

FACTORS AFFECTING COLLEGE COMPLETION IN A NO-RACIAL MAJORITY
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ABSTRACT

Factors associated with Black and Hispanic students' low academic achievement and retention in college have been abundantly discussed in previous studies (Allen, 1988b; Bailey & Weininger, 2002; Cooper, Cooper, Azmitia, Chavira, & Gullatt, 2002; Seidman, 2007; Vernez & Abrahamse, 1996). Among them, a strand of research examined how the racial composition of enrolled students relates to racial minority students' experience of college. Many studies found benefits of enrolling in colleges with large numbers of racial minorities, as opposed to enrolling in Predominantly White Institutions (PWI), in terms of students' academic gains, social experiences, and psychological wellbeing (Allen, 1988b; DeSousa & Kuh, 1996). Despite this prior research, less commonly examined is the degree to which the racial composition of enrolled students relates to minority students' college graduation rates. Also, the prior studies were restricted to either PWI or Minority Serving Institutions (MSI), such as Historically Black Colleges and Universities (HBCUs). Yet, there are colleges that are neither minority serving nor predominantly White, and few studies have investigated minority students' performance in these settings. Addressing this gap in knowledge, the present study examined student surveys and graduation records from a college where there is no majority racial group. First, student graduation rates in this no-racial majority setting were compared with the national college graduation rates. Second, relative risk factors, in terms of college graduation, associated with Black and Hispanic students in comparison to Asian and White students were examined using multinomial logistic regression analyses. Third, risk and protective factors associated with college completion across the racial groups were identified using binary logistic regression analyses. The findings indicated that, in the No-Racial Majority Campus (NRMC), (1) there were no significant racial gaps in graduation rates, (2) Black and Hispanic students graduated at

higher rates than their counterparts in national samples, (3) Black and Hispanic female students graduated at higher rates than Asian and White male students, (4) female-male ratio, household income, parental education, financial resource, commuting length, and hours of study were presented discrepantly in Black and Hispanic students relative to White and Asian students, and (5) high self-reported stress and part-time registration in the early years of college was associated with a lower probability of college completion eight years later.

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Factors Affecting College Completion in a No-Racial Majority Setting

Introduction

The 2016 presidential election brought great fear, anxiety, and even anger in racial minority and immigrant communities, and it triggered countless protests in big and small cities across the nation and around the world as a result. The outcome of the election confirmed that prejudice and discrimination against racial minorities are still embedded and widely accepted in the nation, which made it imperative for educators to examine racial disparities in academic institutions.

Researchers have found considerable achievement gaps among racial groups throughout all levels of education from pre-kindergarten to post-secondary educations (Fletcher & Tienda, 2010; Fryer & Levitt, 2006; Kao & Thompson, 2003; Reardon & Galindo, 2009; Snyder, de Brey, & Dillow, 2016). The disparity in higher education is particularly alarming considering that academic attainment strongly relates to individuals' socioeconomic status, and it reproduces the racial stratifications in society. As an effort to reduce the racial disparities and promote racial diversity in higher education, colleges have accepted increased numbers of Black and Hispanic students under the affirmative action policies in admissions, but their dropout rates have been consistently high across institutions (Shapiro, Dundar, Huie, Wakhungu, Yuan, Nathan, & Hwang, 2017; Snyder, et al., 2018).

Studies have found that, in college settings with dominant numbers of White staff and students, racial minority students often experienced racism and discrimination in addition to lack of social, academic, and financial support, which reduces their sense of belonging and intention to continue education (Gloria, Castellanos, & Rosales, 2005; Hurtado & Carter, 1997; Hurtado & Kamimura, 2003). In a setting with relatively larger numbers of racial minority groups, such as

Historically Black Colleges and Universities (HBCU) and Hispanic Serving Institutions (HSI), racial minority students are likely to have positive experiences and develop stronger academic and psychosocial skills (Fleming, 1984; Gurin & Epps, 1975; Wells-Lawson, 1994). The racial minority students' overall graduation rates, however, were even lower in HBCUs and HSIs than Predominantly White Institutions (PWI; Contreras & Contreras, 2015; Flores & Park, 2013). Researchers explained that students attending Minority Serving Institutions (MSI) tend to have low SAT scores, weak high school records, and lack of financial or parental resources, and these risk factors raised the probability of dropout (Allen, 1992; Benitez & DeAro, 2004; Flores & Park, 2012; Kim & Conrad, 2006).

A review of the effects of racial composition on racial minority students led to the current study's question, "How do racial minority students perform in a setting that is neither dominantly White nor focused on specifically serving Black or Hispanic students?" The current study investigated a No-Racial Majority College (NRMC) where there is no dominant racial group or a target group to support. In the following literature review, studies addressing racial disparities in education, college retention theories, and factors affecting college retention are reviewed. Also, the limitations from the previous studies are discussed, which then leads to the goals and design of the current study.

Disparities in Primary and Secondary Education

Previous studies indicated that the discrepancies in academic achievement and performance among Hispanic, Black, Asian, and White students begin at a very young age (Fletcher & Tienda, 2010), as early as kindergarten (Reardon & Galindo, 2009), and widened as they proceed to higher education (Fryer & Levitt, 2006).

Reardon and Galindo (2009) analyzed the Early Childhood Longitudinal Study-Kindergarten (ECLS-K) math and reading skill scores of 21,400 kindergarten students from 1998 to 2004. Their findings indicated that Hispanic and Black students began kindergarten with lower math and reading scores than White students and continuously underperformed for all six years. Similarly, the National Assessment of Educational Progress (NAEP) data, a collection of scores in reading and mathematics at grades 4, 8, and 12 from early 1990s to 2015, showed that the average reading and math scores of White students were consistently higher than their Black and Hispanic peers (Snyder, de Brey, & Dillow, 2015). To observe racial disparities in GPAs, Kao and Thompson (2003) reviewed the record of National Education Longitudinal Study of 1988 and found that, among 8th graders, Asians received the highest GPA (3.24) followed by Whites (2.96), Hispanics (2.74), and Blacks (2.73). After controlling for parental education, income, household status, immigrant status, and prior experiences at school, Kao et al. (2003) found differences in GPAs between White and Black students remained statistically significant. There were similar racial disparities found in SAT scores collected from 1986 to 2015 by the National Center for Education Statistics (Snyder, de Brey, & Dillow, 2018); average reading scores of White students were consistently higher than all other groups; differences in reading scores between Whites and Blacks ranged from 91 to 100, math scores from 94 to 111, and writing scores from 91 to 99 points. In term of high school dropout rates, studies showed that Hispanics, Blacks, and Native Americans were more likely than White or Asian students to drop out (Teachman, Paasch, & Carver, 1996; Velez, 1989; Warren, 1996; White & Kaufman 1997).

Furthermore, the status completion rate, 18 to 24 years old individuals who hold a high school degree or alternative credential without attending schools, has been consistently higher for Whites than Blacks or Hispanics for over 40 years (Snyder, et al., 2018). The gaps in the

status completion rates indicated that Hispanic and Black students were less likely to pursue high school degrees after they left education systems in comparison to their White counterparts. The review of studies revealed that there are considerable gaps among racial groups before, throughout, and after primary and secondary education in terms of educational enrollment, achievement, and completion.

Disparities in Postsecondary Education

Social science studies have documented achievement gaps in higher education and occupation among racial/ethnic groups for over a half century (Allen, 1985; Cohen, 1969; Fleming; 1984; Rosen, 1959; Snyder, et al., 2018). In early studies, researchers were interested in achievement and adjustment gaps among European immigrant groups, such as Greeks, Jews, Italians, French-Canadians, Irish, and Polish (Cohen, 1969; Rosen, 1959; Strodbeck, McDonald, & Rosen, 1957).

