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Trajectories of Discrimination across the College Years: Associations with Academic, Psychological, and Physical Adjustment Outcomes

Juan Del Toro[1] · Diane Hughes[2]

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Abstract

Despite growing evidence that racial-ethnic discrimination has a critical impact on college students of color, there is a shortage of longitudinal studies investigating such discrimination across the course of students' college careers. The present study examined trajectories of professor- and peer-perpetrated ethnic-racial discrimination across the first three years in college and the correlations between these trajectories and academic, psychological, and physical adjustment outcomes during students' fourth year in a sample of 770 Black, 835 Asian American, and 742 Latino college students (total $n = 2347$; 60.1% female) at elite colleges and universities in the United States. Latent growth modeling revealed stability in reported peer discrimination over the first three years of college and an increase in reported discrimination from professors. Discrimination from peers and professors equally predicted unfavorable grades, a lower likelihood of on-time graduation, and less school satisfaction. Perceived discrimination from peers (but not from professors) during students' first year predicted higher rates of depressive symptoms and more health problems in their fourth year. Although initial levels and trajectories of discrimination varied as a function of students' ethnicity-race, the correlates between discrimination and adjustment outcomes did not vary between ethnic-racial groups. The present findings suggest that ethnic-racial discrimination is a complex, ecologically-based stressor that presents a constellation of challenges for students of color attending elite colleges and universities.

Keywords Ethnic-racial discrimination · Academic achievement · Health · College

Introduction

Recent media coverage has highlighted the presence of unsettling ethnic-racial tensions and challenging racial climates on college campuses across the United States (Hartocollis and Bidgood 2015). For example, in the fall of 2018 alone, racial slurs were found on blackboards at Vanderbilt University (Mojica 2019), on sign posts at Duke University (Kulmala and Roldán 2018; McDonald 2018), and in tweets by students at Davidson College (Morabito 2018). An important component of this racial climate is the extent to which all students—but especially ethnic-racial minority students—feel safe and free from instances of ethnic-racial discrimination and their consequences. The National Academy of Sciences defines ethnic-racial discrimination as differential treatment on the basis of ethnicity-race or on the basis of inadequately justified factors other than ethnicity-race that disadvantage an ethnic-racial group (National Research Council 2004). Unfortunately, studies indicate that the large majority of ethnic-racial minority college students report having experienced such discrimination on campus (Cokley et al. 2011). In addition, ethnic-racial discrimination has been associated with a range of undesirable adjustment outcomes among college students, as well as among children and adults, including poorer psychological and physical health (Lui and Quezada 2019) and cortisol stress (Korous et al. 2017). Thus, there is substantial evidence that ethnic-racial discrimination on college campuses is both pervasive and harmful.

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✉ Juan Del Toro
juan.deltoro@pitt.edu

[1] Learning Research and Development Center, University of Pittsburgh, 3939 O'Hara Street, Office #745, Pittsburgh, PA 15260, USA

[2] New York University, New York, NY, USA

Despite growing concern, empirical knowledge about college students' ethnic-racial discrimination experiences is limited in several important ways. For one, most studies are cross-sectional, limiting scholars' and educators' knowledge about the experience of ethnic-racial discrimination over the course of college and about its possible long-term consequences. In particular, limited empirical information is available regarding whether the frequency of ethnic-racial discrimination experiences accelerate, decline, or remain stable following the initial transition into college. This sort of information may provide important insight into processes of ethnic-racial minority students' integration and adaptation during college. Second, most studies among college students have focused on the consequences of ethnic-racial discrimination for psychological adjustment and substance use outcomes. Comparatively little is known about the consequences of ethnic-racial discrimination in college for academic outcomes even though academic outcomes are arguably among the most important indicators of a successful college experience. Third, studies have paid only limited attention to the source of college students' ethnic-racial discrimination experiences, obscuring the possibility that the frequency and consequences of such discrimination may vary depending on whether it is coming from peers or adults, especially professors. The importance of distinguishing the source of ethnic-racial discrimination has become increasingly evident in the literature on younger adolescents (e.g., Benner and Graham 2013). Finally, most studies have examined discrimination experiences among relatively small samples of students at a single institution and, thus, it is unclear whether findings can be generalized beyond a particular student body or institutional context.

The present study examined the nature and consequences of college students' perceived ethnic-racial discrimination from peers and professors over the course of four years in college. The study is based on secondary analysis of data from the National Longitudinal Survey of Freshmen, which followed a large and diverse cohort of first-time freshmen from 28 four-year institutions over four years of college. The two primary goals of the present study were to (1) describe initial levels and growth trajectories for ethnic-racial discrimination from peers and professors; and (2) examine whether these initial levels and trajectories of ethnic-racial discrimination from peers and professors differentially predicted students' well-being and academic adjustment outcomes at the end of their fourth year in college. Due to the fact that the sample was ethnically-racially diverse, the study also tested whether trajectories and correlates of discrimination varied according to students' ethnic-racial background.

Ethnic-Racial Minority Students at Selective Predominantly White Institutions

The transition into college is a salient task of emerging adulthood for many individuals (Arnett 2016). In the United States, most youth attend college directly following high school (Bureau of Labor Statistics 2019). About half of these college-enrolled students attend four-year colleges and universities (Bureau of Labor Statistics 2019). Although the transition to college is undoubtedly exciting, it is also stressful, frequently involving lowered access to the family, high school peer networks, and community-based supports and structures that helped to sustain students during childhood and adolescence. At the same time, strong grades and college completion have important implications for continued success later in life. In an analysis of Labor Department statistics, Americans with four-year college degrees made 98% more per hour on average than did their counterparts without a degree (Leonhardt 2014).

For ethnic-racial minority students, the transition to college may be an especially vulnerable period, compounding the challenges that are normatively experienced by all students making this transition. This is especially the case for those minority students who choose to attend selective four-year colleges or universities. Selective institutions are those that Barron's or U.S. News and World Report rate as highly exclusive based on factors such as enrollees' grades, SAT/ACT scores, class standings, and acceptance rate (Leonhardt 2013; Morse et al. 2019). These selective institutions are, on average, 85% non-Hispanic White (U.S. Department of Education 2016). Studies have shown that Black and Hispanic students at selective predominantly White institutions are at risk for experiencing belonging uncertainty (Cohen and Garcia 2008; Walton and Cohen 2007) as well as threats to valued social identities (Steele 2010). Black and Latino students who attend selective predominantly White colleges or universities are also less likely to graduate: Whereas 90% of non-Hispanic White and 93% of Asian students at selective four-year private institutions attain a degree within six years, only 71% of Black students and 81% of Hispanic students do so (U.S. Department of Education 2016).

In addition to belonging uncertainty and identity threat, experiences of ethnic-racial discrimination are also common among ethnic-racial minority students attending selective, predominantly White institutions. Upwards of 80% of students have reported exposure to ethnic-racial discrimination in studies of Black (Sellers and Shelton 2003), Latino (French and Chavez 2010), and Asian American students (French et al. 2013). Two recent qualitative studies have provided a rich description of the nature of such students' ethnic-racial discrimination experiences. The Voices of Diversity Project at Harvard University, an interview-based

study of Black, Latino, Asian American, and Native American students at four predominantly White institutions, found that most students described having experienced microaggressions (e.g., indirect, subtle, or unintentional discrimination against members of a marginalized group) including exposure to stereotypes or false assumptions of their intellectual abilities (Caplan and Ford 2014). A focus group study with a similarly diverse sample found that students described having experienced toxic racial jokes and verbal comments, racial slurs, unequal treatment, and denial and minimization of racism in their residence halls (Harwood et al. 2012). Notably, only a small minority of White college students have been found to report ethnic-racial discrimination (Cokley et al. 2011; Donovan et al. 2013).

