a significant negative predictor of participating African American and Latin American students' sociopolitical development in 10th grade, but not 12th grade. In short, these studies yielded mixed results about academic achievement as a predictor of critical consciousness for youth from marginalized racial and economic groups.

Ethnic Studies Programs and Youth Participatory Action Research

Scholarship investigating the effects of interventions aimed at fostering youth critical consciousness also offer insight into the relations between youth critical consciousness and academic achievement. Two of the most prevalent forms of such interventions are ethnic studies program and youth participatory action research (YPAR). Ethnic studies curricula and programs often focus on the lived experiences and cultures of particular ethnic or racial groups as a way to offer students more relevant and engaging curriculum rather than primarily focusing on traditional Euro-American curricular perspectives. Such courses tend to focus on learning about diversity, interacting with different identity groups, and coming to understand the effects of discrimination and racism (Sleeter, 2011).

In a review of ethnic studies literature and research, Sleeter (2011) described associations between ethnic studies programs and higher academic engagement, enhanced literacy skills, more positive attitudes toward learning, a higher sense of agency, and higher academic achievement. In one prominent study of an ethnic studies curriculum, Cabrera et al. (2014) investigated the impact of the Mexican American Studies (MAS) program on participating students' academic achievement during its tenure in Arizona schools from 2008 to 2011. The goal of the class, specifically developed from a Freirean perspective, was to help critically engage students in a non-Eurocentric curriculum that would teach them to become engaged citizens dedicated to challenging systemic oppression (Cabrera et al., 2014). Examining four cohorts of participants, Cabrera et al. (2014) found that participation in the MAS course was associated with increased graduation rates as well as an increased rate of passing school exit examinations. Similarly, Dee and Penner (2017) described the implementation of an ethnic studies pilot program in San Francisco for high school youth at-risk of dropping out. The course focused on issues of social justice, discrimination,

stereotypes, and social movements, and particularly asked students to focus on their own identities and service projects in their communities. They found that participation in the program led to a 1.4-point increase in students' grade point averages (GPAs), with gains particularly large for male participants.

Similarly, courses and programming based in a YPAR approach (Kirshner, 2015; Kornbluh, Ozer, Allen, & Kirshner, 2015) have also been associated with higher academic achievement for youth of color. In general, YPAR engages marginalized youth in identifying a social problem in their community, collecting and analyzing data related to this social problem, and engaging in social action that makes use of these data to address the problem (Kornbluh et al., 2015). In one study of a YPAR approach, Kirshner (2015) found that students participating in a YPAR course experience reported higher testing gains on state standardized tests than those students not participating in the course. Other scholars have reported that YPAR serves as a key route for youth who experience marginalization to develop academically as well as socio-politically (Kornbluh et al., 2015). In short, there is a small but promising set of research studies that suggest efforts to foster youth critical consciousness can have a positive effect upon adolescents' academic achievement.

Critical Race Consciousness

Given the relatively small number of research studies investigating the relations between critical consciousness and academic achievement, there is also value in considering the extant literature in related areas such as Carter's (2008) work on critical race consciousness. Building upon O'Connor's (1997) work and similarly challenging dominant perspectives on race and schooling (e.g., Ogbu, 2003), Carter (2008) described critical race consciousness in youth of color as consisting of both a positive racial identity as well as an awareness of forms of structural racism and discrimination against their racial group.

In a study involving African American adolescents from a Midwestern city, Carter (2008) found that such critical race consciousness can motivate students of color to adopt a "prove them wrong" attitude about schooling that ultimately results in greater academic persistence and achievement (p. 13). Carter (2008) referred to this process as the development of an "achievement as resistance" orientation wherein students of color come to see

achieving in school as a mechanism for challenging discriminatory biases against their racial identity group. While by no means identical to Freire's (1970) work on critical consciousness, Carter's (2008) characterization of critical race consciousness as including an awareness of forms of structural racism and racial discrimination overlaps substantively with Freire's conception of critical reflection, and her description of achievement-as-resistance positions young people's academic achievement as a form of critical action.

A few other studies offer evidence of the relation Carter (2008) identified between awareness of racism and academic achievement (e.g., Sanders, 1997) while other researchers have found the relation between awareness of racism and academic achievement to be a more complex one. For example, in a study of low-income African American and Latinx adolescents in Detroit, Michigan, Altschul, Oyserman, and Bybee (2006) found a significant relation between adolescents' awareness of racism and academic achievement, but only during the first year of high school. Likewise, Chavous et al. (2003) reported that, in a sample of 600 African American adolescents from a Midwestern state, high awareness of racism had a protective effect upon African American adolescents' academic achievement when paired with high racial centrality and racial pride, but led to alienation and poor academic outcomes when paired with weaker racial centrality and pride. In citing this extant research, we do not suggest that awareness of racism is analogous to Freire's (1970) concept of critical reflection; however, this work by Carter and others does point to the potential of a relation between marginalized youths' academic achievement and their understanding of the roots and consequences of oppressive social forces such as racism.

Stereotype Threat

Another related, but distinct, concept from critical consciousness is stereotype threat. Stereotype threat is the concept that the cognitive load induced by activated awareness of a pernicious stereotype regarding one's identity group can hamper an individual's performance (Steele, 2011). For example, Steele and Aronson (1995) found that Black males completing a verbal-ability test consistently performed worse than their White peers when the test was said to measure intellectual ability. As part of this study, Steele and Aronson (1995) also demonstrated that priming activation of racial stereotypes

in Black students was enough to depress these students' test performance even when the test was not specifically framed as a measure of intellectual ability.

Given such research, the work on stereotype threat is potentially at odds with work on critical consciousness in that it suggests high awareness of racism and discrimination may suppress students' academic performance. In fact, Steele (2011) argued that educators, parents, and scholars should err on the side of underpreparing students for interpersonal and systemic forms of racism rather than overpreparing them, else they may continually fall prey to stereotype threat. Yet, the extant research also reports that children of color as young as 6 years old in the United States demonstrate an awareness of stereotypes regarding their own racial group (Bigler, Averhart, & Liben, 2003), and that awareness of racism increases as youth progress through adolescence (Seider et al., 2019). Consequently, youth of color in the United States are likely to develop an awareness of racism regardless of the efforts of their parents and educators.

Given that a growing awareness of racism is part of normative development (Garcia Coll et al, 1996), other scholars have investigated interventions for actively disrupting stereotype threat (e.g., Pennington, Heim, Levy, & Larkin, 2016; Taylor & Walton, 2011). A number of these studies have found that encouraging adolescents to either access an alternative, non-stereotyped identity or affirm their identity in order to restore a positive self-image can help mitigate the impact of stereotype threat (Croizet, Désert, Dutrévis, & Leyens, 2001; Taylor & Walton, 2011). In fact, Croizet et al. (2001) noted the "reduction of the self-relevance of the stereotype. . . should decrease the stereotype threat, and, therefore, reduce its negative consequence on performance" (p. 202).

Accordingly, another potential mechanism for disrupting stereotype threat in youth of color is to engage such youth in critical reflection upon the roots and consequences of racism and stereotypes. In other words, by helping students move from a basic awareness of racism to a deeper understanding of its causes and consequences, efforts to foster youth critical consciousness can highlight for youth of color that pernicious stereotypes about their racial group are inaccurate and unfounded and, in so doing, reduce their self-relevance and effects on student performance. In this way, youth critical consciousness holds the potential to serve as "psychological armor" against the pernicious effects of stereotype threat (Phan, 2010).

The Present Study

A growing body of scholarship supports a connection between critical consciousness and academic achievement, but little research has considered the relation between the key components of critical consciousness (i.e., critical reflection, political agency, and critical action) and adolescents' academic outcomes, and, moreover, how these relations might manifest longitudinally. Accordingly, the present study explored the connection between adolescents' critical consciousness and their GPA and Scholastic Aptitude Test (SAT) scores over the course of their 4 years of high school. Two broad research questions were pursued:

1. To what extent does the critical consciousness of adolescents of color at the start of high school predict their academic achievement 4 years later, as measured by GPA and SAT scores?
2. To what extent does growth in the critical consciousness of adolescents of color over their 4 years of high school predict their academic achievement, as measured by GPA and SAT scores?

Given a growing body of research that has found critical consciousness to be predictive of a number of positive youth outcomes, we hypothesized that adolescents' critical consciousness at the start of high school would significantly predict both their GPA and SAT scores. However, given the paucity of extant research regarding developmental trends in adolescents' critical consciousness, we did not hypothesize regarding whether adolescents' growth in critical consciousness would predict their academic achievement on these same measures, and our analyses remained exploratory.

Method

This study drew upon data collected as part of a larger mixed-methods investigation of the development of adolescents' critical consciousness of racial and economic injustice (Seider et al., 2016, 2017, 2018).

Participants

The study's participants included 364 students who entered the ninth grade in four public charter high schools located in four northeastern cities in

the fall of 2013 and who were members of their respective Class of 2017 cohorts. Of this sample, 210 students (58%) identified as Black or African American, 76 students (21%) identified as Latinx, 60 students (17%) identified as Multi-Racial, 15 students (4%) identified as "Other", 1 student (0.28%) identified as Asian, and 2 students (1%) did not identify. In addition, almost 80% of the participating adolescents qualified for free or reduced-price lunch, a common proxy for low socioeconomic status.