As the demographics of the United States changed, the target of research shifted to Hispanics, Asians, Blacks, and Whites. In 1970, approximately 83% of the U.S. population was White, and only 6% was Hispanic or Asian. In 2009, however, the White population decreased to 66% while the Hispanic and Asian population increased to 19% taken together (Martin & Midgley, 2010). According to the NCES report (Snyder, et al., 2018), college students' demographics were affected by the changes in the U.S. demographic trends; college enrollment of Hispanics increased from 4% to 17%, Blacks increased from 10% to 14%, Asians increased from 2% to 7%, but Whites decreased from 84% to 58% from 1976 to 2015.

Even though the number of Hispanic and Black students entering college were growing, studies showed that Hispanic and Black students were less likely to complete postsecondary

education compare to their White or Asian peers. The National Student Clearinghouse report (Shapiro, Dunder, Huie, Wakhungu, Yuan, Nathan, & Hwang, 2016), which analyzed the college completion rate of 2,823,678 students who entered their postsecondary education in the fall of 2010 after six years, indicated that Asian and White students were more likely to complete four-year colleges than Hispanic and Black students, and White students were more likely to enroll exclusively full time compared to Hispanic, Black or Asian students. Fuligni and Witkow (2004) followed up 1,004 adolescents three years after they were in 12th grade in 1999 or 2001 and found that East Asians were more likely to enroll, continue, and complete four- year colleges in comparison to Hispanic students. McGlynn (2014) demonstrated that Black (27.62%) and Hispanic (19.81%) students' graduation rates were lower than White (43.87%) and Asian (59.35%) students, although their college-going rate increased from 4% to 6%.

A large body of literature demonstrated racial disparities in higher education, but whether the gaps were attributed to other factors, such as socioeconomic status, high school academic performance and college GPAs, or more specifically related to students' race/ethnicity has been controversial (Adelman, 2006; Bowen, Chingos, & McPherson, 2009; Camburn, 1990).

The origins of racial gaps in higher education have been discussed in many studies. Kao and Thompson (2003) summarized various theoretical debates into three general ideas; 1) cultural differences in orientation toward schooling affect educational performance, 2) structural position, determined by their skills and economic ability, of ethnic groups affect educational outcomes, 3) interactions between cultural orientation and structural position affect educational outcomes. These debates demonstrated the effect of ethnic group membership, characterized by their culture and social status, on academic success in higher education. Yet, how individuals were affected by their cultures of origin and eventually made decisions to dedicate or withdraw

from an organization was not fully explained in the debates. College retention theories demonstrate the interactions among the individual, culture, and organization, and how they influence individuals' decisions to pursue or discontinue education. To understand the dynamic within an individual, between an individual and his/her origin, and an individual and the college system, major colleges retention theories are reviewed in the following section.

Theoretical Background

College retention theories. Since Spady (1971) linked students' attrition in college to Durkheim's suicide model (1951), college retention theories have been developed upon the premise that the departure of students is comparable to the withdrawal of individuals from society. Tinto (1975; 1993), by combining this suicide theory and the view of a social anthropologist Van Gennep (1960), developed *the model of institutional departure*. His model (Tinto, 1975; 1993) suggested that students' goals and commitments change throughout three integration phases: (a) separation from old communities, (b) incorporation to new community and norms, and (c) integration with societies in colleges, and whether they succeed or fail in the integration determines graduation or drop out.

Bean (1980) adopted organizational variables into college retention under the premise that employees' quitting and students' dropping out originated from the same psychological process. He suggested that interactions between institutions and individuals determined the development of individuals' positive or negative attitudes. Negative attitude was associated with the intent to withdraw, eventually leading to actual dropout.

Astin's (1995) *I-E-O (input-environment-output) model* highlights the role of students' involvement in their college retention. According to him (Astin, 1995), the involvement of students in institutions requires an investment of psychological and physical energy, and it

determines students' academic experience and outcome. Consequently, activities that diverted students from college involvement, such as working and commuting long hours would lower the likelihood of college retention, and activities that are associated with academic and social involvement, such as working on research projects and studying in groups, would increase the likelihood of retention (Astin, 1984).

These seminal theories created a base for numerous studies and fueled prolific discussions regarding college retention, but they were also criticized for overlooking factors affecting racial minority students in college (Berger & Braxton, 1998; Tierney, 1999). Consequently, later models and studies adopted institutional, psychological, and cultural factors that were specifically associated with racial minority students, such as the racial composition, racial climates, minority status stress, and acculturation issues (Hu & St. John, 2001; Ishitani & DesJardins, 2003; Kadison & DiGeronimo, 2004; Kessler, Foster, Saunders, & Stang, 1995; Neville, Heppner, Ji, & Thye, 2004; Shahid, Nelson, & Cardemil, 2018). These adoptions not only contributed to identifying racial minority students' needs but also expanded the list of protective and risk factors that attribute to students' persistence regardless of their race/ethnicity.

Protective and Risk Factors on College Retention

Slanger, Berg, Fisk, and Hanson (2015) incorporated protective and risk factors from traditional to recent theories and categorized them into four factors, *precollege academic performance factors*, *demographic and socioeconomic factors*, *social and academic integration factors*, and *organizational factors*. According to Slanger et al. (2015), *precollege academic performance* refers to high school GPA, high school rank, and ACT/SAT score; *demographic and socioeconomic factors* include age, gender, ethnicity, SES, residency, and parental education

background; *social and academic integration* refer to involvement with peer, faculty, and co-curricular activities, academic activities, college GPA, college choice, general college satisfaction, enrollment type (full or part-time), and satisfaction with classes; *organizational factors* include academic support, type and timing of financial aid, and quality of teaching.

Precollege academic performance factors. Previous studies have consistently indicated that precollege academic performance was strongly associated with college performance and degree attainment (Adelman, 1999; Astin, 1991; Attewell, Heil, & Reisel, 2011; Bean, 1980; Berger & Milem, 1999; Stoecker, Pascarella, & Wolfe, 1988). Attewell et al. (2011) found that “high school academic preparation is the single strongest predictor of graduation for entrants to four-year colleges” over gender, race/ethnicity, and socioeconomic status (p. 553).

Robertson and Taylor (2009) examined 618 students’ (88.3% female, 87.9% Caucasian) academic and motivational factors over four academic years and found that high school GPA and ACT scores were associated with students’ college retention along with desire to finish college, predicted academic difficulty, academic confidence, and emotional support from family.

Adelman (2006) identified that academic resource in high school, such as class rank, GPA, senior test score, and intensity of curriculum, was the strongest predictor relative to gender, race/ethnicity, family composition, and socioeconomic status. The study (Adelman, 2006) also showed that students’ math level in high school was strongly associated with college graduation; 83.3% of students who reached Calculus but only 3.9% of students who were in Pre-Algebra earned bachelor’s degrees (Adelman, 2006). Moreover, the numbers of students who attended high schools that offered high-level math classes, such as Calculus and Trigonometry, were stratified by race/ethnicity and socioeconomic status (Adelman, 2006). For instance, larger

portions of Asians (61.3%) and students in the highest socioeconomic status (SES) quintile (71.6%) attended high schools that offered high-level math classes than Hispanic students (44.6%) and the students in the lowest SES quintile (43.5%).

Observing factors affecting racial minority students' college retention has been challenging due to their low ratios (below 15%) in previous studies (Adelman, 2006; Robertson & Taylor, 2009; Saunders-Scott, Braley, & Stennes-Spidahl, 2017). Therefore, some researchers used homogeneous sampling which prevents statistic bias caused by disproportionate ratios in samples (Hagedorn, Maxwell & Hampton, 2001; Schwarz & Washington, 1999). Schwartz and Washington (1999) studied 213 freshmen Black female students at a historically Black institution for an academic year, and the outcomes indicated that high school GPA and the rank of high school predicted students' college performance but were not associated with retention. Hagedorn, Maxwell, and Hampton (2001) followed up with 202 African American male students in community colleges for three semesters and found that high school GPA was not associated with students' retention in the first semester but became a strong predictor at the end of the second and third semester. The discrepant outcomes in two homogeneously Black samples suggested that the effect of precollege academic performance factors on non-White students might not be as strong as on White students.