Although descriptive studies on the extent and nature of discrimination have been informative, researchers and educators also need information regarding trajectories of perceived ethnic-racial discrimination during college among ethnic-racial minority students, beginning with the initial college transition. Due to the fact that college entry is a critical developmental transition, it is important to understand whether discrimination experiences increase, decrease, or remain stable following initial entry among this group. In one longitudinal study, Huynh and Fuligni (2012) documented a decline in perceived discrimination among Latino and Asian American college students over three assessments in 12th grade, two years post-high school, and four years post-high school. However, trajectories of discrimination following the college transition may look quite different than trajectories from high school. Thus, one goal of the present study was to describe ethnic-racial discrimination trajectories from college entry through their third year of college.

Perceived Ethnic-Racial Discrimination During College and Adjustment Outcomes

A substantial literature has documented the negative consequences of discrimination for college students' psychological and physical health. College students who perceived more discrimination have reported more depressive symptoms (Donovan et al. 2013), greater anxiety (Cokley et al. 2017), more negative affect (Nadal et al. 2014), a greater likelihood of suicidal ideation (Hollingsworth et al. 2017), and more problematic alcohol use (Hatzenbuehler et al. 2011). Physiologically, studies have also found disrupted sleep patterns (Fuller-Rowell et al., 2017), higher ambulatory blood pressure (Hill et al. 2007), greater heart rate variability (D. P. Williams et al. 2019), and higher cortisol stress output (Korous et al. 2017) among students reporting more frequent ethnic-racial discrimination. The literature in these two areas is large, although most of these studies have been cross-sectional.

Relative to the number of studies that have examined psychological and physical health, fewer have tested whether ethnic-racial discrimination experiences are associated with poorer academic adjustment among college students, even though academic performance and degree completion are critical for postgraduate success (Leonhardt 2014). Moreover, findings in the existing studies have been mixed. For example, in a study of 1300 college students (59% Asian, 24% Latino, 3% Black, 14% multi-racial), Hall et al. (2017) found that an aggregate measure of ethnic-racial discrimination from professors (two items) and peers (one item) predicted lower academic efficacy, with no differences across ethnic-racial groups. In a study of similarly diverse college students, a two-item measure of experienced and vicarious ethnic-racial discrimination was unrelated to students' grades or self-rated performance but—among Black students only—was associated with higher academic motivation the following year (Levin et al. 2006). Forrest-Bank and Cuellar (2018) found that Black, Latino, and Asian American students who reported more frequent microaggressions also reported a stronger ethnic identity which, in turn, predicted greater academic efficacy. O'Brien et al. (2011), in a study of 78 Latino college students, found no correlation between perceived discrimination and students' grade point averages or their sense of belonging at the university. Thus, studies so far have reported negative, positive, and null relations between ethnic-racial discrimination and indicators of academic adjustment but it is difficult to untangle whether the differences are a function of methodology (e.g., sample; cross-sectional versus longitudinal), academic outcome of interest (e.g., GPA versus efficacy or motivation), or measurement of discrimination.

Distinguishing Discrimination from Peer and Professors

During college, both peers and professors play a formidable role in shaping students' experiences and serve as primary sources of students' social interactions (Charles et al. 2009). Both are also potential perpetrators of ethnic-racial discrimination. Research has shown that college students report more frequent discrimination from peers than from professors (Swim et al. 2003). However, no information is available on whether discrimination from these different sources may differentially shape adjustment outcomes during college. Due to the importance of peers for affirming students' identities, for providing social support and companionship, and as primary sources of feedback, discrimination from peers may be more strongly associated with college students' psychological and physical health than is discrimination from professors. In contrast, because professors determine students' grades, academic standing, and access to support inside and outside of class,

discrimination from professors may be especially important in predicting college students' academic outcomes. Indeed, these sorts of differential patterns of relationships have been documented in the literature on discrimination during adolescence (Benner and Graham 2013), with peers as especially important in predicting psychological and physical health outcomes and teachers as especially important in predicting academic outcomes. In light of the roles that peers versus professors may play in college students' experiences, it seems important to examine the extent to which ethnic-racial discrimination from these two sources is differentially associated with adjustment outcomes for college students over time.

Possible Ethnic-Racial Group Differences

College students' perceived discrimination experiences and their consequences may vary among Black, Latino, and Asian American students. Numerous studies have documented ethnic-racial group differences in perceived discrimination, with Blacks typically reporting more discrimination compared to their Asian and Latino peers (Cokley et al. 2011; Donovan et al. 2013). Relations between discrimination and adjustment outcomes have also varied in studies that have included multiple ethnic-racial groups. For example, more discrimination has been found to predict lower psychological well-being for Black and Latino college students but not for their Asian American peers (Cokley et al. 2017; Forrest-Bank and Cuellar 2018). Levin et al. (2006) found that discrimination predicted more academic motivation up to two years later among Black students, but was unrelated to academic motivation among Latino, Asian American, and White students. Thus, it seems important to explore potential group differences in sources of discrimination and their correlates.

Current Study

The present study examined the nature and consequences of ethnic-racial discrimination from peers and professors among minority students attending selective predominantly White four-year colleges and universities. The present study first sought to describe initial levels and trajectories of change in college students' reports of perceived discrimination from peers and professors. Due to the fact that prior studies have not examined trajectories of change in ethnic-racial discrimination during college, hypotheses in this regard were speculative. Although such discrimination could potentially accelerate or decline over time, it seemed most likely to the authors that ethnic-racial experiences non-systematically fluctuate over the course of college. Thus, it was predicted that there would be no systematic linear rate of change in students' perceptions of discrimination from peers and professors over time (Hypothesis 1).

Following a descriptive examination of discrimination levels and trajectories, the study examined whether these varied for Black, Latino, and Asian American college students. It was predicted that Black students would report higher levels of discrimination from professors relative to their Asian American and Latino peers (Hypothesis 2), in line with findings from prior studies (Cokley et al. 2011; Donovan et al. 2013). It was also hypothesized that Asian American students would initially report more frequent peer discrimination compared to their Black and Latino peers (Hypothesis 3), also in line with findings from prior studies (Rosenbloom and Way 2004). Because change over time in either direction (increasing, decreasing, or stable) is possible for any of the three ethnic-racial groups, this part of the study was exploratory and descriptive.

In testing whether ethnic-racial discrimination was associated with psychological, health, and academic outcomes in students' fourth year, the authors hypothesized differential relations to adjustment outcomes for discrimination from peers versus professors, based on the unique role that each source plays for college students and on prior studies of adolescents (Benner and Graham 2013). Specifically, it was hypothesized that discrimination from professors would be especially important in predicting academic adjustment outcomes (lower grades and a lower likelihood of on-time graduation) relative to well-being outcomes (Hypothesis 4). It was also predicted that compared to discrimination from peers, discrimination from professors would be less strongly associated with well-being outcomes (Hypothesis 5). As for how students' ethnicity-race moderated the consequences of discrimination, there was very little research to make informed hypotheses. Therefore, this part of the study was descriptive and exploratory.

Methods

Data for this study come from Waves 1 through 5 of the National Longitudinal Survey of Freshmen. The National Longitudinal Survey of Freshmen is a de-identified, publicly available dataset (Massey et al. 2003). No ethics approval was sought because the Institutional Review Board (IRB) does not require IRB review for the analysis of de-identified, publicly available data.

Procedure

The National Longitudinal Survey of Freshmen was initially launched to test different theoretical explanations for ethnic-racial minorities' academic performance and achievement in

higher education. The principal investigators initially asked 35 schools to participate. Five schools declined the invitation. Only one of four Historically Black Colleges and Universities initially targeted for inclusion ultimately participated. In the case of two additional colleges, the president agreed on behalf of the institutions to participate but the Registrar's Office failed to provide a list of freshmen from which to draw a sample. The final institutional participation rate was 80%. In all, the principal investigators approached 4573 respondents across the 28 colleges and universities. Of these, 3924 students completed the survey, for an overall response rate of 86%. Participants received a token payment of $15 for study participation. In order to be eligible for inclusion in the sample, a respondent had to be enrolled at the institution as a first-time freshmen and be a United States citizen or resident alien. Foreign and returning students were excluded from the sample. Baseline data (Wave 1, the fall semester of students' first year in college) were collected in face-to-face interviews in the fall of 1999. Subsequent data were collected in telephone interviews during the spring semesters of 2000 (Wave 2, first year in college), 2001 (Wave 3, second year), 2002 (Wave 4, third year), and 2003 (Wave 5, fourth year) (for additional details on methodology, see Massey et al. 2003).