Participating Schools

The study's participating adolescents ($n = 364$) were drawn from four charter public high schools located in four cities across the Northeastern United States. Purposeful sampling was utilized to identify schools who served adolescents from racially and economically marginalized groups, and whose mission statements included a commitment to fostering their students' civic development. More information about each of these schools is presented in Table 1. Pseudonyms are used for all participating schools.

Student Data

Participating ninth-grade students completed surveys at the beginning of their ninth grade year of high school (September 2013). Prior to their participation, a letter was sent home to students and parents describing the research study and offering parents and students the opportunity to opt out.

No parents or students explicitly opted out, although a small handful of students (< 10) left their surveys blank or partially blank. Students at the four participating schools then completed the same survey again at the conclusion of ninth grade (May 2014), 10th grade (May 2015), 11th grade (May 2016), and 12th grade (May 2017).

In September 2017, after students had completed their 12th-grade year and moved on to college or professional opportunities, students and their parents received an additional letter describing the present study and allowing them the opportunity to opt out of their anonymized GPA ($n = 199$) and SAT scores ($n = 135$) being shared with the study's authors. No students at any of the participating schools (or their parents) opted out of participating in the study, and these academic scores were then matched to students' survey results.

Overall, the study included 364 students across the four high schools. The extent of missing data was evaluated for each time point separately. Of the entire sample ($n = 364$), a total of $n = 235$ students had survey data from the initial survey (T1); those with missing data did have data for at least one of the remaining survey time points. The number of students with survey data were $n = 235$, $n = 220$, $n = 211$, and $n = 203$ for time points T2 through T5, respectively. Thus, the amount of missing data ranged from 35% to 44% across the five time points under consideration. As described in the following sections, the amount of missing data was taken into consideration when choosing an appropriate estimation method and when interpreting the results.

Table 1
Descriptions of Participating Schools (J = 4)

School	Urban context	Students of color	F/R lunch	Mission, philosophy, or core values
Community Academy	Large northeastern city	99%	75%	Philosophy: Develop in students the knowledge, skills, and commitment to envision a better world and work toward achieving it.
Make the Road Academy	Midsized industrial city	100%	76%	Mission: To offer students an education that strengthens our community by equipping them to address educational and social inequities.
Espiritu High School	Midsized industrial city	91%	78%	Mission: Community involvement and improvement are central goals at Espiritu Academy. . .Students engage in deep learning and reflection about their own experiences and relationships with others in our community.
Leadership High School	Large northeastern city	100%	81%	Mission: To educate socially responsible students for a life of active and engaged citizenship.

Measures

When this study commenced in September 2013, there existed no psychologically validated measures of critical consciousness. Consequently, the authors of the present study identified eight previously validated psychological measures that corresponded with the three key dimensions of critical consciousness: critical reflection, political agency, and critical action. Given that the larger mixed methods investigation was focused on youth critical consciousness of racial and economic injustice, several of these identified measures focused specifically on these forms of injustice. As described in greater detail in the following section, these identified measures were then combined in order to create composite measures of critical reflection, political agency, and critical action. Students responded to all of the items comprising these measures along a 5-point Likert scale wherein "1" represented *No Way! or Not like me at all* and "5" represented *Definitely! or Very much like me*. Mean scores of each construct at each time point were calculated and used in the study's analyses, as described in the following section.

Since this study commenced in 2013, four separate measures of critical consciousness have been developed and validated (Diemer et al., 2017; McWhirter & McWhirter, 2016; Shin, Ezeofor, & Goodrich, 2016; Thomas et al., 2014). Perhaps the best known of these scales is the Critical Consciousness Scale (Diemer et al., 2017) that consists of three sub-scales measuring two dimensions of critical reflection (perceived inequality, egalitarianism) and one dimension of critical action (sociopolitical participation). Another of these scales, the Measure of Adolescent Critical Consciousness (McWhirter & McWhirter, 2016) has perhaps the most in common with the measures utilized in the present study in that this 10-item Likert-style scale was developed to assess Latinx adolescents' critical consciousness of racial injustice and includes sub-scales for critical agency and critical action (but not critical reflection). In contrast, the Contemporary Critical Consciousness Measure (Shin et al., 2016) is a 19-item Likert-style scale that focuses specifically on critical reflection with three sub-scales assessing adolescents' (and adults') critical consciousness of racism, classism, and heterosexism.

Had these scales existed in 2013 when the present study commenced, we would have utilized several of the sub-scales from these measures to assess participating students' critical reflection, political agency, and critical action with regard to

issues of racial and economic injustice. However, in their absence, we describe in the following section the three measures of critical reflection, two measures of political agency, and two measures of critical action that were combined to form composites of these various dimensions of critical consciousness. Confirmatory factor analyses were conducted prior to combining our critical reflection, agency, and critical action measures for this study. Although not presented here for parsimony, preliminary results supported one-factor models, providing additional support for the combination of the measures into the three scales presented here.

Critical Reflection Measures

In line with Watts et al.'s (2011) critical consciousness framework, adolescents' observed scores on three of the study measures (Awareness of Interpersonal Racism, Awareness of Structural Racism, and Beliefs about the Structural Causes of Poverty) were averaged in order to create an overall "Critical Reflection" score for each student. The merged "Critical Reflection" measure's Cronbach's alpha ranged $\alpha = .63-.74$.

The *Awareness of Interpersonal Racism* measure is a five item sub-measure from Oyserman, Gant and Ager's (1995) Racial-Ethnic Identity Scale that assesses an individual's recognition of the presence of interpersonal racism in the various communities of which he or she is a part. The measure asks youth to identify their racial identity and then solicits their level of agreement with statements into which they 'insert' that racial identity. For example, one item reads: "Some people will treat me differently because I am _____."

The *Awareness of Structural Racism* measure consists of four items adapted from Gurin, Nagda and Zuniga's (2013) Structural Thinking about Racial Inequality Scale and assesses the extent to which an individual recognizes the systemic factors underlying racial inequality. For example, one item solicits youths' level of agreement to the following statement: "Racism in the educational system limits the success of Blacks, Latinos and other racial minorities."

The *Beliefs about the Causes of Poverty* measure consisted of five items adapted from the Poverty in America Survey (NPR-Kaiser-Harvard, 2001) that assesses the extent to which an individual conceptualizes poverty as caused by individual or structural factors. A score of "1" on this scale is correlated with attributing inequality to more

individualist causes while a score of “5” on this scale is correlated with attributing inequality to more systemic or structural causes. For example, one item from this measure reads: “A shortage of jobs is a major cause of poverty.”

Political Agency Measures

In line with Watts et al.’s (2011) model, adolescents’ observed scores on two of the study measures (Youth Sociopolitical Control and Youth Social Responsibility) were averaged in order to create an overall “Political Agency” score for each student. The merged “Political Agency” measure’s Cronbach’s alpha ranged $\alpha = .77-.86$.

The *Youth Sociopolitical Control* measure is a six-item measure adapted from Peterson, Peterson, Agre, Christens, and Morton’s (2011) scale of the same name that assesses adolescents’ feelings of efficacy within social and political systems. An example item includes, “Youth like me have the ability to participate effectively in community or school activities and decision making.”

The *Youth Social Responsibility* measure (short version) is an eight-item measure developed by Pancer, Pratt, Hunsberger, and Alisat (2007) that assesses adolescents’ commitment to striving for the benefit of society. An example item includes, “Young people have an important role to play in making the world a better place.”

Critical Action Measures

Again, drawing upon Watts et al.’s (2011) model, two measures (Commitment to Activism and Achievement as Resistance) were averaged to create an overall “Critical Action” score for each adolescent. The merged “Critical Action” measure’s Cronbach’s alpha ranged $\alpha = .76-.83$.

The *Commitment to Activism* measure is a nine-item measure adapted from Corning and Myers’s (2002) Activism Orientation Scale that assesses adolescents’ commitment to engaging in collective social action to challenge injustice. Questions include those such as “How likely is it now or in the future that you will take part in a protest, march, or demonstration?”

The *Achievement as Resistance* measure is a four-item sub-measure of Oyserman et al.’s (1995) Racial-Ethnic Identity Scale (Embedded Achievement) that assesses the extent to which people of color are motivated to attain personal success as a mechanism for countering hegemonic notions that achievement is a White property. An example item

includes, “If I am successful, it will help the (student’s racial group) community.”

Academic Achievement Data

Two academic achievement outcome variables were included in the present study: high school GPA and the SAT, a standardized test assessing reading and math abilities. Students’ SAT scores included their total reading and math SAT scores on a 1600-point scale, reported for the fall 2016 testing session ($n = 135$). Many scholars have argued that the SAT is an important measure of student achievement because it offers a “common yardstick for assessing academic ability, in contrast to high school grades, which are viewed as a less reliable indicator owing to differences in grading standards across high schools” (Geiser & Santelices, 2007, p. 4). Yet, standardized test scores have also been found to be highly correlated with youths’ socioeconomic backgrounds and to demonstrate biases against youth from marginalized racial and economic groups (Geiser & Santelices, 2007).