Demographic and socioeconomic factors. Numerous studies have shown the influence of parents' socioeconomic status on college retention, which corroborates Kao and Thompson (2003) assertion "Parental education and family income is probably the best predictor of eventual academic outcomes among youth" (p.431). Ishitani and DesJardins (2002) analyzed demographic factors of 3,450 students who matriculated at four-year colleges in 1989. Their findings indicated that students' family income, mother's education, and the amount of financial

aid were negatively associated with college dropout. Similarly, Fuligni and Witkow (2004) followed 1,004 adolescents 3 years after they were in 12th grade in 1999 or 2001 and found that parental education and family income were positively associated with postsecondary education progress. Considering that Black and Hispanic groups have been linked with low family income, lack of financial support, and low parental education (Rector, Johnson, & Fagan, 2001; Rincón, & Rincón, 2008; Wells, 2008), their low college completion rates are partially explained by the absence of protective factors that are present in White and Asian students. Evidently, after controlling parental socioeconomic status, the racial gaps in graduation were mitigated or disappeared in some studies (Adelman, 2006; Warren, 1996).

The role of siblings' college attendance in college retention has been occasionally included in previous studies, and they indicated that having siblings with college degrees was positively associated with students' persistence in college (Hoffman, 2014; Sanders, Milward, & Eshun, 2006). In terms of immigrant status on college retention, studies showed that students from immigrant families were equally likely to enroll and perform in four- year colleges, even though they had additional challenges, such as language barriers, low social capital, and political and economic disadvantages (Fuligni & Witkow, 2004; Keller & Tillman, 2008).

In terms of gender, numerous studies showed that women were more likely than men to earn bachelor's degrees across all racial/ethnic groups and socioeconomic statuses (Buchman & DiPrete, 2006; Ewert, 2002; Schwartz & Mare, 2005). Buchman and DiPrete (2006) pointed out that the male advantage in college disappeared in 26 out of 30 OECD, and their study found that the White female advantage in college completion was negatively associated with the graduation rates of male students who have fathers with low education or absent. In addition,

Buchman et al. (2006) discussed that the female advantages were weaker among non-White students in comparison to White students, and having fathers with college degrees at home significantly raised the probability of male students' graduation, especially for Black students.

Whalen, Saunders, and Shelley's (2010) study, based on 1,905 students' one- and six-year retention data, found that the gender differences were not detected in one-year retention but became salient in six-year retention. The discrepancies between one- and six-year retention indicated that the effects of factors on college retention could change over time. Ewert (2012) found that the gender gap in college graduation disappeared after controlling for attendance patterns, social integration, and academic performance, which demonstrated that the gender disparity in graduation stemmed from differences in academic behaviors and performance rather than the gender itself. Furthermore, the female advantage in college graduation was observed consistently across seminal studies, but its statistically significant effects have been reported inconsistently (Millea, Wills, Elder, & Molina, 2018; Saunders-Scott, Braley, & Stennes-Spidahl, 2018).

Social and academic integration factors. Social and academic integration was demonstrated slightly differently in Astin and Tinto's theories. In Astin's *I-E-O model* (1995), social and academic integrations was described as students' involvement, referring to psychosocial and physical energy, in academic and social activities. In the *Model of Institutional Departure*, Tinto (1993) referred to students' ability to depart from old communities and integrate into academic and social groups in college. Generally, in quantitative studies, social integration was examined by measuring students' interaction with faculty and peers, and academic integration was observed by assessing students' academic activities and performance

(Braxton, Milem, & Sullivan, 2000; Pascarella & Terenzini, 1980; Tinto, 1993; Thomas, 2002a).

Measuring social and academic integration, however, became complicated, as the researchers adopted the sociological, systemic, economic, behavioral, and psychological components into the retention models and theories.

To determine students' level of social and academic integration, Chapman and Pascarella (1983) measured students' GPA, academic and intellectual activities, participation in social and academic programs, contacts with faculty, peer conversation, and friendship. Strage (1999) observed students' academic confidence, social confidence, leadership, teacher rapport, and internal locus of control. Adams, Meyers, and Beidas (2016) examined counseling needs, financial worry, academic demands, social isolation, inability to study, and difficulty with academic expression (*e.g.*, "Felt you could not express yourself adequately in class discussions).

Students' mental health also has been frequently linked with academic and social functions. Studies showed that stressors in the college environment, such as academic pressure, lack of academic support, potential social isolation, and financial debt, exacerbated students' mental health symptoms that compromised students' ability to continue their education in college (Kadison & DiGeronimo, 2004; Kessler, Foster, Saunders, & Stang, 1995). Similarly, Saunders-Scott, Braley, and Stennes-Spidahl (2017) found that students who reported high stress were more likely to drop out in comparison to students who reported low stress.

Other studies included economic and behavioral measures, such as expectations for the financial benefit of college degrees, college financing methods, enrollment status, hours of study, hours of work, and employment status to determine students' integration at college (Ackerman & Gross, 2003; Menon, 1997; Mounsey, Vandehey, & Diekhoff, 2013; Montmarquette,

Mahseredjian, & Houle, 2001; Nonis & Hudson, 2006; Rampell, 2013; Robotham, 2009; Rozon, 2015; Whalen, Saunders, & Shelley, 2009 Bradburn, 2002). Discrepant from Astin's study (1975), recent studies found that hours of work, hours of study, and employment status had no effect on academic performance (Ackerman & Gross, 2003; Mounsey, Vandehey, & Diekhoff, 2013; Nonis & Hudson, 2006; Robotham, 2009; Rozon, 2015). Additionally, students who expected higher financial gain with a college degree (Menon, 1997; Rampell, 2013; Rozon, 2015; Whalen, Saunders, & Shelley, 2009) and registered full-time (Bradburn, 2002; Montmarquette, Mahseredjian, & Houle, 2001) were more likely to continue education and show better academic performance.

The economic and behavioral factors do not directly demonstrate students' social and academic integration but address financial comfort, motivation, resource, and academic efforts influencing students' motivation and ability to integrate into the institutions.

Organizational factors. Regarding financial supports in organizations, many studies (DesJardins, Ahlburg, & McCall, 2002; Hu & St. John, 2001, Ishitani & DesJardins, 2003; Whalen et al, 2009) found that receiving financial support from college, regardless of its forms, influenced students' persistence. Ishitani and DesJardins (2003) showed that financial aid and dropout rate were negatively associated. Hu and St. John (2001) demonstrated that having financial aid had more substantial influence on ethnic minority students than White students. Kaltenbaugh, St. John, and Starkey (1999) and St. John (1991) showed that minority students were more sensitive to the cost of college than White students and less likely to use educational loans.

Students' satisfaction with the college environment and services also have been considered as influencing factors (Bean, 1986; Kuh, 1991), but only a handful of quantitative

studies have been conducted (Aitken, 1982; Graham & Bishop, 1995). Graham and Bishop (1995) found that students who were enrolled at the time were most satisfied, and students who dropped out were least satisfied with college services and environment, including academics, admission, and registration. In contrast, Aitken (1982) found that academic satisfaction was not significantly associated with college retention. The effects of students' satisfaction on college service and environment were mixed even within the small number of studies. Plus, whether the low satisfaction led students to drop out, or students felt less satisfied after they dropped out was not fully explored in either study.

Racial Composition Affecting College Students

Among the organizational factors, racial composition and diversity on college campus have been discussed increasingly along with the affirmative action policies and college admissions. Hu and Kuh (2003) addressed that the diversity on college campuses prepares students to live and work in a diverse society. Ward and Zarate (2015) demonstrated that racial diversity on campus was linked to mostly positive outcomes, such as students' critical thinking, academic skills, civic engagement, racial understanding, and commitment to promoting democratic ideals.