Analytic Sample

The full sample for the National Longitudinal Survey of Freshmen consisted of 3924 students across 28 selective colleges and universities in the United States. The analytic sample for the present study consisted of 2347 college students (60.1% female) who identified as being of Black or African American ($n = 770$; 32.8%), Asian American ($n = 835$; 35.6%), and Latino ($n = 742$; 31.6%) descent. About 998 White students were excluded because a central goal of the current study was to examine ethnic-racial minority students' perceived ethnic-racial discrimination experiences. Because an additional goal was to estimate longitudinal relations, 56 students who participated in only one wave of data administration were omitted as were students with missing data on relevant demographic variables ($n = 451$), all discrimination measures ($n = 8$), or all adjustment outcomes ($n = 5$). Students in the analytic sample attended liberal arts colleges (10.1%), private research universities (56.8%), and public research universities (33.1%). Slightly more than half of the analytic sample (53.2%) came from households in which both the mother and father had a college degree or higher, 24.7% came from households in which neither mother or father had a college degree, and 22.1% came from households in which either the mother or father had a college degree. Approximately one in five students (19.0%) were born abroad.

Table 1 shows demographic characteristics of the analytic sample by students' ethnicity-race. Although all groups were approximately 60% female, a chi-square test indicated that females were slightly over-represented in the Black sub-sample relative to their proportion in other ethnic-racial groups, χ^2 (2) = 7.23, $p < 0.05$. About 7.5% of the Black sample, 29.5% of the Asian American sample, and 19.0% of the Latino sample were born abroad. Thus, Black students were more likely to be native born than foreign born, and Asian American students were more likely to be foreign born than native born, χ^2 (2) = 125.37, $p < 0.001$. Because 7.5% of Black students were born abroad, the authors use the term "Black" rather than "African American" to be inclusive of all Black students who were native and foreign born. Black students were reported as having the darkest skin tones followed by Asian Americans, then Latinos, $F(2, 2344) = 298.74$, $p < 0.001$. Asian Americans were more likely to come from households in which both parents had college or more advanced degrees, χ^2 (2) = 105.17, $p < 0.001$, whereas Blacks and Latinos were more likely to come from households in which neither parent has a college degree, χ^2 (2) = 47.62, $p < 0.001$.

Measures

Table S1 in the Supplementary Information presents the full set of items for all scales used, followed by the name of the scale, wave(s), and Likert responses.

Ethnic-racial discrimination from peers and professors

Participants completed items assessing perceived ethnic-racial discrimination at the end of their first (Wave 2), second (Wave 3), and third (Wave 4) years in college. For the present study, the six items that were included in all three waves were used. Exploratory factor analyses of the six items indicated that a two-factor structure that distinguished discrimination from peers versus professors fit the data better than did a one-factor structure in the participants' first [$\Delta\chi^2$ (1) = 788.57, $p < 0.001$], second [$\Delta\chi^2$ (1) = 563.21, $p < 0.001$], and third year in college [$\Delta\chi^2$ (1) = 893.99, $p < 0.001$]. A confirmatory factor analysis (CFA) indicated that the two-factor structure across the three waves fit the data well [χ^2 (105) = 459.54, $p < 0.001$, RMSEA 0.03, CFI 0.98, TLI 0.97, SRMR 0.03]. *Peer discrimination* consisted of the mean of four items (e.g., "How often, if ever, have students in your college classes ever made you feel uncomfortable or self-conscious because of your race or ethnicity: 1 (*never*), 5 (*very often*); α-range-time: 0.70–0.72). *Professor discrimination* consisted of the mean of two items (e.g., "Since the beginning of the [academic year], how often, if ever, have you felt you were

Table 1 Demographic characteristics in percent presented for the full sample and for each students' ethnicity-race

Demographic characteristics	Full sample ($n = 2347$)	Black ($n = 770$; 32.8%)	Asian American ($n = 835$; 35.6%)	Latino ($n = 742$; 31.6%)
Gender				
%Female	60.10	63.90	58.80	57.50
%Male	39.90	36.10	41.20	42.50
Skin color				
Mean score	3.60	4.93	3.15	2.73
Foreign born				
%Native-born	81.00	92.50	70.50	81.00
%Foreign-born	19.00	7.50	29.50	19.00
Parental education				
%Both parents have a college or advanced degree	53.20	45.70	67.40	45.00
%Only mom has a college or advanced degree	7.10	12.00	2.00	7.00
%Only dad has a college or more advanced	15.00	12.20	14.10	18.70
%Neither parent has a college degree	24.70	29.20	16.40	29.20
High school				
Mean ethnic congruence	0.24	0.32	0.17	0.24
Mean ethnic diversity	0.46	0.45	0.49	0.46
Neighborhood				
Mean ethnic congruence	0.26	0.42	0.15	0.23
Mean ethnic diversity	0.31	0.31	0.31	0.31
College student peers				
Mean ethnic congruence	0.08	0.07	0.13	0.05
Mean ethnic diversity	0.45	0.45	0.45	0.46
College professors				
Mean ethnic congruence	0.09	0.10	0.09	0.07
Mean ethnic diversity	0.25	0.27	0.23	0.20
Institution type				
%Private research university	56.80	56.90	55.70	57.80
%Public research university	33.10	33.50	33.70	32.20
%Liberal arts college	10.10	9.60	10.70	10.00

given a bad grade by a professor because of your race or ethnicity": 1 (*never*) to 5 (*very often*); *r*-range-time: 0.62–0.73). For both measures, higher scores indicated more frequent discrimination.

Grades

Students reported their grades for their fourth year in up to six courses on a five-point scale ($0 = F$, $4 = A$). The authors calculated the average of these grades such that higher scores indicated higher performance. Massey et al. (2003) reported that students' self-reported grades were strongly correlated with grades on their official transcripts.

Graduated

On-time graduation was a categorical variable that represented whether or not the student graduated in four years ($0 = did\ not\ graduate\ from\ college/university$; $1 = graduated\ from\ college/university$) based on data drawn from registrars offices of participating colleges and universities and from the National Student Clearinghouse (Charles et al. 2009).

School satisfaction

School satisfaction was the mean of three items that assessed students' positive feelings toward their college/

university (e.g., "If I had it to do all over again, I would choose to attend [name of most recent college attended]"; 0 (*totally disagree*) to 10 (*totally agree*); $\alpha = 0.79$). High scores on school satisfaction represented more favorable feelings toward their college/university.

Depressive symptoms

Students' scores in their fourth year on 13 items from the Center for Epidemiologic Studies Depression Scale (e.g., "You felt depressed"; 0 = *never*, 4 = *all of the time*; $\alpha = 0.88$) (Lewinsohn et al. 1997) were used to assess the domain of psychological health. High scores on depressive symptoms indicated that students reported more frequent depressive symptoms.

Poor health status

Physical health status was assessed using a single item ("In general, how is your health?"; 1 = *excellent*, 5 = *poor*). Self-rated health has previously been used in a number of large-scale surveys, including the National Longitudinal Survey of Youth (United States Department of Labor 1997), and has been found to be highly correlated with objective indicators of health status, such as mortality rate (Idler and Benyamini 1997). High scores on self-rated health status indicated that students reported poorer health statuses.