Grade point average data represented adolescents’ cumulative GPA at the end of their 4 years of high school. GPA was reported on a 4.0 scale for 199 youth across the four participating schools. In contrast to the SAT, GPA is highly correlated with multiple intellectual skills and “non-cognitive” factors associated with academic success including perseverance or grit (Duckworth, Peterson, Matthews, & Kelly, 2007) and curiosity (Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008). Other studies have found that high school GPA is a better predictor of success in college—both in terms of GPA and graduation rates—than standardized test scores (Geiser & Santelices, 2007). Notably, although, Noble and Sawyer (2004) demonstrated that standardized test scores are better at predicting higher GPAs in college (those over 3.75) given, they argued, that higher level classes rely mainly on cognitive strengths.

Data Analysis

For the present study, a series of latent growth models (LGMs) were fit in order to explore the study’s research questions. In LGMs, repeated averaged observed scores are used as indicators of latent factor variables. One of these factors (the intercept) represents the initial level of any growth construct of interest. The other factor (the slope) represents how much change can be expected in the growth construct after a unit change in time

(Preacher, 2010). Although both the intercept and slope factors are unobserved variables, this technique assumes that the factor intercepts and slopes are responsible for changes witnessed in individuals' averaged observed scores on the growth construct of interest. LGMs can also function as part of larger path models, wherein individuals' baseline scores (the intercept) as well as their growth in a construct (slope) can predict later endogenous outcomes (Preacher, 2010).

All statistical analyses were conducted using Stata 15.0 (StataCorp, 2017). As previously noted, averaged observed scores were used in the models for purposes of ease as well as comprehensibility to the widest audience. In accordance with suggestions from Preacher (2010) and Grimm, Ram, and Estabrook's (2016), RMSEA less than .10 and .05, and TLI values above .90 and .95, were considered consistent with acceptable and good model fit, respectively. Given the presence of missing data in the data set used here (Little, 2013), full information maximum likelihood estimation was used for all analyses, using the maximum likelihood with missing values estimation in Stata (StataCorp, 2017). This method allowed for the inclusion of all cases with data for at least one variable in the model. Thus, cases were included in the models despite having missing values on either the critical consciousness variables included in that particular model or the outcome (i.e. SAT or GPA); if cases had missing data for all variables in the model, they were excluded from the analyses.

In order to assess whether baseline levels or growth in each of the study constructs (critical reflection, political agency, and critical action) were associated with students' total GPA scores, we fit linear LGMs to each construct's averaged observed scores (i.e., at all five time points); and factor means, variances, and correlations were estimated.

Table 2
Summary Statistics for Critical Reflection, Political Agency, and Critical Action

	T1	T2	T3	T4	T5
<i>n</i>	235	235	220	211	203
Crit. Reflection	3.24 (0.53)	3.23 (0.55)	3.51 (0.51)	3.62 (0.55)	3.81 (0.56)
Pol. Agency	3.88 (0.45)	3.97 (0.61)	4.11 (0.56)	4.10 (0.54)	4.20 (0.55)
Crit. Action	3.35 (0.61)	3.34 (0.66)	3.44 (0.63)	3.46 (0.69)	3.58 (0.62)

Note. Standard deviations in parentheses.

For these models, students' total GPA scores were regressed on to each of the baseline intercepts and growth factors. Based on the pattern of means observed in students' scores, linear LGMs were expected to fit the data well (see Table 2). Although demographic variables were available, they were not included in the models due to the study's relatively small sample size.

Second, the same models were run in order to investigate associations between baseline levels or growth in each study construct and youths' fall 2016 SAT scores. Again, linear LGMs were fit for each construct's averaged observed scores (i.e., for each time point). For the analyses with the SAT scores, only growth over the first four time points were modeled so as not to include survey scores collected after the fall 2016 SAT testing date. For each LGM factor means, variances, and correlations were estimated. For these models, youths' total fall 2016 SAT scores were regressed on to each of the constructs' baseline intercepts and growth factors. Linear LGMs were again expected to fit the data well based on the pattern of mean observed scores.

For each of the models described earlier, we followed Westland's (2010) calculations to ensure adequate statistical power was reached for these models. For Models 1-3 (see Figure 1-3), wherein there were five time points as observed indicators and 2 latent variables, the *r*-ratio was 2.5. At 0.80 statistical power, a minimum sample size of $N = 288$ would be needed to detect a medium effect (i.e. standardized effect size estimate of .25 or higher), and a minimum sample size of $N = 947$ would be required to detect a small effect (i.e. standardized effect size of 0.10 or greater). For Models 4-6 (see Figure 4-6), there were only four time points included as observed indicators and again 2 latent variables, yielding an *r*-ratio of 2. For these models, at 0.80 power, a minimum sample size of $N = 400$ would be needed to detect a medium effect, and a minimum sample size of $N = 947$ would again be required to detect a small effect. These calculations suggest that the models and sample size for this study ($N = 364$) were sufficiently powered to detect medium effect sizes, but perhaps were underpowered for detecting smaller effect sizes.

Results

The descriptive statistics for adolescents' mean scores on the critical reflection, political agency, and critical action measures are presented in Table 2.

These statistics reveal that adolescents in the sample demonstrated positive mean changes, on average, on all of the critical consciousness measures included in the study across their 4 years of high school. In the following section, we report on the LGMs that investigated growth on the three key dimensions of critical consciousness and their relation with two dimensions of academic achievement. As described in the following section, we found that participating adolescents' growth in critical

reflection and critical action over 4 years of high school significantly predicted their GPA (see Figures 1 and 3), and that these adolescents' baseline critical reflection and critical action scores at the start of high school significantly predicted their 12th grade SAT scores (see Figures 4 and 6). Finally, neither adolescents' baseline political agency scores nor their growth in political agency over the course of high school were predictive of either academic outcome (see Figures 2 and 5).

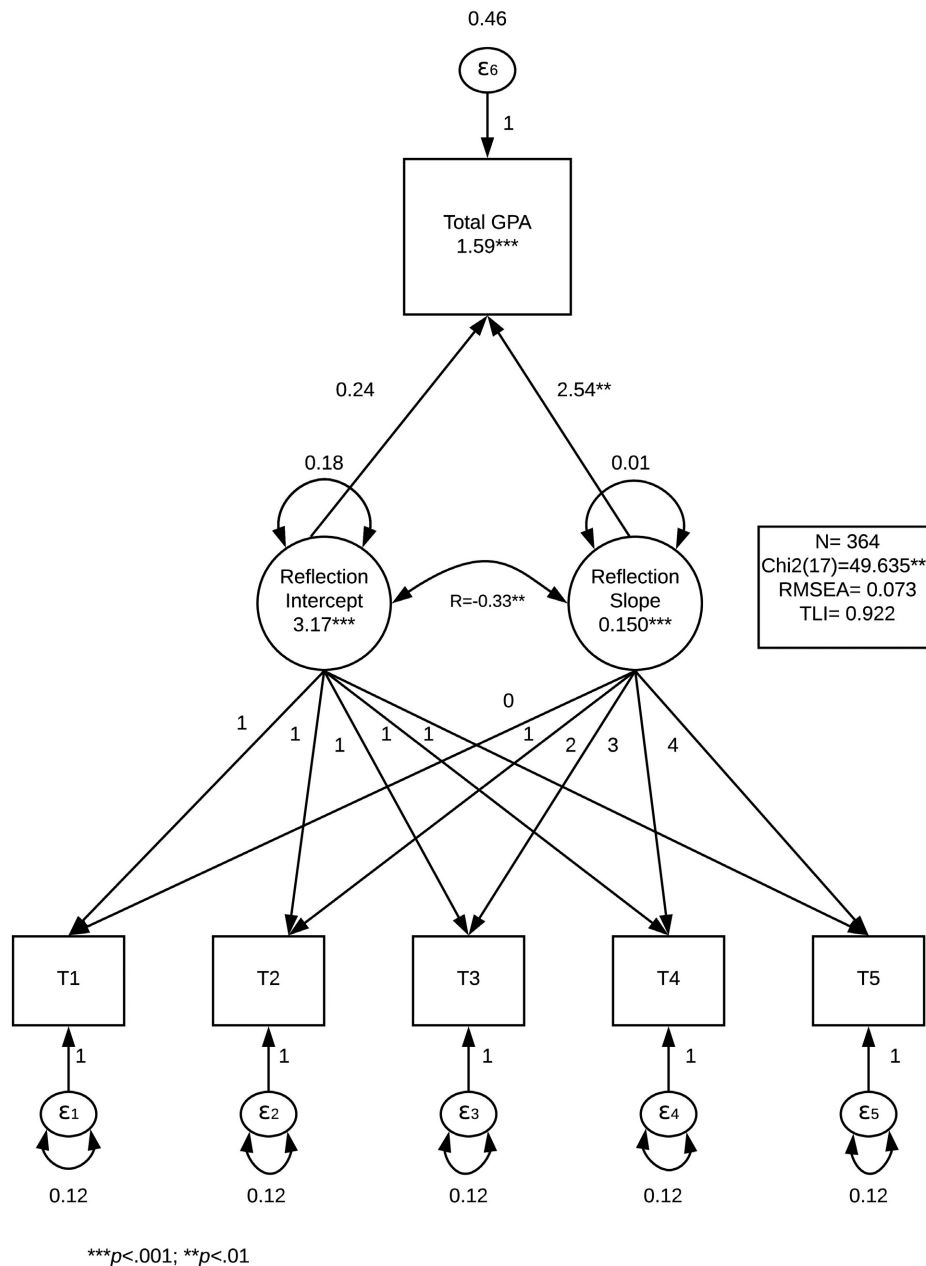


Figure 1. Total GPA regressed on critical reflection intercept and slope. GPA, grade point averages.