Due to the benefits of having racially diverse students and as an effort to decrease racial disparities in higher education, increased numbers of Hispanic and Black have been accepted in colleges, but their dropout rates also have been consistently high across institutions (McGlyn, 2014; Shapiro, et al., 2016; Snyder, et al., 2018). Studies found that, ethnic minority students experienced additional stress and difficulties that were triggered by their membership in socially stigmatized group, and this 'minority status stress' negatively affect students' mental health and willingness to continue their education (Contrada et al., 2001; Gloria, Castellanos, Lopez, &

Rosales, 2005). In colleges with dominant numbers of White staff and students, racial minorities were likely to experience racism and discrimination as well as lack of social, academic, and financial support, which reduced their sense of belonging and intention to continue education (Gloria, et al., 2005; Hurtado & Carter, 1997, Hurtado & Kamimura, 2003).

In settings with larger numbers of racial minority groups, such as Historically Black Colleges and Universities (HBCU), Black students have more frequent and meaningful interactions with faculty (Wells-Lawson, 1994), more positive self-image, stronger racial pride, higher educational aspiration (Gurin & Epps, 1975), and more favorable adjustment skills (Fleming, 1984) than Black students on White campuses. Black students at Predominantly White institutions (PWI), however, have a significantly lower level of social involvement, worse psychological wellbeing (Neville, Heppner, Ji, & Thye, 2004; Shahid, Nelson, & Cardemil, 2018), lower grades, and less positive relationships with professors than their peers at HBCUs (Allen, 1992).

Despite the positive effects of enrolling in HBCUs, studies found that racial minority students at HBCUs and Hispanic Serving Institute (HSI) were less likely to graduate compare to their counterparts at PWIs (Contreras & Contreras, 2015; Flores & Park, 2013). Kim and Conrad (2006) also observed lower graduation rates of Black students at HBCUs in comparison to PWIs, although the differences were not statistically significant. *Tracking Black Student Graduation Rates at HBCUs* (2014) reported that, among sixty-four HBCUs, the graduation rates of only five colleges were similar to or above the national average, and the graduation rates of the rest ranged from only 12% to 48%.

Regarding the low graduation rates at HBCUs, researchers discussed that students at HBCUs tend to have lower SAT scores, weaker high school records, and less financial or

parental resource compared to their counterparts at PWIs, and these risk factors contributed to students' low academic performance (Allen, 1992; Benitez & DeAro, 2004; Flores & Park, 2013; Kim & Conrad, 2006). At the point of this review, how the racial composition in college campuses affect minority students' graduation is undetermined. The mixed outcomes of previous studies suggested that our perceptions might have been too restricted to think outside of Black and White boxes.

Limitations in Previous Studies

The review of prior studies highlighted a few limitations: (1) The effects of racial composition on students' college retention have been observed in either dominantly White or minority-serving institutions, although there are colleges with more diverse racial compositions. (2) Due to the demographics of the US population, samples in previous studies often contained substantial portions (more than 85%) of White subjects but limited numbers of minority subjects (below 15% combined). Racially disproportionate samples can produce biased outcomes due to the underrepresentation of small-sized groups, and inaccurate representations could have misguided our understanding of minority students in college retention. (3) A large body of research on college retention measured students' year-by-year or semester-by-semester persistence instead of completion. Thus, the list of factors affecting students' graduation, as opposed to short-term retention, might not be fully established due to the limited number of long-term studies. (4) In most previous studies, discontinuing registration in an institution was considered drop out, which overlooked the students who transferred and received bachelors' degrees in other institutions. To investigate the longitudinal success of students across institutions, transferred students should be followed up and counted in analyses. (5) Among risk

and protective factors regarding college retention, some factors are relatively *well-established*, such as gender, socioeconomic status, and parental education. Others, such as stress, satisfaction in college, hours of study, hours of work, siblings' education, length of commute, immigration status, are *under-examined*. Therefore, additional investigations are required to determine the associations of *under-examined* factors with college retention and graduation.

Purpose of the Current Study

The current study was designed to address the limitations identified in previous studies. First, the present study examined a setting composed of proportionately diverse racial groups where there is no dominant racial group or a target group for support. The inclusion of this setting broadens our perspective on how varying racial composition affects minority students in college. In addition, having a sample with the proportionate racial diversity in analyses would improve the representation of minority groups in outcomes. Second, the study was designed to provide a longitudinal picture of students' performance by following them for eight years. Considering that the number of four-year-college graduation finalized in six years due to the large percentage of students who take extra years to graduate (National Center for Education Statistics, 2017), following up students after six years or longer is necessary to obtain the total graduation rates. Third, the current study included students who discontinued their enrollment in the initial college but received bachelors' or higher degrees in other institutions. By adding them into the analyses, students' longitudinal success across institutions was observed. Fourth, the present study included both the *well-established* factors and *under-examined* factors in order to determine their roles in college completion at the No-Racial Majority College (NRMC).

The primary purpose of the study was to investigate racial minority students' graduation rates and associated factors in a new setting, NRMC. The objectives of the study were to

compare racial minority students' graduation rates at the NRMC to the national averages, identify protective and risk factors affecting students' graduation across the racial groups, and reveal relative risk factors that are more likely to present with Black and Hispanic students than Asian and White students.

Goals. Given the lack of studies that were conducted in similar settings, no prior hypotheses are posited. Instead, there are two aims and four questions guiding the exploration in the present study.

Aim 1: In a NRMC, investigate *well-established* and *under-examined* protective/risk factors that are associated with specific racial/ethnic groups.

Question 1: In a NRMC, what protective/risk factors are associated with students' race?

Question 2: In a NRMC, what protective/risk factors are associated with Black and Hispanic students relative to Asian and White students?

Aim 2: In a NRMC, identify factors that predict students' graduation using the *I-E-O model* (Astin, 1995).

Question 3: In a NRMC, do *Input variables*, such as gender, race, parental education, siblings' education, immigration status, and household income, predict the likelihood of college graduation across racial/ethnic groups, whether they were *well-established* or *under-examined* in previous studies?

Question 4: In a NRMC, do *Environmental variables*, such as satisfaction in college services, financial supports, registration status, level of stress, students' employment, hours of work, hours of study, and length of commute, predict the likelihood of college

graduation across racial/ethnic groups, whether they were *well-established* or *under-examined* in previous studies?

Method

During the fall semester in 2009, a questionnaire with 21 multiple-choice items was distributed in an introductory psychology class. Among 514 students who participated in the survey, freshmen ($n = 251$) were followed and matched with the NRMC enrollment data in 2013. One prior study was conducted using a shorter time frame than the current study. Rozon (2015) matched 2009 survey data and the enrollment data of 2013, calculated students' 4-year retention rates, and examined factors affecting freshmen's college persistency. Rozon (2015) included seven independent variables (father's education, mothers' education, off-campus employment, hours of employment, hours of study, the expectation of college premium, and household income) and found that two factors, students' expectation for college premium and mother's educational attainment, were associated with freshmen's college retention.

The current study used the survey data collected in 2009 and followed all 514 students, including transferred students, to 2017. By linking the 2009 survey data to the graduation data provided by the Office of Institutional Research (OIR) at the NRMC and the National Student Clearing House (NSC) in 2017, the 8-year graduation rate was determined and the factors affecting college completion at the NRMC were examined.

For the present study, approvals of Institutional Review Board (IRB) from both Rutgers and the NRMC were received.

Participants

The NRMC is a large urban commuter-based institution offering low in-state tuition and comprised of over 16,500 students including 630 (3.8 %) doctoral, 2,441 (14.8%) masters, and 13,445 (81.4%) undergraduate students (Silverman, 2018) The diversity of this setting is likely due to its geographic location, history, and financial affordability. The ratios among racial groups were relatively proportionate (see Table 1).