Covariates

Demographic variables

Several individual-level demographic variables that have been associated with both perceived discrimination and adjustment outcomes were entered as covariates in all analyses (Cheng et al. 2016; Neblett et al. 2016). These covariates included students' sex (0 = *female*, 1 = *male*), both parents' highest level of education, immigrant status (0 = *native U.S. born*, 1 = *foreign born*), and college type. Parents' highest level of education was represented with three binary variables representing four groups: only mother has a bachelor's degree or more advanced, only father has a bachelor's degree or more advanced, neither parent has a bachelor's degree, and both parents have a bachelor's degree or more advanced. Two dummy variables represented three college types: liberal arts colleges, private research universities, public research universities. A variable representing interviewers' observation of students' skin color was also included as an individual-level covariate. Students' skin tone has been associated with discrimination and with ethnicity-race in prior studies (Sweet et al. 2007).

Ethnic-racial diversity and congruence

The authors created ethnic-racial diversity and ethnic-racial congruence scores for multiple settings. Diversity scores were generated using the Simpson's Diversity Index (Benner and Graham 2009; Simpson 1949) and is a function of the number of ethnic-racial groups and the degree to which each group is equally represented (range = 0–1; 0 = *homogeneous*; 1 = *ethnic-racial heterogeneous*). Students' ethnic-racial congruence scores represented the percentage of others who are the same ethnicity-race as the target student (French et al. 2000) (0 = *completely ethnically-racially incongruent*, 1 = *completely ethnically-racially congruent*). Thus, whereas diversity is the probability of contact with individuals from other ethnic-racial groups, congruence is the degree to which a student's ethnicity-race matches the ethnic-racial composition of the student body on campus. Administrative data were available for the ethnic-racial composition of the college-student body. Student-reported data on the percentage of their college professors, neighborhood, and high school were from different ethnic-racial backgrounds were used. Diversity and congruence have a curve-linear association with one another; for example, diversity can be low when congruence is either low or high.

Missing Data

Missing data represents a concern across all longitudinal studies. Among the analytic sample ($n = 2347$), there were the following rates of retention compared to baseline: 100% in the first year of college, 92.6% in the second year, 85.5% in the third year, and 81.2% in the fourth year. Across the waves, 73.2% of the entire sample participated in all five waves, 16.3% participated in four of the fives waves, 7.1% participated in three waves, and 3.4% participated in two waves. Black students had more waves of data missing than did Asian American students; Latinos did not differ from their Black and Asian American counterparts, $F(2, 2614)$, $= 3.94$, $p < 0.05$. Students from households in which parents had more advanced educational degrees had fewer waves of data missing relative to their peers with parents with less educational experience ($r = -0.05$, $p < 0.05$). Students with more missing waves of data had a lower likelihood of on-time graduation ($r = -0.17$, $p < 0.001$). No other relations emerged between the waves of missing data and the key study variables. To retain sample variability and diversity, the authors used multiple imputation to retain all participants ($n = 2347$) other than those who were initially excluded in the analyses. Missing values for students' responses to measures of discrimination and all adjustment outcomes were imputed using multiple imputation. Multiple imputation introduces appropriate random error,

approximates unbiased parameter estimates, and offers better standard error estimates than single imputation (Little and Rubin 1989). Mplus' DATA IMPUTATION generated 20 imputed datasets (Asparouhov and Muthén 2010). All covariates, all discrimination items at each wave, all adjustment outcomes in Wave 5, Wave 4 adjustment outcomes (self-rated health and depressive symptoms), and measures at baseline (i.e., self-reported grades and self-esteem) were included in the imputation process. Analyses run on each dataset were pooled, according to Rubin (1987)'s rules. Results using listwise deletion and Full Information Maximum Likelihood are similar to those using multiple imputation, so imputed results are presented.

Analytic Plan

All analyses were conducted using Mplus Version 8.3 (Muthén and Muthén 1998–2019). The TYPE = COMPLEX option was used to account for the fact that students were nested within schools. To determine whether the means across key constructs reliably differed among Black, Asian American, and Latino college students, multi-group analyses were conducted where students' ethnicity-race was the grouping variable. In this analysis, the different means of the continuous variables were given parameter labels, and MODEL TEST was used to look for significant differences among ethnic-racial groups.

To describe initial levels and trajectories in ethnic-racial discrimination from peers and professors, two unconditional latent growth models (i.e., latent trajectories) were estimated. The latent growth model was comprised of fixed (e.g., mean-average) and random (e.g., variance) effects for a latent intercept and a latent slope. The latent intercept factor represented students' initial levels of perceived discrimination in their freshmen year, with factor loadings of each repeated measure fixed to 1. The latent slope factor represented students' linear rates of change over the three years of assessment, with factor loadings for Wave 2, Wave 3, and Wave 4, respectively, fixed to 0, 1, and 2. The models also estimated the correlation between the latent factors (intercepts and slopes). Latent growth models were estimated separately for each source of discrimination. Hu and Bentler (1999) standard criteria were used to evaluate model fit to the data, including a root mean square error of approximation (RMSEA) value of less than 0.08, a comparative fit index (CFI) value of greater than 0.95, a Tucker Lewis index (TLI) value of greater than 0.95, and a standardized root mean square residual (SRMR) value of less than 0.08. To evaluate possible ethnic-racial differences in discrimination, multi-group analyses were performed using students' ethnicity-race as the grouping variable. The multi-group framework tested whether the fixed and random effects of the latent factors could be constrained to be equivalent across groups without a significant decrement in model fit using the chi-square difference tests.

To examine the associations between initial levels and trajectories of change in perceived peer and professor ethnic-racial discrimination and students' adjustment during students' fourth year of college, separate models were estimated for each domain of adjustment; academic adjustment (grades and likelihood of on-time graduating) and well-being (i.e., school satisfaction, depressive symptoms, and self-rated health status). Separate models were estimated for each domain of adjustment; academic adjustment (grades and likelihood of on-time graduating) and well-being (i.e., school satisfaction, depressive symptoms, and self-rated health status) due to the fact that correlations between adjustment indicators across domains were low (r-range = −0.11 to 0.12; see Table 2). Within each domain, outcomes were treated as observed rather than latent variables, due to the moderate size of their intercorrelations (r-range = −0.11 to 0.40, see Table 2). Each indicator was regressed onto intercept and slope factors for each source of discrimination alongside the covariates reported at baseline and other outcomes within the domain. Thus, the two final models examined the following associations: (1) peer and professor discrimination with grades and graduation, (see Fig. 1) and (2) peer and professor discrimination with school satisfaction, depressive symptoms, and health status (see Fig. 2).

Following model estimation, multi-group analysis first tested potential differences in relations across ethnic-racial groups, using ethnicity-race as the grouping variable. In the academic adjustment model, the weighted least square mean and variance adjusted (WLSMV) estimator was used, because this estimator adjusts standard errors for dichotomous dependent variables (Flora and Curran 2004). For models with well-being outcomes as dependent variables, maximum likelihood with robust standard errors (MLR) was retained as the estimator because the outcomes were continuous variables. Finally, for each of the two models, chi-square difference tests were used to evaluate whether constraining the parameter estimates for relations between peer growth factors (intercept and slope) and each outcome to be equal to those for professor growth factors and the same outcomes resulted in a significant decrement in model fit, formally testing whether the parameter estimates for peer versus professor discrimination were reliably different from one another.