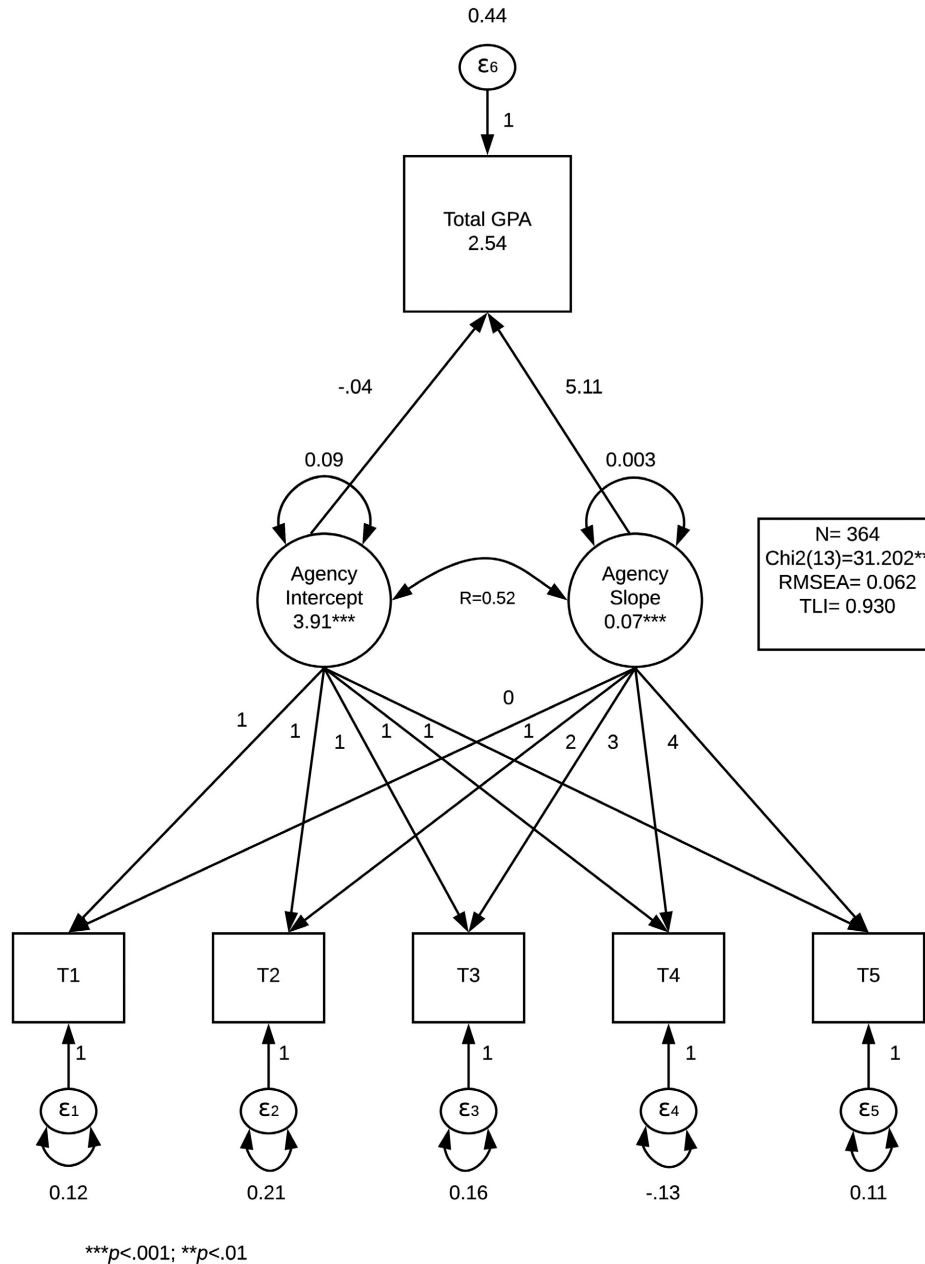
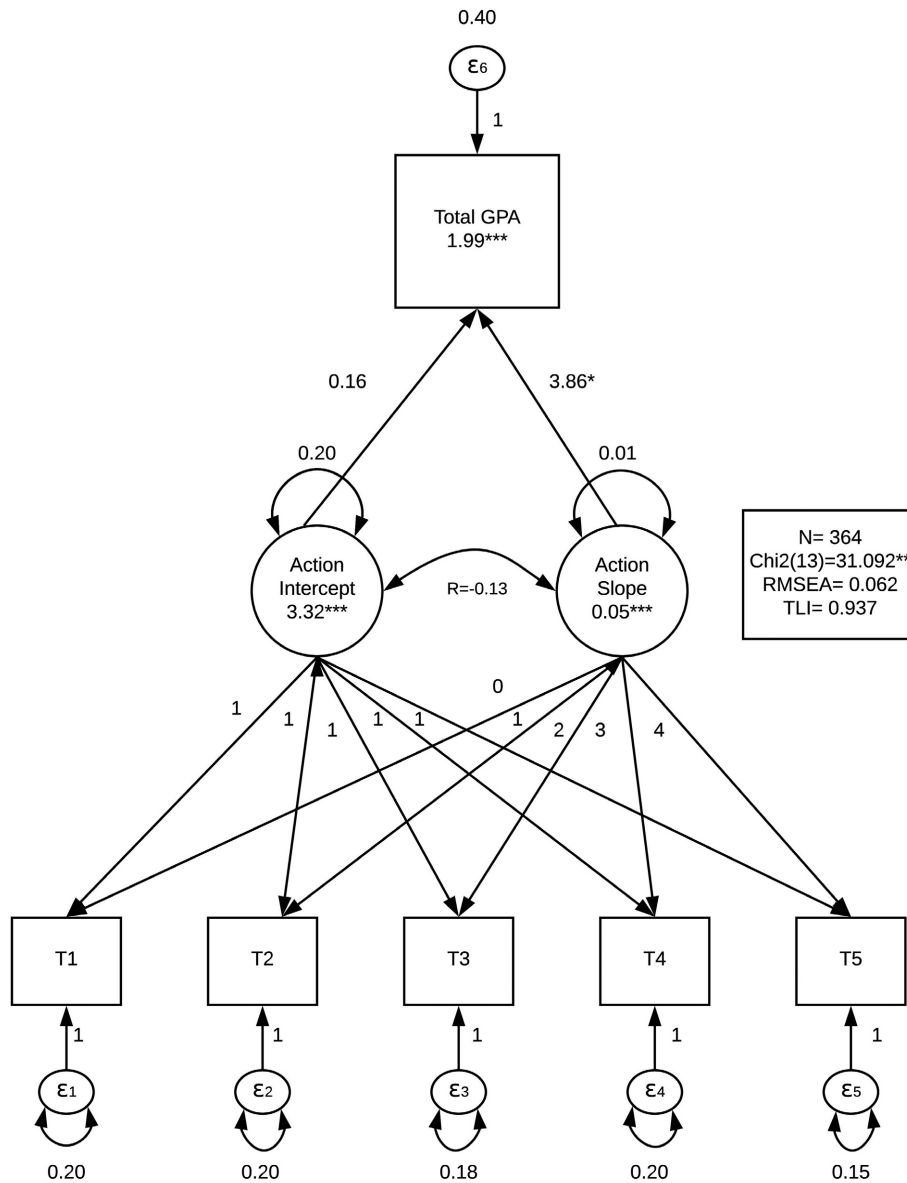


Figure 2. Total GPA regressed on political agency intercept and slope. GPA, grade point averages.