Two samples were used in the current study: the first sample included all undergraduate students ($n=12,960$) who were enrolled in the fall semester of 2009, and the second sample included 514 students who completed the survey in 2009 at an introductory psychology class. Table 1 described the numbers and ratios of both samples by gender, race, residency type, place of birth, and years in college.

The cohort sample was comprised of 6,660 (51.38%) female and 6,300 (48.61%) male students who are Hispanic (35.76%), Black (25.09%), White (19.62%), and Asian (19.55%). In terms of years in college, there were 2,911 (32.6%) freshmen, 2,120 (24.5%) sophomores, 2,215 (23.6%) juniors, and 2,437 (19.3%) seniors.

The survey sample included 280 (54.5%) females and 234 (45.5%) males that were composed of 207 (40.3%) Hispanic, 116 (22.6%) Asian, 116 (22.6%) Black, 70 (13.6%) White, 3 (0.58%) American Indian, and 2 (0.39%) Non-resident Alien students. In terms of years in college, there were 356 (69.3%) freshmen, 107 (20.8%) sophomores, 37 (7.2%) juniors, 14 (2.7%) seniors in the sample.

Table 1

Demographics of the 2009 Undergraduate Cohort (n = 12,960) and Survey Sample (n = 514)

		Cohort (%)	Survey (%)
Gender	Female	6,660 (51.38)	280 (54.5)
	Male	6,300 (48.62)	234 (45.5)
Race	Hispanic	4,180 (32.26)	207 (40.27)
	Black	2,930 (22.61)	116 (22.57)
	Asian	2,285 (17.63)	116 (22.57)
			East: 46 (8.95)
			South: 48 (9.34)
			Other: 22 (4.28)
	White	2,293 (17.69)	70 (13.62)
	American Indian	17 (0.13)	3 (0.58)
	Nonresident Alien*	1,255 (9.68)	2 (0.39)
Year in College	Freshmen	4,226 (32.6)	356 (69.3)
	Sophomore	3,171 (24.5)	107 (20.8)
	Junior	3,058 (23.6)	37 (7.2)
	Senior	2,505 (19.3)	14 (2.7)
Residency Type	In-City	10,321 (79.6)	428 (83.2)
	Foreign	1,255 (9.7)	40 (7.8)
	In-State	1,064 (8.2)	38 (7.4)
	In USA*	320 (2.5)	8 (1.6)
Place of Birth	In USA	3,778 (29.2)	319 (62.06)
	US Territory	92 (0.7)	-
	Outside of USA	3,389 (26.1)	166 (32.3)
	Undetermined	5,701 (44.0)	29 (5.64)
Total		12,960	514

Note: Nonresident Alien indicates students who holds neither the green card nor citizenship.

Note: In USA indicates all other US states.

The descriptions of residency type in both samples showed that majority (about 80%) of the students resided in the city, and 87.8% to 90.7% of students lived in the state. In terms of place of birth, 62.1% of the survey sample were born in the United States while 32.3 % were

born outside of the United States. Due to the large number (over 40%) of undetermined data in the cohort sample, for privacy protection due to the federal Deferred Action for Childhood Arrivals (DACA) repeal, the ratio of the US-born to foreign-born students were not established. The descriptions of demographics in two samples confirmed the fact that the NRMC is an urban-commuter based setting providing a low-rate tuition for about 90% of students with diverse racial backgrounds.

Data Source

Survey. The survey data collected in 2009 was used for the current study. The content of the survey included single item multiple choice questions about student *sociodemographic* characteristics, such as race, household income, parents' education attainment, siblings' education attainment, place of birth, and *college-related experience* including students' employment, source of financial support, registration status (full vs. part-time), length of commute, stress, hours of study, hours of work, and satisfaction in college services (See Appendix A). The survey was developed by Parabal De, a professor of the Economic and Business department at the NRMC and had not been used in research prior to the Rozon (2015) study. Thus, no prior reliability or validity information was available. Moreover, single items measured each construct. This means measures of internal consistency, a form of reliability, could not be calculated.

Institutional records of the NRMC. The Office of Institutional Research (OIR) of the participating college provided graduation, academic, and demographic data of 514 students who participated in the survey in 2009. In addition, de-identified data of 12,960 students who registered for the fall semester in 2009 was provided. The de-identified data included students' completion status, registration status (full or part-time), residential type, gender, place of birth,

and race. The current study used both sets of data to investigate graduation rates and associated factors.

National student clearing house record. The National Student Clearing House (NSC) provided transfer and graduation records of all students who were registered at the NRMC in 2009 ($n = 12,960$). The NSC data enabled us to track students who left the NRMC but received bachelors' or higher degrees in other institutions. The total graduation rate was produced by merging the graduation data of the OIR and the NSC records.

Measures

The *Input-Environment-Output (I-E-O) model* has been used in numerous studies since it categorizes multidimensional factors into three simple ways; *Input*, *Environment*, and *Output* variables (Ahmad, Anantharaman, & Ismail, 2012; Callahan, LaDue, Baber, Sexton, Kraft, & Zmain-Gallager, 2017; Patterson, Krouse, & Roy, 2013; Renn & Reason, 2013). *Input* variables account for students' demographics, backgrounds, and skills learned prior to college.

Environment variables refer to experience factors including social, academic, economic, formal, and informal experience in college. *Output* variables indicate students' knowledge, attitude, values that they developed at the completion of college education. In this study, 8 *input* variables, 14 *environment* variables, and 1 *output* variables were used in analyses, and the coding of values for each variable are described in Table 3.

Input. Eight *input* variables, race, gender, place of birth, father's education, mother's education, sibling's college enrollment, sibling's college graduation, and household income, were included in this study. Race was divided into four groups, Asian (the survey included East/South/Other Asians, but they were combined and categorized as Asian), Black, Hispanic,

and White. Gender described if the student was male or female. Place of birth described if students were born in or outside of the United States. Mother and fathers' educational attainment were recorded in multiple choice questions (e.g., (a) 8th grade or less, (b) some high school, (c) high school graduate, (d) some college, (e) college graduate, (f) don't know). Sibling's college attendance and graduation were indicated in 'yes or no' questions. Lastly, household incomes were recorded on a 5-point scale (e.g., (a) less than 20,000, (b) 21,000 – 30,000, (c) 31,000 to 40,000, (d) 41,000-50,000, (e) above 50,000). Among all input variables, this study considered race, gender, parental education, and household income as *well-established* factors, and siblings' college enrollment, siblings' college graduation, and place of birth as *under-examined* factors.

Environment. To observe the association between environment variables and college graduation, the study included 13 variables, students' expectation of "college premium" (Rampell, 2013), resources for financial support, employment status, hours of work, hours of study, length of commute, stress, registration status, satisfaction in academic service and tutoring, satisfaction in computer lab services, satisfaction in library services, and satisfaction in teaching. To measure the expectation of college premium, students were asked to estimate how much more college graduates earn in comparison to high school graduates on a four-point scale, (1) 20% - 39%, (2) 40% - 59%, (3) 60%-79%, or (4) 80% - 100%. The financial resource for college, either personal resources, such as savings and earnings of self/parents/partner, or organizational resources, such as loans and grants, were determined in two multiple choice questions (see Appendix A). Students' employment status described if they were (a) not employed, (b) employed on campus, (c) employed off campus, or (d) employed both on and off campus. The 'hours of work' in a week was indicated on a five-point scale, (a) 0, (b) 1-10, (c) 11-20, (d) 21-34, (e) 35 or more, and hours of study in a week was demonstrated on a five-point

scale, (a) 0 hrs, (b) 1-5 hrs, (c) 6-10 hrs, (d) 11-20 hrs, and (e) Over 20 hrs. The length of commute was indicated on a multiple-choice question (e.g., (a) I live in dormitories, (b) 15-30 minutes, (c) 31-60 minutes, (d) 1.5 hours, (e) More than 1.5 hours). Students' stress in college relative to high school was indicated on a 3-point scale, (a) less stressful, (b) equally stressful, or (c) more stressful. The registration status demonstrated if students were enrolled full-time or part-time in the fall semester of 2009. Lastly, students' satisfaction with academic advising and tutoring, computer lab services, library services, and teaching were recorded on a 6-point scale comprised of (a) very satisfied, (b) satisfied, (c) neutral, (d) dissatisfied, (e) very dissatisfied, and (f) not applicable. In this study, the expectation for college premium, financial support, and registration status were considered *well-established* factors and the remaining variables (i.e., hours of study, hours of work, students' employment, length of commute, stress, and satisfaction in college services) were considered *under-examined factors*.