Results

Descriptive Results

Table 3 presents means and standard deviations for the two measures of discrimination each year alongside the criterion

Table 2 Bivariate correlations among all key study variables

		1	2	3	4	5	6	7	8	9	10	11
1	Peer discrimination in Year 1	1										
2	Peer discrimination in Year 2	0.57**	1									
3	Peer discrimination in Year 3	0.54**	0.62**	1								
4	Professor discrimination in Year 1	0.39**	0.23**	0.19**	1							
5	Professor discrimination in Year 2	0.28**	0.41**	0.29**	0.37**	1						
6	Professor discrimination in Year 3	0.30**	0.33**	0.39**	0.33**	0.50**	1					
7	Grades in Year 4	−0.03	0.03	−0.07*	−0.01	−0.06*	−0.05*	1				
8	Graduated in Year 4	−0.11**	−0.08**	−0.08**	−0.04*	−0.04	−0.07**	0.30**	1			
9	School satisfaction in Year 4	−0.15**	−0.13**	−0.16**	−0.09**	−0.07**	−0.10**	0.08**	0.10**	1		
10	Depressive symptoms in Year 4	0.24**	0.20**	0.26**	0.08**	0.12**	0.13**	−0.10**	−0.06*	−0.21**	1	
11	Poor health status in Year 4	0.14**	0.12**	0.20**	−0.01	0.05	0.06*	−0.07*	−0.11**	−0.11**	0.40**	1

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

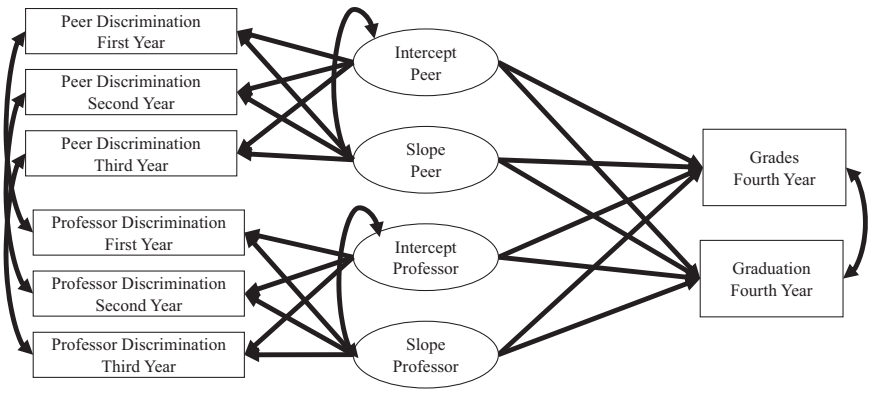

Fig. 1 A visual depiction of the final structural equation model with academic related outcomes in students' fourth year regressed onto the intercept and the slope for each source of discrimination

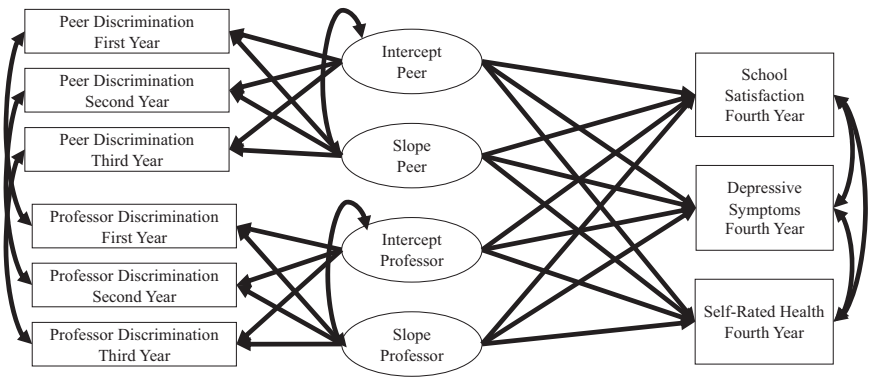

Fig. 2 A visual depiction of the final structural equation model with well-being outcomes in students' fourth year regressed onto the intercept and the slope for each source of discrimination

variables during the fourth year by ethnicity-race. Students perceived discrimination from peers more frequently than from professors in Year 1 [$\Delta\chi^2$ (1) = 1173.21, $p < 0.001$], Year 2 [$\Delta\chi^2$ (1) = 670.01, $p < 0.001$], and Year 3 [$\Delta\chi^2$ (1) = 897.68, $p < 0.001$]. Chi-square comparisons tested whether these means differed reliably among Blacks, Latinos, and Asian Americans. Beginning with results for discrimination from peers, the table indicates significant ethnic-racial differences in peer discrimination in Year 1 [$\Delta\chi^2$ (2) = 106.10, $p < 0.001$], Year 2 [$\Delta\chi^2$ (2) = 63.94, $p < 0.001$], and Year 3 [$\Delta\chi^2$ (2) = 66.47, $p < 0.001$]. Sequential chi-square difference tests indicated that in each of the three waves, Black

Table 3 Means (standard deviations) for all key study variables for the full sample and by students' ethnicity-race

Key study variables	Full sample	Black	Asian American	Latino
Peer discrimination in Year 1	1.66 (0.62)	1.90 (0.68)$_a$	1.58 (0.55)$_b$	1.52 (0.57)$_b$
Peer discrimination in Year 2	1.63 (0.61)	1.86 (0.67)$_a$	1.52 (0.52)$_b$	1.53 (0.57)$_b$
Peer discrimination in Year 3	1.66 (0.62)	1.88 (0.66)$_a$	1.58 (0.55)$_b$	1.54 (0.57)$_b$
Professor discrimination in Year 1	1.11 (0.36)	1.20 (0.48)$_a$	1.08 (0.30)$_b$	1.06 (0.25)$_b$
Professor discrimination in Year 2	1.12 (0.37)	1.21 (0.49)^a	1.06 (0.28)$_b$	1.07 (0.30)$_b$
Professor discrimination in Year 3	1.19 (0.45)	1.34 (0.60)$_a$	1.11 (0.33)$_b$	1.12 (0.34)$_b$
Grades in Year 4	3.45 (0.42)	3.32 (0.43)$_a$	3.56 (0.38)^b	3.45 (0.42)$_c$
Graduated (%) in Year 4	66.0	57.3$_a$	73.9$_b$	66.3$_c$
School satisfaction in Year 4	7.18 (2.20)	6.93 (2.63)$_a$	7.24 (2.09)$_b$	7.36 (2.18)$_b$
Depressive symptoms in Year 4	1.04 (0.55)	1.06 (0.57)	1.06 (0.54)	0.99 (0.55)
Poor health status in Year 4	2.00 (0.90)	2.01 (0.90)	2.03 (0.91)	1.97 (0.89)

Different sub-scripts within a row indicate significant difference between ethnic-racial groups at the $p < 0.05$ level

students reported more frequent peer discrimination, on average, than did Asian American and Latino students who, in turn, did not differ reliably from each other. For professor discrimination, there were significant main effects for students' ethnicity-race in Year 1 [$\Delta\chi^2$ (2) = 51.09, $p < 0.001$], Year 2 [$\Delta\chi^2$ (2) = 31.70, $p < 0.001$], and Year 3 [$\Delta\chi^2$ (2) = 114.20, $p < 0.001$]. Sequential chi-square difference tests showed that in each of the three waves, Black students reported more frequent discrimination from professors, on average, than did Asian American and Latino students. Asian American and Latino students did not significantly differ from one another in their reports of professor discrimination.

The third and fourth panels in Table 3 shows descriptive analyses for indicators of students' academic adjustment and well-being in Year 4, respectively. Asian American students reported the highest GPA than their Latino peers, who reported a higher GPA on average than Black students [$\Delta\chi^2$ (2) = 123.47, $p < 0.001$]. All three ethnic-racial groups had GPAs that ranged between B's and A's. Chi-square tests showed that Black students were less likely to graduate on time compared to both Asian American students [χ^2 (1) = 23.64, $p < 0.001$] and Latino students [χ^2 (1) = 13.32, $p < 0.001$]. Latino students also had a lower graduation rate than did their Asian American peers [χ^2 (1) = 11.22, $p < 0.001$]. The means for students' reports of school satisfaction were above the scale's mid-point: students reported moderately positive satisfaction with their colleges or universities. A chi-square test showed significant ethnic-racial group differences in school satisfaction [χ^2 (2) = 8.07, $p < 0.05$]. Black students reported lower school satisfaction than did their Asian American and Latino peers, who did not, in turn, differ from each other. Students' average values on depressive symptoms and poor health status were below the scale midpoint, suggesting that students overall reported few problems in these areas. Chi-square tests indicated that students did not differ significantly by ethnicity-race on depressive symptoms [χ^2 (2) = 3.56, $p = ns$] or on poor health status [χ^2 (2) = 1.25, $p = ns$]. Bivariate correlations among the key study variables are presented in Table 2 but are not discussed, given the multi-variate analyses of key interest.