Model 1: Critical Reflection and GPA

A linear growth model demonstrated acceptable fit with the data ($n = 364$; $\chi^2(17) = 49.635$, $p < .001$; $TLI = 0.922$; $RMSEA = 0.073$ [90% CI = 0.050, 0.097]). Adolescents demonstrated an average increase in critical reflection between their ninth and 12th-grade years of high school. On average, these young people began high school with an average critical reflection score of 3.17 ($p < .001$) and, with each year of schooling, their scores increased by 0.15 points ($p < .001$). Based on the

variance in the model, we would expect 95% of adolescents to begin the year with an intercept between 2.337 and 3.995, with growth rates ranging from -0.058 to 0.354 . Adolescents' critical reflection intercept did not significantly predict their total average GPA ($p = .102$); however, growth in adolescents' critical reflection abilities was significantly associated with their total GPA, with a one unit increase in adolescents' critical reflection growth rate associated with a 2.54-point increase in their total GPA ($p = .002$). Given the metric of the growth rate, it may be helpful to interpret this as a 0.1



*** $p < .001$; ** $p < .01$; * $p < .05$

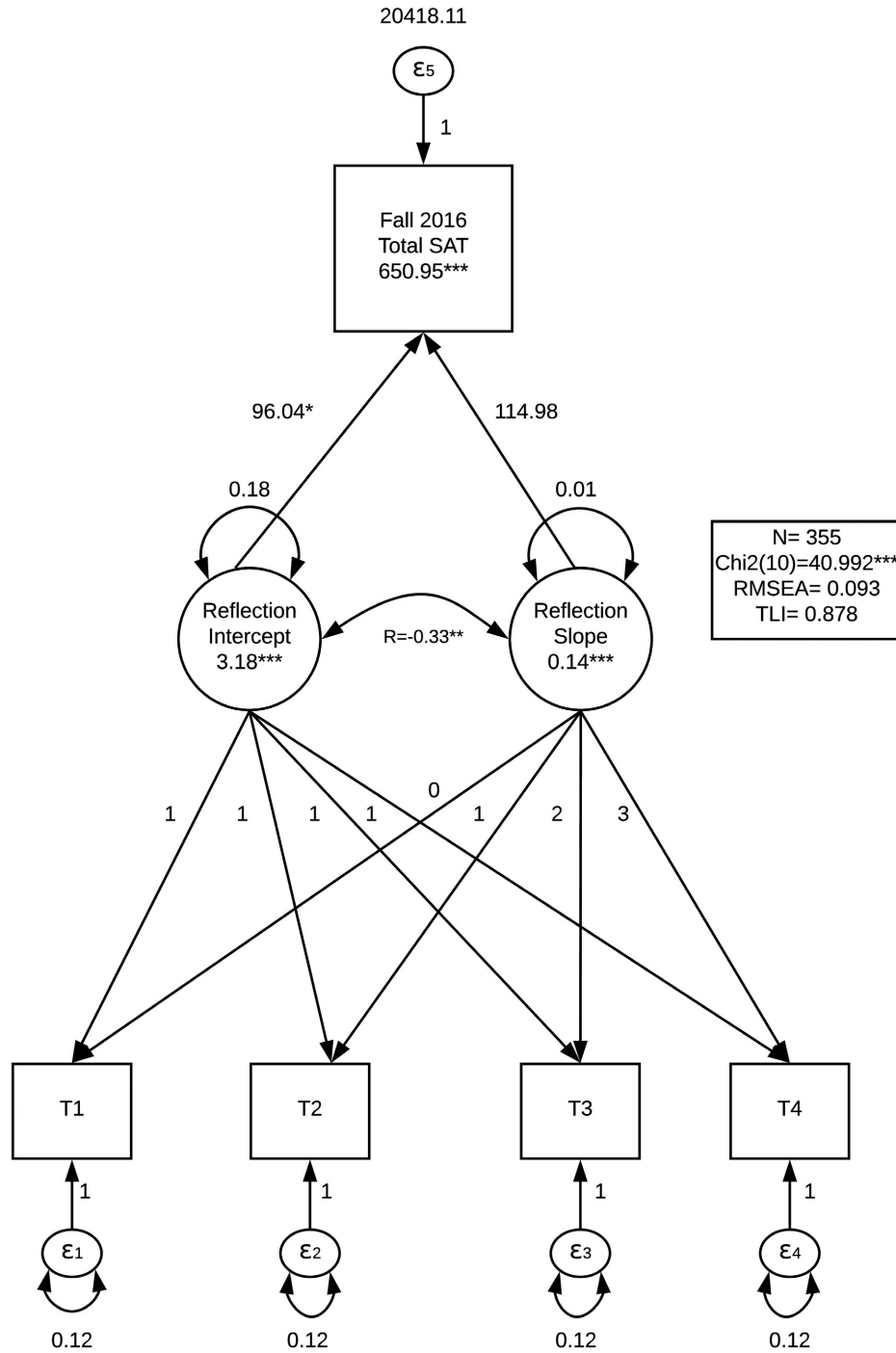
Figure 3. Total GPA regressed on critical action intercept and slope. GPA, grade point averages.

unit increase in adolescents' critical reflection growth rate being associated with a 0.254-point increase in total GPA. Finally, the standardized coefficient for the significant prediction of GPA from slopes was 0.373, well above the 0.25 threshold needed to detect a significant effect with at least 0.80 power.

Model 2: Political Agency and GPA

A linear growth model demonstrated acceptable fit with the data ($n = 364$; $\chi^2(13) = 31.202$,

$p < .01$; $TLI = 0.930$; $RMSEA = 0.062$ [90% CI = 0.034, 0.090]). Adolescents demonstrated an increase in political agency between their ninth and 12th-grade years of high school. On average, adolescents began high school with a political agency score of 3.91 ($p < .001$) and, with each year of schooling, their scores increased by 0.067 points ($p < .001$). Based on the variance in the model, we would expect 95% of adolescents to begin the year with an intercept between 3.316 and 4.504, with growth rates ranging from -0.105 to 0.111 . Yet,



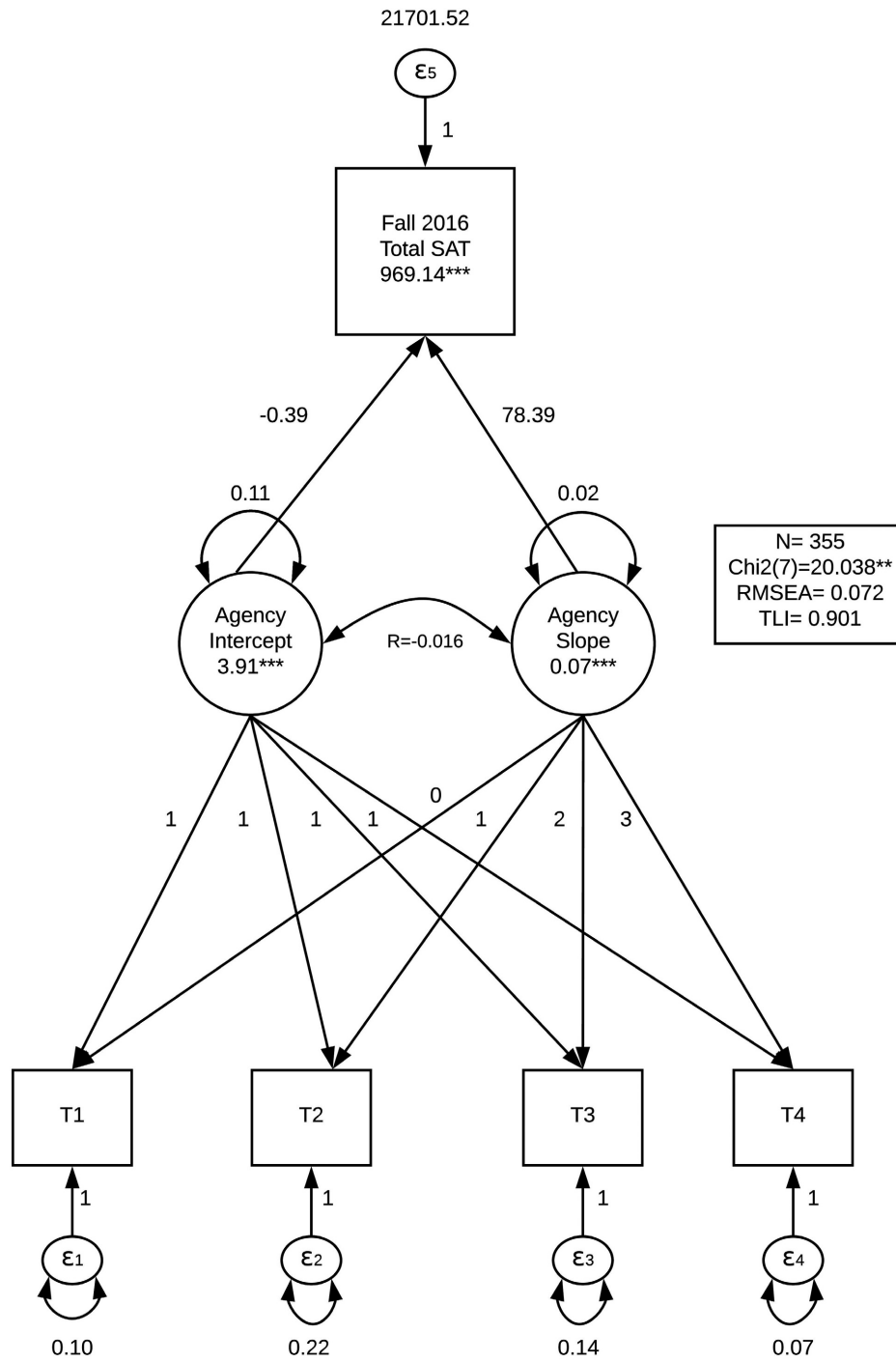
*** $p < .001$; ** $p < .01$; * $p < .05$

Figure 4. Fall 2016 SATs regressed on critical reflection intercept and slope. SATs, Scholastic Aptitude Tests.

neither adolescents' political agency intercept ($p = .971$) nor their political agency growth rate ($p = .489$) were significantly associated with their total GPA.