Output. The only output variable used in this study was college completion, and it was extracted from both the OIR and NSC data. The completion was indicated either complete (1) or incomplete (0).

Data Analytic Plan

The data analysis of the current study was composed of five steps, and different samples were used in each step. The first step included both the cohort ($n = 12,960$) and survey sample ($n = 514$), the second step analyzed the cohort sample only, and the third to fifth steps examined the survey sample only.

In the first step, to observe the general graduation patterns at the NRMC, the 2009 cohort and survey groups' graduation rates were analyzed by gender, race, and year in college. In the second step, the graduation rates of freshmen ($n = 4,226$) were extracted from the cohort sample

and compared with the national averages of freshmen graduation rates reported by the National Student Clearing House (NSC) and National Center for Education Statistics (NCES). In the third step, correlations within *input*, within *environment*, and among *input*, *environment*, and *output* variables were calculated. The analyses in this step revealed factors associated with students' race and determined the correlations among all variables. In the fourth step, multi-nominal logistic regressions (NOMREG) were conducted using White and Asian as reference groups and race as the dependent variable. The analyses in this step identified relative risk factors that were associated with Black or Hispanic group in comparison to White and Asian groups. In the fifth step, the binary logistic regression analyses were conducted with the *well-established* variables in block 1 and the *under-examined* in block 2. The analyses in this step identified factors that affect college completion at the NRMC.

More specifically, the correlation and multinomial logistic regression analyses in the third and fourth steps addressed the Question 1, "In a NRMC, what protective/risk factors are associated with students' race?" and the Question 2, "In a NRMC, what protective/risk factors are associated with Black and Hispanic students relative to Asian and White students?"

The binary logistic regression analyses in the fifth step addressed the Question 3, "In a NRMC, do *Input variables*, such as gender, race, parental education, siblings' education, immigration status, and household income, predict the likelihood of college graduation across racial/ethnic groups, whether they were *well-established* or *under-examined* in previous studies?" and the Question 4, "In a NRMC, do *Environmental variables*, such as satisfaction in college services, financial supports, registration status, level of stress, students' employment, hours of work, hours of study, and length of commute predict the likelihood of college

graduation across racial/ethnic groups, whether they were *well-established* or *under-examined* in previous studies?”

Handling missing values. Missing data analysis described that 11 variables had at least one missing value, 224 students failed to answer at least one question, and a total 389 (3.44%) among 11,308 values were not recorded. Even though the rate of missing values was below 5%, three variables, satisfaction in academic service/tutoring (27.4%), satisfaction in computer lab service (13.6%), and satisfaction in library service (12.5%), had large proportions of missing values (See Table. 2), and the missing patterns appeared not completely at random. Therefore, the missing data were handled by matching with the OIR data and using multiple imputation.

Regarding race, there were 23 missing values and 34 values with no ethnic information (categorized as Others in Table 1). After matching with the OIR data, 55 values were properly categorized, but two values remained unidentified and removed from the analyses. American Indian was also excluded due to extremely small sample size ($n = 3$), and East, South, and Other Asians were combined under Asian to align with the OIR data. Therefore, the racial groups included in this study were Asian, Black, Hispanic, and White, and the size of the survey sample reduced from 514 to 509.

Regarding place of birth, there were 29 missing values, and 17 (US born = 12, Foreign born = 5) were identified by matching with OIR data. The 12 remainders in place of birth and all other missing values from hours of work, hours of study, stress, financial resource-self/family, financial source-loan/grant, satisfaction in academic service/tutoring, satisfaction in computer lab service, satisfaction in library service, and satisfaction in teaching (See Table. 2) were replaced with plausible values using multiple imputation: the missing values were imputed five times, and the pool of five imputed sets were used in analyses.

Table 2

Descriptions of Missing Data

	<u>Valid</u>	<u>Missing</u>		<u>Method*</u>
		Count	%	
<i>Input</i>				
Race	491	23	4.5	OIR
Place of Birth	485	29	5.6	OIR, MI
<i>Environment</i>				
Hours of Work	512	2	0.4	MI
Hours of Study	509	5	1	MI
Stress	491	23	4.5	MI
Financial Resource - Self/Family Saving	511	3	0.6	MI
Loan/Grant	511	3	0.6	MI
Satisfaction in Academic Service/Tutoring	373	141	27.4	MI
in Computer Lab Service	450	64	12.5	MI
in Library Service	444	70	13.6	MI
in Teaching	491	23	4.5	MI

Note: MI = multiple imputation, OIR = the cohort data from the office of institutional research

Preventing multicollinearity and determining effective sample size. To prevent multicollinearity, collinearities among all variables were tested and VIF was controlled below 3.0 by removing sibling's college graduation prior to analyses. During the multinomial logistic regression (NOMREG) analyses, however, a singularity in Hessian matrix and a possible quasi-complete separation were still detected. The quasi-complete separation occurs when an outcome variable separates predicting variables, not completely but in a certain degree. A singularity in Hessian matrix occurs when a category of an outcome variable and a predicting variable are consonant (Hosmer, Lemeshow, & Sturdivant, 2013). In other words, the predicting variable showed patterns or directions that are too consonant with outcome variables to properly calculate the maximum likelihood and parameter estimates. Both errors were corrected by removing two variables, place of birth and registration status, that were associated with the possible separation and singularity during NOMREG. Thus, sibling's college graduation variable was removed from

all analyses, and place of birth and registration status were excluded from the NOMREG. The final list of *I-E-O* variables used in this study was described in Table 3 along with the source of data and coding value.

Peduzzi, Concato, Kemper, and Holford (1996) suggested an equation to calculate effective sample size, $N = 10k/p$, to prevent over or under estimates of parameters and ensure statistic power in logistic regression analyses. k indicates the number of independent variables and p refers to the smallest proportions of negative or positive cases (graduate vs. drop out). In the present study, using the sample size that was already determined ($n = 509$), the appropriate number of independent variables calculated was 17. The current study, however, included over 17 independent variables. Therefore, to ensure the statistic power of the study, two separate logistic regression analyses, one with *input* and another with *environment* variables, were conducted in the fourth and fifth steps.

Table 3

Descriptions, Coding Values, and Sources of I-E-O variables

<i>Label</i>	<i>Description</i>	<i>Coding Value</i>	<i>Source*</i>
<i>Input</i>			
Race (Binary Logistic) Reference: White	Black	1 Black 0 else	S, O
	Hispanic	1 Hispanic 0 else	
	Asian	1 Asian 0 else	
Race (NOMREG)		1 White 2 Black 3 Hispanic 4 Asian	S, O
Gender		1 Female 0 Male	
*Place of Birth	US or Outside	1 Foreign 0 US	S, O
Parental Education	Mother and Father	1 8 th grade or less 2 Some high school 3 High school graduate 4 Some college 5 College graduate Null Don't know	S
Siblings' College Enrollment	Current enrollment	1 Yes 0 No	S
Household Income	Last year income	1 Less than 20,000 2 21,000-30,000 3 31,000-40,000 4 41,000-50,000 5 Above 50,000	S

Note: O = OIR data, S = survey data, N = NCS data

Note: Variables excluded from NOMREG, *.