Unconditional Latent Growth Models

Table 4 presents parameter estimates for the unconditional latent growth models for peer and professor discrimination. For both measures, analyses indicated that overall the growth model fit the data adequately [peer discrimination: χ^2 (1) = 9.54, $p < 0.001$, RMSEA 0.06 CFI 0.99 TLI 0.99 SRMR 0.01; professor discrimination: χ^2 (1) = 22.06, $p < 0.001$, RMSEA 0.07 CFI 0.93 TLI 0.80 SRMR 0.02]. However, multi-group analyses indicated that models in which parameter estimates were permitted to vary across groups fit the data better than did models in which parameter estimates were constrained to equality [peer discrimination: $\Delta\chi^2$ (10) = 192.07, $p < 0.001$; professor discrimination: $\Delta\chi^2$ (10) = 115.35, $p < 0.001$]. Thereafter, sequential chi-square difference tests determined which of the latent factors could be constrained to equality for Black versus Latino versus Asian American students without a significant decrement in model fit. In Table 4, the parameter estimates that differ across groups differed reliably according to the chi-square difference tests.

Beginning with peer discrimination, Table 4 shows that students' initial average was significantly different from zero for all three groups. However, Black students reported significantly higher initial levels of peer discrimination compared to their Asian American and Latino counterparts [$\Delta\chi^2$ (2) = 96.13, $p < 0.001$], who did not differ reliably from each other [$\Delta\chi^2$ (1) = 1.57, $p = ns$]. Black students also had greater variability around the intercept than did

Table 4 Unstandardized coefficients (standard errors) for unconditional latent growth factors by source of discrimination for the full sample and for each ethnic-racial group

Latent growth factors	Full sample	Black	Asian American	Latino
Peer discrimination				
Intercept				
Mean	1.65 (0.02)***	1.88 (0.04)***	1.54 (0.02)***	1.54 (0.02)***
Variance	0.23 (0.01)***	0.25 (0.02)***	0.16 (0.01)***	0.16 (0.01)***
Slope				
Mean	0.00 (0.01)***	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Variance	0.02 (0.01)*	0.02 (0.01)*	0.02 (0.01)*	0.02 (0.01)*
Covariance (intercept, slope)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Model fit indices:	χ^2 (1) = 9.54, $p < 0.001$, RMSEA 0.06, CFI 0.99, TLI 0.99, SRMR 0.01	χ^2 (11) = 28.33, $p < 0.01$, RMSEA 0.05, CFI 0.99, TLI 0.99, SRMR 0.08		
Professor discrimination				
Intercept				
Mean	1.10 (0.01)***	1.18 (0.02)***	1.06 (0.01)***	1.06 (0.01)***
Variance	0.05 (0.01)***	0.08 (0.02)**	0.02 (0.01)**	0.02 (0.01)**
Slope				
Mean	0.04 (0.01)***	0.07 (0.01)***	0.02 (0.00)***	0.02 (0.00)***
Variance	0.01 (0.00)***	0.01 (0.00)***	0.01 (0.00)***	0.01 (0.00)***
Covariance (intercept, slope)	0.00 (0.00)	0.02 (0.01)**	0.00 (0.00)	0.00 (0.00)
Model fit indices:	χ^2 (2) = 12.69, $p < 0.001$, RMSEA 0.05, CFI 0.94 TLI 0.90, SRMR 0.02	χ^2 (10) = 11.02, $p = ns$, RMSEA 0.01, CFI 0.99, TLI 0.99, SRMR 0.03		

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

Asian American and Latino students [$\Delta\chi^2$ (1) = 19.74, $p < 0.001$], but the variability for Asian and Latino students did not differ reliably [$\Delta\chi^2$ (1) = 1.38, $p = ns$]. Parameter estimates for the slope indicated that, on average, ethnic-racial discrimination from peers remained stable over time, with no significant differences among groups [$\Delta\chi^2$ (2) = 1.53, $p = ns$]. There was significant variability in trajectories of peer discrimination over time, and this variability did not differ significantly among the three groups [$\Delta\chi^2$ (2) = 1.45, $p = ns$].

Turning to discrimination from professors, Table 4 shows that students' initial level of perceived discrimination from professors was significantly different from zero for all three ethnic-racial groups. Black students reported significantly more discrimination from professors than did their Latino and Asian peers [$\Delta\chi^2$ (2) = 21.67, $p < 0.001$], who in turn did not differ reliably from each other [$\Delta\chi^2$ (1) = 0.24, $p = ns$]. There was also more variability among Black students in their reports of discrimination from professors, compared to that among Asian American and Latino students [$\Delta\chi^2$ (1) = 4.22, $p < 0.05$]. Latino and Asian students did not differ reliably from each other in this regard [$\Delta\chi^2$ (1) = 0.30, $p = ns$]. Across all three groups, results showed a significant linear increase in professor discrimination over time. This increase was steeper among Black students compared to Asian American and Latino students [$\Delta\chi^2$ (2) = 15.42, $p < 0.001$]. The increase in professor discrimination did not differ between Asian American and Latino students [$\Delta\chi^2$ (1) = 0.46, $p = ns$]. There was significant variability in trajectories of professor discrimination over time, with no significant differences among the three groups [$\Delta\chi^2$ (2) = 0.64, $p = ns$].

The covariation between the intercept and slope for Black students indicated that those who reported more frequent professor discrimination initially also reported more accelerated increases in such discrimination over time. The relation between initial levels and rates of change over time for Black students reliably differed from that for Asian and Latino students [$\Delta\chi^2$ (2) = 6.34, $p < 0.05$]. The covariation between the intercept and the slope was non-significant for both Asian and Latino students, who did not differ from each other [$\Delta\chi^2$ (1) = 0.07, $p = ns$].

Perceived Discrimination and Students' Adjustment

Table 5 shows parameter estimates for the two models in which academic adjustment (Fig. 1) and well-being outcomes (Fig. 2) during students' fourth year were regressed onto the intercepts and slopes of peer and professor discrimination, controlling for covariates. For both models,

Table 5 Unstandardized coefficients (standard errors) for students' grades, likelihood of graduating, school satisfaction, depressive symptoms, and health status regressed on latent growth factors, after accounting for covariates. The observed coefficients did not vary among Black, Asian American, and Latino college students

	Grades	Graduated	School satisfaction	Depressive symptoms	Poor health status
Peer discrimination					
Intercept	0.01 (0.01)	−0.11 (0.05)*	−0.64 (0.13)***	0.32 (0.10)**	0.40 (0.16)*
Slope	−0.13 (0.06)*	0.04 (0.16)	−0.37 (0.51)	0.53 (0.54)	1.18 (0.95)
Professor discrimination					
Intercept	0.01 (0.01)	−0.11 (0.05)*	−0.64 (0.13)***	0.18 (0.37)	−0.22 (0.65)
Slope	−0.13 (0.06)*	0.04 (0.16)	−0.37 (0.51)	−0.15 (0.50)	−0.24 (0.90)
Model fit indices:	χ^2 (53) = 132.04, $p < 0.001$, RMSEA 0.03, CFI 0.97, TLI 0.91, SRMR 0.03		χ^2 (52) = 246.20, $p < 0.001$, RMSEA 0.04, CFI 0.96, TLI 0.84, SRMR 0.01		

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

multi-group analyses indicated that a model in which parameters were permitted to vary across ethnic-racial groups did not fit the data better than did a model in which parameters were constrained to equality across groups [academic model: $\Delta\chi^2$ (16) = 7.95, $p = ns$; well-being model: $\Delta\chi^2$ (24) = 12.08, $p = ns$]. Additionally, chi-square tests indicated that peer and professor latent growth factors could be constrained to be equal in the academic adjustment model [$\Delta\chi^2$ (4) = 5.76, $p = ns$], but not in the well-being model [$\Delta\chi^2$ (6) = 15.60, $p < 0.05$]. Thus, in Table 5, parameter estimates are shown for the full sample, with ethnicity-race included as a covariate. Where parameter estimates for peer versus professor discrimination differ, these specific estimates could not be constrained to be equal without a significant reduction in model fit according to the chi-square difference test. The final models fit the data adequately [academic model: χ^2 (53) = 132.04 < 0.001, RMSEA 0.03 CFI 0.97 TLI 0.91 SRMR 0.03; well-being model: χ^2 (52) = 246.20, $p < 0.001$, RMSEA 0.04 CFI 0.96 TLI 0.84 SRMR 0.01].