Model 3: Critical Action and GPA

A linear growth model demonstrated acceptable fit with the data ($n = 364$; $\chi^2(13) = 31.092$,

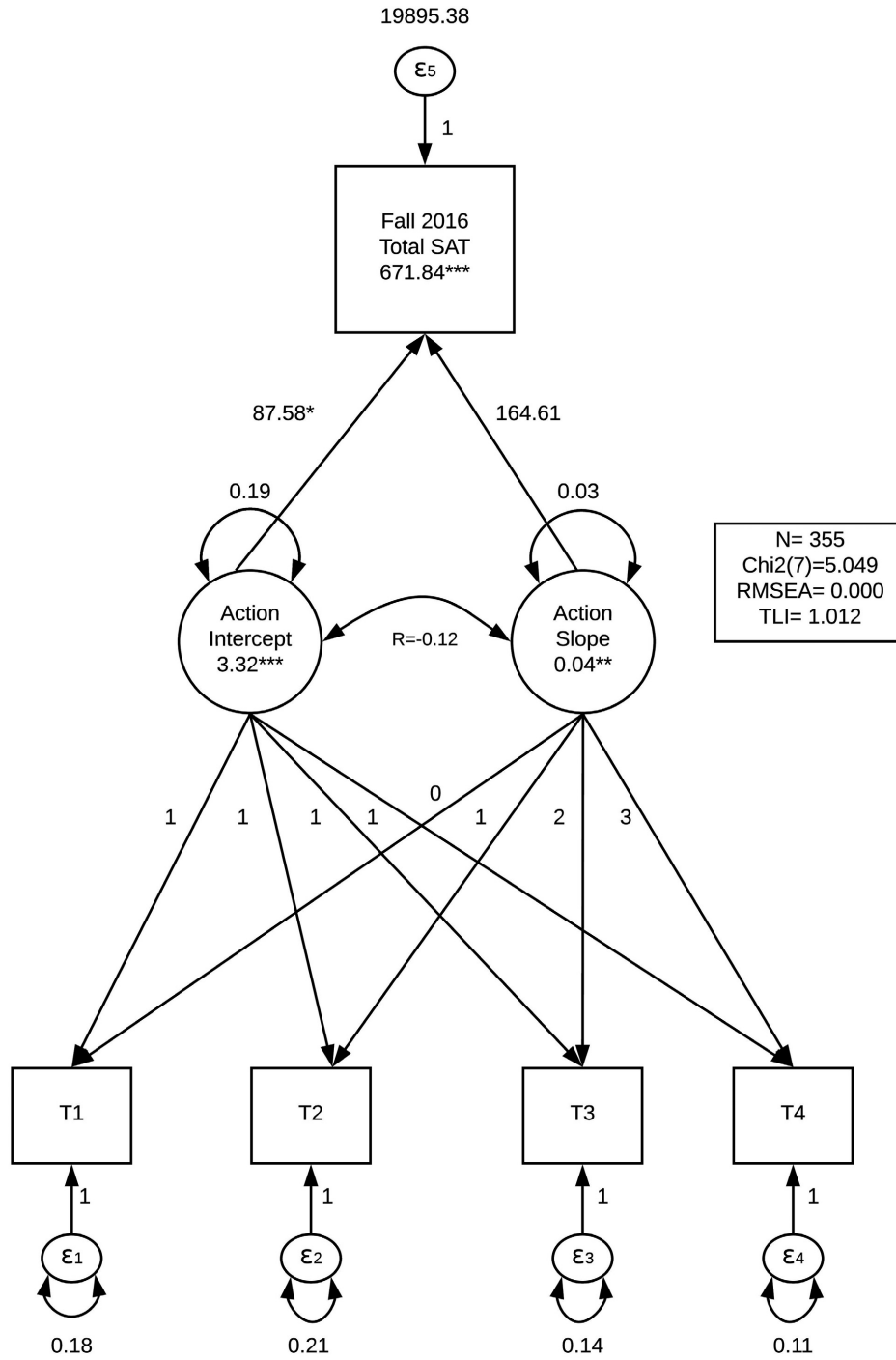


*** $p < .001$; ** $p < .01$

Figure 5. Fall 2016 SATs regressed on political agency intercept and slope. SATs, Scholastic Aptitude Tests.

$p = .003$; TLI = 0.937; RMSEA = 0.062 [90% CI = 0.034, 0.090]. Adolescents demonstrated an average increase in critical action between their ninth and 12th-grade years of high school. On

average, these young people began high school with an average critical action score of 3.315 ($p < .001$) and, with each year of schooling, their scores increased by 0.049 points ($p < .001$). Based



*** $p < .001$; ** $p < .01$; * $p < .05$

Figure 6. Fall 2016 SATs regressed on critical action intercept and slope. SATs, Scholastic Aptitude Tests.

on the variance in the model, we would expect 95% of adolescents to begin the year with an intercept between 2.440 and 4.190, with growth rates ranging from -0.131 to 0.230 . Adolescents' critical action

intercept did not significantly predict their total average GPA ($p = .379$); however, their critical action growth rate did significantly affect GPA ($p = .021$), with a one unit change in their critical

action slope associated with a 3.863 point increase in total GPA. This could also be interpreted as a 0.1 unit increase in adolescents' critical action growth rate being associated with a 0.386-point increase in total GPA. Finally, the standardized coefficient for the significant prediction of GPA from slopes was 0.490, which was above the 0.25 threshold needed to detect a significant effect with at least 0.80 power.

Model 4: Critical Reflection and SATs

A linear LGM demonstrated borderline fit with the data, with the RMSEA indicating acceptable fit, but the TLI falling below the cutoff for acceptable fit ($n = 355$; $\chi^2(10) = 40.992$, $p < .001$; TLI = 0.878; RMSEA = 0.093 [90% CI = 0.065, 0.124]). Adolescents demonstrated an increase in critical reflection between their ninth and 12th-grade years of high school. On average, these young people began high school with an average critical reflection score of 3.18 ($p < .001$) and, with each year of schooling, their scores increased by 0.14 points ($p < .001$). Based on the variance in the model, we would expect 95% of adolescents to begin the year with an intercept between 2.34 and 4.00, with growth rates ranging from -0.10 to 0.38. Adolescents' critical reflection intercept was found to significantly predict their fall 2016 total SAT score. That is, every unit increase in adolescents' critical reflection score at baseline was associated with a 96.04 point increase in their SAT scores ($p = .014$), suggesting that youth who began high school with higher critical reflection abilities scored higher on their fall 2016 SATs. The standardized coefficient this relationship 0.279, which above the 0.25 threshold needed to detect a significant effect with at least 0.80 power. However, adolescents' critical reflection growth rate was not significantly associated with their total SAT score ($p = .517$). Given the overall fit of the model, these results should be interpreted with caution.

Model 5: Political Agency and SATs

A linear growth model demonstrated acceptable fit with the data ($n = 355$; $\chi^2(7) = 20.048$, $p = .006$; TLI = 0.901; RMSEA = 0.072 [90% CI = 0.036, 0.111]). Adolescents demonstrated an increase in political agency between their ninth and 12th-grade years of high school. On average, these young people began high school with a political agency score of 3.905 ($p < .001$) and, with each year of schooling, their scores increased by 0.066 points ($p < .001$).

Based on the variance in the model, we would expect 95% of adolescents to begin the year with an intercept between 3.265 and 4.547, with growth rates ranging from -0.182 to 0.314. Yet, neither adolescents' political agency intercept ($p = .995$) nor their political agency growth rate ($p = .675$) were significantly associated with their fall 2016 SAT scores.

Model 6: Critical Action and SATs

A linear growth model demonstrated very good fit with the data ($n = 355$; $\chi^2(7) = 5.049$, $p = .654$; TLI = 1.012; RMSEA = 0.000 [90% CI = 0.000, 0.053]). Adolescents demonstrated an increase in critical action between their ninth and 12th-grade years of high school. On average, these young people began high school with an average critical action score of 3.322 ($p < .001$) and, with each year of schooling, their scores increased by 0.040 points ($p = .016$). Based on the variance in the model, we would expect 95% of adolescents to begin the year with an intercept between 2.467 and 4.177, with growth rates ranging from -0.282 to 0.363. Furthermore, adolescents' critical action intercept was found to significantly predict their fall 2016 total SAT score; that is, every unit increase in youths' critical action intercept was associated with an 87.576 point increase in their SAT scores ($p = .034$), again indicating that young people who began high school with higher critical action scores were also likely to score higher on their fall 2016 SATs. The standardized coefficient was 0.259, which was above the 0.25 threshold needed to detect a significant effect with at least 0.80 power. However, adolescents' critical action growth rate was not significantly associated with their total SAT score ($p = .176$).

Discussion

The present study investigated whether critical consciousness at the start of high school for a sample of adolescents of color, and their growth in critical consciousness over 4 years of high school, were associated with academic achievement outcomes, as measured by GPA and the SAT. In so doing, the present study sought to contribute to a small body of research that has pointed to critical race consciousness as a motivator of academic achievement for Black youth (Carter, 2008; O'Connor, 1997), ethnic studies coursework as contributing to gains in academic achievement for youth of color (Cabrera

et al., 2014; Dee & Penner, 2017), and mixed results about the relationship between academic achievement and sociopolitical development for youth of color and low-income youth in secondary analyses of several national data sets (Diemer, 2009; Diemer et al., 2010).