Table 3

Descriptions, Coding Values, and Sources of I-E-O variables (Cont'd.)

<i>Label</i>	<i>Description</i>	<i>Value</i>	<i>Source*</i>
<i>Environment</i>			
College Premium	Expectation	1 20% - 39%	S
		2 40% - 59%	
		3 60% - 79%	
		4 80% - 100%	
Employment	Employed	1 Yes	S
		0 No	
Hours of Work	Hours/week	1 0	S
		2 1-10	
		3 11-20	
		4 21-34	
		5 35 or more	
Hours of Study	Hours/week	1 0	S
		2 1-5	
		3 6-10	
		4 11-20	
		5 Over 20	
Length of Commute		1 I live in dormitories	S
		2 15-30 minutes	
		3 31-60 minutes	
		4 1.5 hours	
		5 More than 1.5 hours	
Stress	Compare to high school	1 Less stressful	S
		2 Equally stressful	
		3 More stressful	
*Registration Status		1 Full-time	O
		0 Part-time	
Financial Resource	Self/Family Saving	0 None	S
		1 Support	
	Loan/Grant	0 None	
		1 Support	

Note: O = OIR data, S = survey data, N = NCS data.

Note: Variables excluded from NOMREG, *

Table 3

Descriptions, Coding Values, and Sources of I-E-O variables (Cont'd.)

<i>Label</i>	<i>Description</i>	<i>Value</i>		<i>Source*</i>
Satisfaction		Null	Not Applicable	S
in Academic Service/Tutoring		1	Very Dissatisfied	
in Computer Lab Service		2	Dissatisfied	
in Library Service		3	Neutral	
in Teaching		4	Satisfied	
		5	Very Satisfied	
<i>Outcome</i>				
Graduation	Completing colleges	0	Incomplete	O, N
		1	Complete	

Note: O = OIR data, S = survey data, N = NCS data.

Note: Variables excluded from NOMREG, *.

Results

Graduation Rates at the NRMCC

Graduation rates of the 2009 cohort. The analyses of graduation rates revealed that among 12,960 students who enrolled in the 2009 fall semester, 74.71% ($n = 9,683$) graduated by the end of 2017, 63.42% ($n = 8,219$) from the NRMCC, and 11.29% ($n = 1,464$) from their transferred institutions (see Table 4). The graduation rates analyzed by gender and race demonstrated that female students (77.58%) graduated with a higher rate than male students (71.68%), and Asian students (79.39%) graduated with the highest rate followed by White (74.49%), Hispanic (73.21%), and Black (72.8%) students. The graduation rate analysis by the number of years in college revealed that the percentage of graduates increased along with the number of years in college; 2017 graduation rate of students who were freshmen in 2009 was

60.67%, sophomore in 2009 was 74.52%, junior in 2009 was 81.62%, and senior in 2009 was 90.22%.

Graduation rates of the survey group. Among 514 students who participated in the survey in 2009, 66.93% ($n = 344$) were graduated by the end of 2017, 49.81% ($n = 256$) from the NRMC and 17.12% ($n = 88$) from their transferred institutions (see Table 4). The completion rates analyzed by gender and race indicated that female students (68.57%) graduated with higher rates than male students (64.96%), and Hispanic students graduated with the highest rate (68.11%) followed by Black (67.24%), White (67.14%), and Asian (65.62%) students. Discrepancies in graduation rates among Asian subgroups, East Asian (73.17%), South Asian (64.68%), and Other Asians (54.54%), were found, and it suggested that Other Asian and South Asian struggled even more than Hispanic and Black groups to complete bachelors' degree programs in the NRMC. The analysis of graduation rate by years in college showed that the discrepancies in graduation rates among freshmen, sophomores, juniors, and seniors in the survey sample were not as prominent or consistent as shown in the cohort group.

Due to the divergent number of students and demographic composition of each sample, differences in graduation rates between the cohort ($n = 12,960$) and survey data ($n = 509$) were expected and detected. First, the graduation rate of the cohort sample was 7.8 points higher than the survey sample, because the survey sample included a larger portion of freshmen (69.3%) than the cohort sample (32.6%) (see Table 1). As discussed above, the graduation rate increased with the number of years in college, and the higher portion of the first-year students in the survey sample could lower the average graduation rate. In addition, because of the small number of juniors ($n = 37$) and seniors ($n = 14$) in the survey sample (See Table 1), their graduation rates

are less likely to be representative. Second, the graduation rate of Asian students was the highest in the cohort group but the lowest in the survey group. Because Other Asians' graduation rate (54.54%) was considerably behind the East Asian (73.17%) and the sample size of survey is markedly smaller than the cohort, the average rate of Asian in the survey was affected to a greater degree than in the cohort. Even with differences in two samples, there were similar patterns found in graduation rates; female students graduated with higher rates than male students, and the differences in graduation rates among racial groups were insubstantial.

Table 4

The Number of 2017 Graduates in the 2009 Cohort and Survey Samples

<i>Variables</i>	<i>Cohort (n = 12,960)</i>	<i>Survey (n = 509)</i>
	<i>Number of Completion (Graduation rate)</i>	
<i>Total Graduation</i>	9,683 (74.71)	344 (66.9)
<i>Gender</i>		
Female	5,167 (77.58)	192 (68.57)
Male	4,516 (71.68)	152 (64.96)
<i>*Race</i>		
Hispanic	3,060 (73.21)	141 (68.11)
Black	2,133 (72.80)	78 (67.24)
Asian	1,814 (79.39)	76 (65.52)
		East: 30 (73.17)
		South: 31 (64.68)
		Other: 12 (54.54)
White	1,708 (74.49)	47 (67.14)
<i>Year in College</i>		
Freshmen in 2009	2,564 (60.67)	241 (67.7)
Sophomore in 2009	2,363 (74.52)	69 (64.5)
Junior in 2009	2,496 (81.62)	25 (67.6)
Senior in 2009	2,260 (90.22)	9 (64.3)

**Note:* Graduation rates of Nonresident alien and Native Indians were omitted.

Descriptions of Graduation Rates at the NCES, NSC, and NRMC

Graduation rates of freshmen cohorts in the National Center for Education Statistic (NCES), National Student Clearing House (NSC), and No-Racial Majority Campus (NRMC)

were analyzed and compared (See Table 5). The NCES and NCS followed students who were freshmen in 2009, the NSC followed students who were freshmen in 2010. In this comparison, the NCES and NSC, described the average graduation rates at 150% of normal time (6 years), but the NRMC data demonstrated the graduation rates at 200% of normal time (8 years). In other words, the NCES and NSC analyzed the students' 6-year graduation rates while the NRMC calculated the 8-year graduation rates in four-year college programs. According to an NCES report, *Tracking Student to 200 Percent of Normal Time: Effect on Institutional Graduation Rates* (2011), there was 1.9% to 3.8% increase in graduation rates between 6th and 8th years. Therefore, the average graduation rate was expected to be slightly higher in the NRMC than NCES and NSC.

Table 5

Graduation Rates (%) of Freshmen Cohorts in the NCES, NSC, and NRMC

<i>Variables</i>		<i>NCES 2009 Cohort</i>	<i>NSC 2010 Cohort</i>	<i>NRMC 2009 Cohort*</i>
<i>Gender</i>				
	Female	62.1	58.3	65.46
	Male	56.2	51.5	55.54
<i>Race</i>				
	White	63.3	67.2	60.89
	Black	39.5	45.9	57.59
	Hispanic	53.6	54.9	58.30
	Asian	73	71.7	65.77
Overall		59.4	54.8	60.67

The Undergraduate Retention and Graduation Rate Report of the 2009 Cohort by the NCES (Snyder, et al., 2018) demonstrated that 59.4% of undergraduate students who were freshmen in four-year institutions graduated in six years. The report also demonstrated that 73% of Asian, 63.3% of White, 53.6% of Hispanic, and 39.5% of Black students were able to

complete the four-year college programs in six years, and the differences in graduation rates among racial groups ranged from 9.7 to 33.5 points.