The left panel of Table 5 shows results for the academic adjustment model. Students' freshmen year reports of discrimination from peers and professors were unrelated to their cumulative GPA in Year 4, but the significant coefficient for the latent slopes indicated that students who reported steeper increases in perceived discrimination over time reported a lower cumulative GPA in Year 4. For on-time graduation, students who reported more frequent peer and professor discrimination as freshmen were less likely to graduate in their fourth year. Trajectories of change in students' perceived discrimination from either source did not predict on-time graduation.

Findings for well-being are shown in the right panel of Table 5. Students who reported more frequent discrimination from peers and professors during their freshmen year reported less school satisfaction in their fourth year, but change over time in students' reported discrimination did not predict school satisfaction. Next, students who reported more frequent discrimination from peers as freshmen reported greater depressive symptoms three years later. However, students' perceived discrimination from professors during their first year did not predict depressive symptoms in Year 4. Changes in students' perceived discrimination from peers and professors also did not predict depressive symptoms in Year 4. Finally, students who reported more frequent discrimination from peers as freshmen reported poorer health in Year 4, but professor discrimination was unrelated to health status. Changes in students' perceived discrimination from peers and professors did not predict health status in Year 4.

Sensitivity Analyses

The authors conducted supplementary analyses to bolster confidence in the inferences drawn from the present study's results. In particular, because the regression models did not control for initial levels of the Year 4 outcomes, the authors sought to reduce the plausibility that pre-existing academic adjustment and well-being resulted in students' perceiving more frequent discrimination rather than the reverse. For the well-being outcomes, although no measures of initial depression or physical health were collected at baseline, the authors were able to control for baseline self-esteem as a proxy for well-being freshmen year. Doing so did not change the pattern of findings for depression, poor health, or school satisfaction. In addition, because students completed measures of depressive symptoms and self-rated health in students' third year, two regression models were estimated (one model for each outcome) in which well-being outcomes in students' fourth year were regressed onto their third-year discrimination from peers and professors while controlling for third year well-being outcomes and the key covariates. Discrimination from peers—but not professors—in Year 3 predicted greater depressive symptoms and

more negative health status in Year 4, controlling for depressive symptoms and self-rated health status in Year 3. In the models for academic adjustment, measures of freshmen year GPA were included as covariates in the model. With these additional covariates included, the overall results did not change.

Discussion

The literature on college students' perceived ethnic-racial discrimination is comprised of several gaps that the present study sought to address. Specifically, most studies of discrimination during the college years have been cross-sectional, focus almost exclusively on its consequences for psychological adjustment and substance use, and use measures of perceived discrimination that either collapse multiple sources into a single measure or fail to specify its perpetrators. To address these gaps, the present study sought to describe the initial levels of discrimination from peers and professors upon entry into college as well as how these initial levels changed over a three-year period. The study also examined whether these discrimination experiences predicted academic adjustment and well-being at the end of students' fourth year in college.

Students in the present sample reported more frequent discrimination from peers than from professors, consistent with findings from past research (Hughes and Johnson 2001; Swim et al. 2003). This is not a surprising finding, given that college students likely have more frequent contact with their peers. Moreover, interaction with peers is likely to be more informal and to occur in multiple settings (e.g., dining halls, dorm rooms, parties or other school social events), possibly leaving more opportunity for insidious forms of discrimination, such as daily micro-aggressions, to occur (Harwood et al. 2012; Sue et al. 2007). It should be noted, however, that the peer discrimination measure contained more items and covered a broader range of potential issues, which could alternatively account for greater frequency of peer relative to professor discrimination. In addition, the fact that the measure of peer discrimination consisted of four items while the measure of professor discrimination consisted only of two items may have contributed to the different frequencies between the two sources.

Consistent with Hypothesis 1, findings indicated that that the frequency of students' discrimination from peers did not increase or decrease linearly, on average, over the course of four years of college. In contrast, however, there was an average increase in students' perceived discrimination from professors over time. The latter is an important finding because it suggests that students were not simply transferring experiences with teacher discrimination from prior institutions to the college setting but were, indeed, experiencing more discrimination as they took more courses in the current setting. It seems likely, for example, that students are initially reluctant to attribute certain patterns of interaction with professors to discrimination (Rojas-Sosa 2016). However, exposure to ambiguous situations increases minority students' vigilance such that as patterns re-occur, and as students of color identify with and cue amongst each other, their construction of professor behavior as implicit or explicit ethnic-racial bias may increase (Major et al. 2003). In addition, the fact that students continue to encounter new professors as they move through college may mean that they are more likely, over time, to perceive at least one of them as engaging in discriminatory behavior.

Trajectories of discrimination from peers and professors varied as a function of students' ethnicity-race. Due to differences in the types of stereotypes and micro-aggressions that students of different ethnic-racial groups experience, the authors had hypothesized that Black students would initially report more frequent discrimination from professors than their Asian American peers (Hypothesis 2) and that Asian American students would initially report more frequent discrimination from peers compared to their Black peers (Hypothesis 3). However, findings indicated that Black college students consistently reported more discrimination from both peers and professors than did Asian American or Latino college students. Although several prior studies of younger adolescents have reported that Asian American students are particularly susceptible to peer discrimination (Hughes et al. 2017), it may be that this susceptibility is heightened only during middle school, the developmental period during which this pattern has been documented. Once students are college-age, the stereotypes that drive Asian American students' discrimination experiences during early adolescence (e.g., non-athletic, nerdy) (Hughes et al. 2017) may be less relevant to their peer relationships.

Findings regarding Black students' elevated discrimination from professors relative to their peers was consistent with a priori hypotheses and with the relatively large literature on experienced stigma among Black students on college campuses. Most notably, Steele's program of research on stereotype threat (Steele 2010) as well as Cohen and colleagues' research on belonging uncertainty (Walton and Cohen 2011) both underscore the particular challenges that African American students, more so than other students of color, encounter due to their awareness of historically entrenched negative stereotypes about their intellectual inferiority. Notably, however, the measure of professor discrimination did not assess types of discrimination that may be more common for Asian American or Latino college students, including instances of being treated as model minorities or perpetual foreigners (Sue et al. 2007).

Findings indicated that, in general, ethnic-racial discrimination from peers and professors was associated with poorer academic adjustment outcomes as well as poorer well-being. Although prior cross-sectional studies have suggested this as well, the fact that discrimination and adjustment outcomes were assessed at different time points in the present study reduces the likelihood that the relation between them is spurious (e.g., due to mood or mindset). Importantly, however, the findings of the present study also highlight the particular relevance of peer cultures for college students' adjustment, which is discussed next. Although a priori hypothesis stated that discrimination from professors would be more highly related to academic adjustment than would discrimination from peers (Hypothesis 4), findings indicated that discrimination from peers and professors were of equal relevance in predicting both grades and on-time graduation. Rather than relying on significance levels alone, the analyses formally tested whether the parameter estimates for peer versus professor discrimination could be constrained to equality. Overall, these findings suggest that the source of discrimination is inconsequential for academic outcomes. Experiences with any type of discrimination may reduce mental and emotional energy available to focus on school-related goals.