In the present study, we found that participating adolescents' baseline critical reflection and critical action scores at the start of high school significantly predicted their 12th-grade SAT scores, but not their total GPA. Conversely, adolescents' growth in critical reflection and critical action over 4 years of high school significantly predicted their total GPA, but not their SAT scores. Finally, neither adolescents' baseline political agency scores nor their growth in political agency over the course of high school were predictive of either academic outcome. Next, we consider each of these key findings in turn.

Critical Consciousness Development in Adolescence

First, it was notable that this study's adolescents ($n = 364$) demonstrated significant growth, on average, in their critical reflection, critical action, and political agency scores over 4 years of high school. These findings align with theoretical work that positions adolescence as an important period for the development of critical reflection capacities (e.g., Erikson, 1968), and, in particular, for youth from marginalized racial groups (e.g., Garcia Coll et al., 1996; Watts & Flanagan, 2007). These findings also align with empirical work that has found adolescents' growth in cognitive skills between early and late adolescence facilitates their ability to reflect critically upon sociopolitical forces (e.g., Hughes & Bigler, 2011; Flanagan, 2013).

Additionally, because adolescents in the present study were drawn from four secondary schools with explicit goals for promoting youth civic development, these findings align as well with extant research that has found school-based civic programming and practices can foster youths' feelings of political agency (e.g., Beaumont, 2010) and commitment to critical action (e.g., Campbell, 2008). Specifically, the adolescents in the present study attended secondary schools that featured a number of research-based practices for fostering youth civic development including controversial conversations of political issues (Hess & Posselt, 2002), community service learning (Seider et al., 2012), and opportunities to engage in collective social action with trusted adult mentors (Youniss & Levine, 2009). In short, though not the central focus of this study's research questions, our analyses offer useful

support for extant scholarship on the development of critical consciousness in youth from marginalized racial and economic groups between early and late adolescence as well as the role that school-based civic programming can play in such development.

Critical Consciousness and the SATs

Regarding this study's first research question, our analyses found that adolescents who began high school with higher baseline critical reflection and critical action scores subsequently earned significantly higher scores on the SAT 3 years later in their final year of high school. Specifically, along a 5-point scale, a one unit-change in adolescents' baseline critical reflection intercept was associated with a 96.04 point increase in their 12th-grade SAT scores ($p = .014$), and a one-unit increase in adolescents' baseline critical action intercept was associated with a 87.58 point increase in their 12th-grade SAT scores ($p < .034$).

Given that critical reflection and critical action represent key dimensions of critical consciousness, one possible—albeit speculative—explanation for such results was that adolescents who demonstrated higher levels of critical consciousness at the beginning of high school were less apt to be negatively impacted by stereotype threat as they completed the SATs and other forms of standardized testing. As described in the Introduction, a substantial body of research (e.g., Steele, 2011; Steele & Aronson, 1995) has demonstrated that the performance on standardized tests of individuals from racially marginalized groups can be hampered by their fear of inadvertently confirming stereotypes about the intellectual inferiority of their group. As for why students higher in critical consciousness might be less impacted by stereotype threat, extant research reveals that adolescents of color are generally highly aware of pernicious societal stereotypes regarding their academic ability (Altschul et al., 2006). However, adolescents with high critical reflection scores possess a deeper understanding than their peers of how such stereotypes emerge from systems of oppression rather than a valid assessment of their academic potential or that of other members of their racial group. Likewise, adolescents who demonstrate a high commitment to critical action recognize that oppressive forces such as racism at the root of racial stereotypes are neither fixed nor static, but can be resisted, challenged, and changed. In short, then, adolescents of color who demonstrate high critical reflection and critical action scores are more likely to recognize the

baselessness of racial stereotypes both because they recognize the systemic forces underlying those stereotypes and because they regard those systemic forces themselves as malleable in the face of sociopolitical activism.

Although an individual need not believe in the veracity of a stereotype in order to suffer the deleterious effects of stereotype threat (Steele, 2011), possessing a deep understanding of how systemic oppression contributes to the development of stereotypes—and that systemic oppression itself can be challenged and changed—could lessen the relevance of pernicious stereotypes for adolescents (Croizet et al., 2001), and thereby reduce their susceptibility to stereotype threat. In this way, critical consciousness would serve, as scholars have posited, as a form of “psychological armor” against the negative effects of oppression (Phan, 2010). A growing body of research has investigated both mediators of stereotype threat (Pennington et al., 2016) and interventions that can disrupt stereotype threat (Taylor & Walton, 2011), and future research might investigate the role of youth critical consciousness in these processes as well.

In considering other explanations for the relations between youth critical consciousness and SATs, one might also speculate that adolescents who demonstrated high levels of critical consciousness at the start of high school were also the students who began high school with the highest cognitive sophistication and abstract thinking skills. These same thinking skills may also have served these students well 3 years later on a test of cognition such as the SAT (Geiser & Santelices, 2007). In short, future research would do well to investigate potential causal explanations for the association between youths’ ninth grade critical consciousness scores and subsequent performance on the SAT.

Critical Consciousness and GPA

Regarding this study’s second research question, our analyses found that growth in adolescents’ critical reflection and critical action scores positively and significantly predicted a higher total GPA at the end of high school. Specifically, along a 5-point scale, a 0.1 unit change in adolescents’ critical reflection growth rate was significantly associated with a 0.254 point increase in their total high school GPA ($p = .002$). Likewise, a 0.1 unit change in adolescents’ critical action growth rate was significantly associated with a 0.386 point increase in their total high school GPA ($p < .021$).

Carter’s (2008) work on critical race consciousness offers one possible—although again speculative—explanation for these relations between adolescents’ GPA and growth in critical consciousness. Recall from the Introduction that Carter (2008) defines critical race consciousness as an understanding of the asymmetrical power relationships that exist between White people and people of color in the United States. In her work, Carter found that youth of color with high critical race consciousness can adopt an “achievement as resistance” orientation in which they come to see academic achievement as a mechanism for challenging prejudice and biases against their racial group. In this way, Carter’s work aligns with both the critical reflection and critical action dimensions of critical consciousness. Namely, the ability to recognize asymmetrical power relationships between privileged and marginalized racial groups draws on the social analysis skills associated with critical reflection while committing to academic achievement as a form of resistance represents an individualized form of critical action. For these reasons, it seems possible that students in the present study who demonstrated the greatest growth in their critical reflection and critical action scores over the course of high school were also the students most likely to have developed a critical race consciousness and “achievement-as-resistance” orientation that motivated them to work toward higher levels of academic achievement.

In short, then, we propose distinct explanations for the significant associations between, on one hand, key dimensions of participating adolescents’ baseline critical consciousness and their SAT scores, and, on the other hand, growth in adolescents’ critical consciousness and their GPA. Namely, we speculate that adolescents’ critical consciousness can disrupt the harmful effects of stereotype threat on the performance of youth of color on standardized tests such as the SAT, and, additionally, result in youth of color adopting an achievement-as-resistance orientation that motivates increased academic persistence and achievement over the course of high school. Given extant scholarship that has found youths’ GPA and SAT scores to be associated with different qualities (e.g., Duckworth et al., 2007) and outcomes (e.g., Noble & Sawyer, 2004), these distinct explanations for the present findings are by no means at odds with the extant research literature. Importantly, however, the present study was not designed to identify causal mechanisms for the relations between adolescents’ critical consciousness and academic achievement, and so future research is necessary to investigate both stereotype

threat-disruption *and* an achievement-as-resistance orientation as potential causal mechanisms for the present findings.

Political Agency and Academic Achievement

Finally, it was notable that neither participating adolescents' baseline political agency scores nor their growth rate on this measure significantly predicted either their GPA or SAT scores. Previous scholarship has found political agency to be one of the strongest predictors of political participation, political interest, and paying attention to current events (e.g., Beaumont, 2010). Other scholars have reported that related constructs such as sociopolitical control have been found to be predictive of positive outcomes such as mental health in youth of color (Zimmerman, Ramirez-Valles, & Maton, 1999) and avoidance of negative behaviors such as drug and alcohol abuse (Peterson et al., 2011). While researchers have found that an individual's educational level is a positive predictor of their feelings of political agency (e.g., Verba, Schlozman, & Brady, 1995), we are not aware of extant research that has explored relations between adolescents' political agency and academic achievement.

In this study, then, adolescents' critical reflection and critical action scores predicted their subsequent academic outcomes in ways that their political agency scores did not. Perhaps this difference points to political agency playing a different role within the development of youth critical consciousness than the other two constructs. While some contemporary models of critical consciousness have theorized all three constructs—critical reflection, critical action, and political agency—to be distinct, yet interrelated parts of a cycle of development (e.g., Diemer et al., 2016; Watts et al., 2011), other models have positioned critical reflection and critical action as the central components of critical consciousness development, with political agency moderating the relations between the two (e.g., Watts & Flanagan, 2007). Given that the present study offers some very preliminary evidence of political agency playing a different role within critical consciousness development than critical reflection or critical action, future research could seek to clarify the distinct roles of all three constructs in critical consciousness development.

Limitations

This study had several limitations. First, an optimal modeling strategy for this study would have

been multilevel latent growth modeling in order to account for the nesting of students within schools (Little, 2013). However, given that youth in the present study were only drawn from four different schools, such a modeling strategy was not practicable. In addition, the goodness-of-fit statistics for Model 4 did not fully meet the criterion set forth by Preacher (2010) and Grimm et al. (2016), given that the model's TLI fell below a $> .90$ cutoff value. We considered adding paths to the model based on the modification indices, which indicate how much the model χ^2 will be reduced if one freely estimates an additional parameter in the model, resulting in better model fit (Acock, 2013). However, none of the model's suggested modification indices were theoretically justifiable (Acock, 2013); as a result, the model fit is acceptable based on its RMSEA values, but it appears the model is not able to reproduce the observed data as well as the other Models under investigation. As such, we recommend that the results be interpreted with caution. All of the study's other models achieved "acceptable" model fit based on RMSEA and TLI cutoff values, rather than "good" model fit (Grimm et al., 2016). Although the study's sample size might have contributed to such values, the results should still be interpreted with these considerations in mind (Grimm et al., 2016; Preacher, 2010).

A related methodological limitation, given the sample size, is the possibility that the analyses were slightly underpowered for detecting small to medium effects. The sample size for this study ($N = 364$) was sufficiently large for detecting at least medium effects at 0.80 power. All of the significant results for the prediction of GPA or SAT outcomes from intercepts or slopes were above the medium effect threshold, indicating that these significant results were found with a good deal of power. However, it is possible that the study was slightly underpowered, particularly for detecting smaller effects. In this case, we *may* have failed to detect a significant relationship due to a lack of power; alternatively, the lack of a significant relationship could reflect a true lack of relationship in the population. Thus, we recommend that future researchers replicate this study with larger sample sizes to avoid this limitation.

Third, as noted in the Method section, this study commenced in 2013 prior to the development and validation of four different critical consciousness scales, and, thus, relied on combining a number of existing measures to form composite measures of critical reflection, political agency, and critical action. Forming these composites allowed the

authors to focus specifically on investigating adolescents' critical reflection about racial and economic injustice, and also to include achievement-as-resistance as a form of critical action in which adolescents of color are well-positioned to engage. Utilizing such particular measures of critical reflection and action have both strengths and limitations. One key strength is that the specificity of these measures avoids Godfrey and Burson's (2018) admonition against critical consciousness scales that invoke "broad generalities, assessing awareness, for example, of 'oppression' of 'social groups' and generalized 'inequality.'" (p. 25). That said, even the present study merges adolescents' consciousness of two different forms of injustice (e.g., racial, economic) into a single composite when such consciousness may be more domain-specific. Relatedly, the present study's composite measures were comprised of scales not explicitly developed to assess youth critical consciousness. Accordingly, there would be great value in replicating and corroborating this study's findings with one or more of the newly developed critical consciousness scales.

Fourth, also noted in the Method section was the considerable amount of missing data in the sample used for the present study. In addition to attrition over the course of the study, which is common in longitudinal studies (Little, 2013), there is also a practical explanation for the missing data in this study, particularly for the outcome variables. Namely, to protect the confidentiality of participating adolescents during data collection, these young people did not share their names in completing the critical consciousness survey during each year of high school. Instead, adolescents were asked to share several pieces of information that were then used to match their surveys each year: gender, first three letters of their mother's first name, and the day of the month in which they were born. This was an imperfect process for matching youths' surveys from year to year due to a number of factors including youths' misunderstanding of one or more of these questions, writing illegibly, answering mischievously, and having demographic information that coincidentally overlapped with that of other students.

Additionally, another challenge arose in seeking to match our critical consciousness survey data to the academic achievement data held by the participating schools because the schools did not necessarily have their students' achievement data in databases that included each of these same identifying variables (gender, mother's first name, and birthday). For that matter, participating schools often

kept records of students' SAT scores in databases separate from their GPA and demographic information, which contributed to a greater challenge in matching students' critical consciousness scores to their SAT scores. For all of these reasons, there is a considerable amount of missing data in this study's data set that was likely due to the challenge of effectively matching adolescents' confidential surveys at each time point as well as to their academic achievement data. That said, it is also possible there may be other mechanisms driving the presence or missingness of these data.

Although we selected an estimator that could accommodate missing data and would include all cases despite the presence of missing values, the extent and underlying causes of the missing data could impact the generalizability of the results found here. However, independent t-tests revealed that students who only completed the first survey time point ($n = 66$) did not significantly differ on any of the study measures from students who completed additional survey time points. A related limitation of the data is that, due to a relatively small overall sample size, we did not include demographic controls in the study models. The sample size for specific groups was too small to draw generalizable inferences regarding differences across groups. For all of these reasons, we encourage researchers to replicate this study with larger sample sizes so that differences across demographic groups can be examined.

An additional data-related limitation is that the Cronbach's alpha (i.e., internal consistency reliability) for the Critical Reflection measure at some time points was slightly lower than the commonly used threshold of 0.70 for acceptable reliability (DeVellis, 2012). A possible explanation for the lower reliability on this measure is the weak inter-item correlation between two of the measures that comprised this composite: Awareness of Structural Causes of Racism and Beliefs about the Structural Causes of Poverty (see Appendix S1). Moreover, other studies have found a weak relationship between these two measures as well (Seider et al., 2019). Perhaps, then, future research efforts should be wary of merging participants' critical reflection scores on these two different social issues into a single composite, or of forming such composites via unidimensional confirmatory factor analysis in which items are forced to load onto a single latent construct. Such caution may be particularly warranted given that low reliability on a key study measure can result in (a) an attenuation of the observed correlations among Critical Reflection scores at the five time points,

which could have implications for model fit; (b) increase the difficulty of detecting statistical significance in analyses involving the Critical Reflection measure; and (c) affect results in which the Critical Reflection measure is included. However, it should also be noted that the lowest reliability value for Critical Reflection scores was 0.63, only slightly under the 0.70 threshold. For this reason, we feel the unreliability in scores is not so low as to substantially impact the results of this study.

Finally, it is important to note that this study draws on a sample of adolescents of color from (predominantly) low-income families living in northeastern cities and attending charter public high schools with explicit goals for youth civic development. On one hand, our sample served as a key strength of the study, given the need for increased scholarship examining the relation between critical consciousness and academic achievement specifically with adolescents of color from low-income households. In so doing, our sample also seemed to align with Godfrey and Burson's (2018) recent call for developmental scholarship on critical consciousness that demonstrates sensitivity to intersectional perspectives by examining the critical consciousness of youth facing "particular systems of oppression and particular intersections of these systems" (p. 29). However, these findings may not generalize to adolescents from other geographic, racial, and economic groups, or possibly even to adolescents attending traditional, district secondary schools. For example, while the adolescents in the present study were all admitted to their respective charter high schools via randomized registration lotteries, it is possible that these young people's enrollment in these lotteries indicates that they came from families with relatively higher education-related social capital than others in their same communities. However, the fact that all four of these schools featured long waiting lists for admission suggests that many families within these youths' communities possessed equivalent social capital to seek out such schooling options for their children. Nonetheless, there would be great value in replicating these findings with adolescents attending traditional district high schools as well as from other geographic, racial, and economic groups.

Conclusion

The present study added to existing theoretical and empirical scholarship on the important role of critical consciousness in the positive development

of youth of color by offering evidence of a relation between academic achievement and critical consciousness in a sample of adolescents of color over their 4 years of high school. The study's longitudinal design—and multiple measures of both academic achievement and critical consciousness—also offered valuable insights into how growth in particular dimensions of adolescents' critical consciousness over the course of high school can and cannot contribute to their academic achievement. Accordingly, these results—although unquestionably preliminary—have important implications for both scholars and educators.

For scholars, as noted in the Discussion, there remains much work to be done in investigating causal mechanisms underlying these relations between critical consciousness and academic achievement. In the present study, we have speculated that the positive, significant relation between adolescents' baseline critical consciousness and 12th-grade SAT scores may be due to critical consciousness buffering youth against the negative effects of stereotype threat. Likewise, we have speculated that the positive significant relation between adolescents' critical consciousness growth rates and cumulative GPA may be due to youths' critical consciousness resulting in an achievement-as-resistance orientation that, in turn, contributes to greater academic persistence and achievement. These and other potential causal mechanisms warrant further research and investigation.

For educators, the present study offers additional support for the role of youth critical consciousness in contributing to the flourishing of youth of color. As described in the Introduction, researchers have found that youth critical consciousness is predictive of a variety of positive outcomes in youth from marginalized racial and economic groups including resilience (Ginwright, 2010), professional aspirations (Rapa et al., 2018), and civic and political engagement (Diemer & Li, 2011; Watts et al., 2011). We believe the present study offers some of the most robust evidence to date that academic achievement can be added to this list of positive outcomes. In so doing, the present study points to programming fostering youth critical consciousness as a potential mechanism for narrowing racial and economic opportunity gaps in the United States and elsewhere (e.g., Cabrera et al., 2014; Dee & Penner, 2017). Given evidence that programming such as ethnic studies coursework and YPAR can contribute to both youth critical consciousness and academic achievement, educators would do well to consider incorporating such programming into their work to

prepare youth to survive and thrive in societies such as the United States where racial injustice and inequity remain pernicious and persistent.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's website:

Appendix S1. Measure Correlations