The fact that cumulative GPA was impacted negatively only among students' whose reported discrimination experiences increased over time is especially noteworthy. Due to the fact that the slopes for discrimination represented change trajectories that varied across students rather than variation in initial levels, the findings have implications for understanding ethnic-racial minority college students' integration and adaptation during college. That is, regardless of the initial levels of perceived discrimination from professors and peers during college, those students who increasingly perceived such discrimination ultimately performed less well academically during their senior year.

Consistent with the authors' a priori expectations (Hypothesis 5), the findings suggested that ethnic-racial discrimination from peers was more strongly associated with students' well-being in Year 4 than was ethnic-racial discrimination from professors. Specifically, more frequent peer discrimination was associated with more depressive symptoms and poorer health status in Year 4 whereas more frequent professor discrimination was not associated with these outcomes. College students at selective colleges and universities who live on campus during their first year may be more sensitive to peer than to professor relationships, especially since they seek to develop new and strong friendships in a new setting. The present findings support existing research that suggest the peer setting is an important source of students' psychological adjustment relative to discrimination from other sources (Benner and Graham 2013).

The correlates between discrimination and adjustment outcomes did not vary between students' ethnic-racial groups. Even though there were mean ethnic-racial group differences in the experiences of discrimination from different sources, the processes linking discrimination to adjustment outcomes were the same across Black, Asian American, and Latino college students. This finding is surprising given the aforementioned literature examining the differential consequences of discrimination by students' ethnic-racial group. However, because the ethnic-racial group differences are inconsistent across studies and each study recruited participants from a single institution, it begs the question whether their results reflect ethnic-racial group differences or differences between schools. Because the present study accounted for effects between 27 schools, among which did not vary reliably on the frequency of students' perceived discrimination, the lack of significant group differences in the present study may reflect the students' common vulnerability as non-White students in settings that only privilege White students.

Strengths and Limitations

As with all studies, the current study had both strengths and limitations. A relative strength of the present study is that students were recruited from many different colleges and universities, which enabled the authors to control for contextual-level factors that varied across campuses in analyses. An additional strength is the examination of relations of discrimination to multiple outcomes—including academic and health outcomes—in a single sample. The outcomes were both subjective (e.g., depressive symptoms, health status, grades, and school satisfaction) and objective (e.g., graduation). Furthermore, the present study differentiated sources of discrimination among college students. Additionally, each ethnic-racial group was fairly equal in size that enabled the authors to use multi-group analyses by ethnicity-race to examine between-group variation in trajectories of discrimination between students' ethnicity-race. Lastly, although the National Longitudinal Survey of Freshmen did not include measures of many adjustment outcomes until students' third year in college, the authors utilized as much of the data as possible to check the degree to which the present findings were robust after accounting for students' reports of self-esteem at baseline, their academic performance after completing their first year in college, and their adjustment outcomes during their third year in college. In each of the supplemental analyses, students' perceived discrimination had strong longitudinal relations with their adjustment outcomes three years later.

There were also several limitations in the present study. For one, because participants in the study were enrolled in selective colleges and universities, they represent only a

small and self-selected segment of the general young adult population. Thus, findings cannot be generalized to all young adults or to all college students. Second, while the authors were able to examine discrimination from two primary sources in the college setting (e.g., peers and professors), the authors could not examine trajectories of discrimination from other possibly important sources, including school staff (e.g., sports' coaches, administrators, and on-campus police) or off-campus adults (e.g., store clerks and off-campus police). Third, the authors could not test for possible sub-ethnic group differences because the National Longitudinal Survey of Freshmen data collapsed subgroups into pan-ethnic-racial groups. Fourth, the measures of discrimination did not permit the authors to distinguish between types of discrimination that reflect distinct ethnic-racial groups' experiences in a college setting, such as perceived model minority stress for Asian American college students and treatment as perpetual foreigners for Latino college students. Lastly, the present study may potentially be biased to over- or under-reports of actual discrimination experiences (D. R. Williams 2016), because the present study is a survey-based study that relied on self-reports of perceived discrimination experiences. Despite these limitations, the present study provides a descriptive depiction of change in discrimination across the college years and the deleterious consequences that it has on students' adjustment.

Directions for Future Research

The present study has implications for future research in the study of ethnic-racial discrimination. First, the present study provides empirical evidence for why future research should distinguish between sources of discrimination for college students. The distinction between sources of discrimination has important methodological implications for the study of discrimination. Specifically, the combination of multiple sources of discrimination into a single measure can mask or weaken significant correlates when one source of discrimination predicts an outcome and another source does not. Second, future research should examine whether discrimination originating from peers versus professors differentially result in college students' substance abuse and suicidal ideation, which are outcomes that were frequently studied in the college student literature and are the leading causes of higher mortality for college students (Turner et al. 2013), which can have public health implications. Third, the data in the present study and that in most of the existing empirical literature preceded the election of Donald Trump as president of the United States, which may have exacerbated ethnic-racial minority students' belonging uncertainty and vigilance to anticipate discrimination in predominantly White colleges and universities. Therefore, future research that collected data following the election should explicitly address how their results may have differed from past research as a function of the political climate. Lastly, because multiple social categories may intersect to shape the rates and consequences of perceived discrimination (Cole 2009), future research should consider contributing to this domain of inquiry given the large diversity of the National Longitudinal Survey of Freshmen.

Conclusion

The idea that the nature of discrimination can vary between perpetrators is accepted in adolescent-focused studies, but this framework has yet been applied to understand the experiences of college-going young adults. The present study found that the frequency, the rate of change over time, and correlates of discrimination differed when distinguishing between peer and professor discrimination. College students perceived more frequent discrimination from peers than from professors. Students' reports of peer discrimination were stable across the college years whereas their reports of professor discrimination increased over time. Despite this increase, discrimination from peers remained more frequent than that from professors over the three-year period. Therefore, for those committed to building a safe and inclusive college environment, college administrators should develop innovative strategies to reduce discrimination instances in settings where peer discrimination is likely to happen, such as school dining halls and dorm rooms. Because Black students are especially at risk for experiencing discrimination from both peers and professors, college administrators' actions to increase a sense of belonging for African American students may be particularly vital. Additionally, students who reported having experienced more discrimination from both peers and professors had a lower cumulative GPA, were less likely to graduate, and were less satisfied with their school overall in their fourth year of college. Students' well-being was negatively affected by more frequent discrimination experiences, but discrimination from peers was more important than was discrimination from professors. Peers have an informative role during the transition into college, especially as it pertains to students' psychological and physical health. In order for practitioners and interventionists to promote positive adjustment for students of color in today's elite colleges and universities, they should keep in mind the specific sources of strain that precede these domains of adjustment.

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Compliance with Ethical Standards

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

Ethical Approval No ethics approval was sought because the Institutional Review Board (IRB) does not require IRB review for the analysis of de-identified, publicly available data.

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Juan Del Toro is a postdoctoral research scientist at the University of Pittsburgh's Learning Research and Development Center (LRDC). His major research interests include examining the differential precedents and consequences of children's and adolescents' perceived ethnic-racial discrimination from peers, adults inside and outside of school, and law enforcement.

Diane Hughes is a professor of Applied Psychology in the Steinhardt School of Culture, Development, and Education at New York University (NYU). Her research interests focus on (a) understanding how racial/ethnic dynamics influence individual's experiences across multiple settings including workplaces, classrooms, neighborhoods, and families, and (b) ethnic and cultural differences in parents' socialization goals, beliefs, and practices, especially as these influence children's learning.