According to the report, *Signature 12 Supplement: Completing College: A National View of Students Attainment Rates by Race and Ethnicity-Fall 2012 Cohort* provided by the NSC (Shapiro, Dunder, Huie, Wakhungu, Yuan, Nathan, & Hwang, 2017), the six-year graduation rates of students who started four-year college ($N = 2,823,578$) in 2010 was 54% including 42% graduating from their starting college and 12.8 % graduating from transfer colleges. The report also demonstrated that Asian students graduated with the highest rate (71.7%) followed by White (67.2%), Hispanic (54.9%), and Black (45.9%) students, and the differences among racial groups ranged from 4.5 to 25.8 points.

At the NRMCC, among all students ($n = 4,226$) who started college in 2009, 60.67% graduated either from the NRMCC or colleges where they transferred. The analyses of graduation rates by racial groups revealed that 65.77 % of Asian, 60.89% of White, 58.3 % of Hispanic, and 57.59 % of Black students received bachelor's or higher degrees by the year 2017. The differences among racial groups ranged from 0.71 to 8.18.

Comparisons of the Graduation Rates by Race and Gender

The comparisons of graduation rates of racial groups demonstrated that Black students' graduation rate at the NRMCC was 18.08 points higher than the NCES and 11.69 points higher than the NCS. Hispanic students' graduation rate at the NRMCC was 4.7 points higher than the NCES and 3.4 points higher than the NSC. On the other hand, Asian and White students' graduation rates at the NRMCC were 2.41 to 7.23 points lower than the national averages (see Table 5). Consequently, the discrepancies among ethnic/racial groups in graduation rates at the NRMCC were smaller than racial disparities shown in the NSC and NCES.

When analyzing the graduation rates of female and male students separately by race, in the NRMC, Black (62.28%) and Hispanic (64.29%) female students graduated with higher rates than males of all races, including Asian (61.65%) and White (56.96 %), while their counterparts still graduated with lower rates than Asian and White males in the NCES and NSC (see Figure 1 and Appendix B).

Another finding was that the gender gap was larger than the racial gap in the NRMC, while the racial gap was larger than the gender gap in the NCES and NSC reports. The range of racial gaps in graduation rates, calculated by subtracting the smallest value from the largest value, was 25.8 in the NSC, 33.5 in the NCES, and 8.18 in the NRMC. The range of gender gaps in graduation rates was 6.8 in the NSC, 5.9 in the NCES, but 9.92 in the NRMC (See Figure 2 and Appendix C).

There were also a few common patterns found among the NSC, NCES, and NRMC; Asian female students graduated with the highest rate; Black male students graduated with the lowest rate; and racial gaps among males were larger than females. In general, the average graduation rates of freshmen cohorts at the NRMC (60.67%), NCES (59.4%), and NSC (54.8%) were not greatly different from one another.

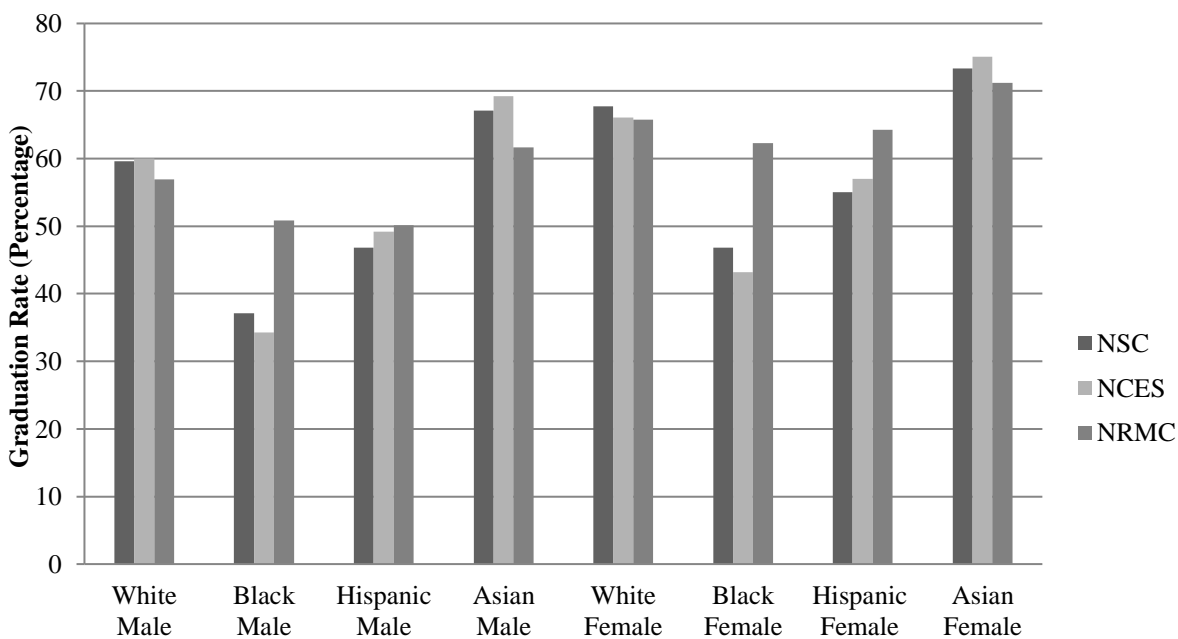


Figure 1. Comparisons of graduation rates by gender and race

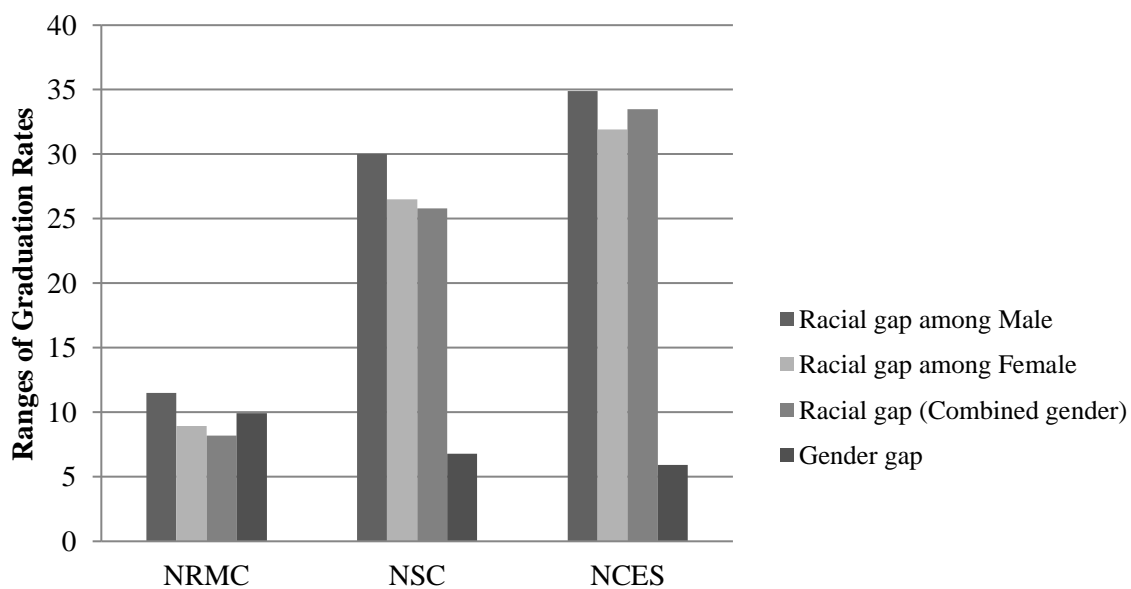


Figure 2. Racial and gender gaps of NRMC, NSC, and NCES in graduation rates

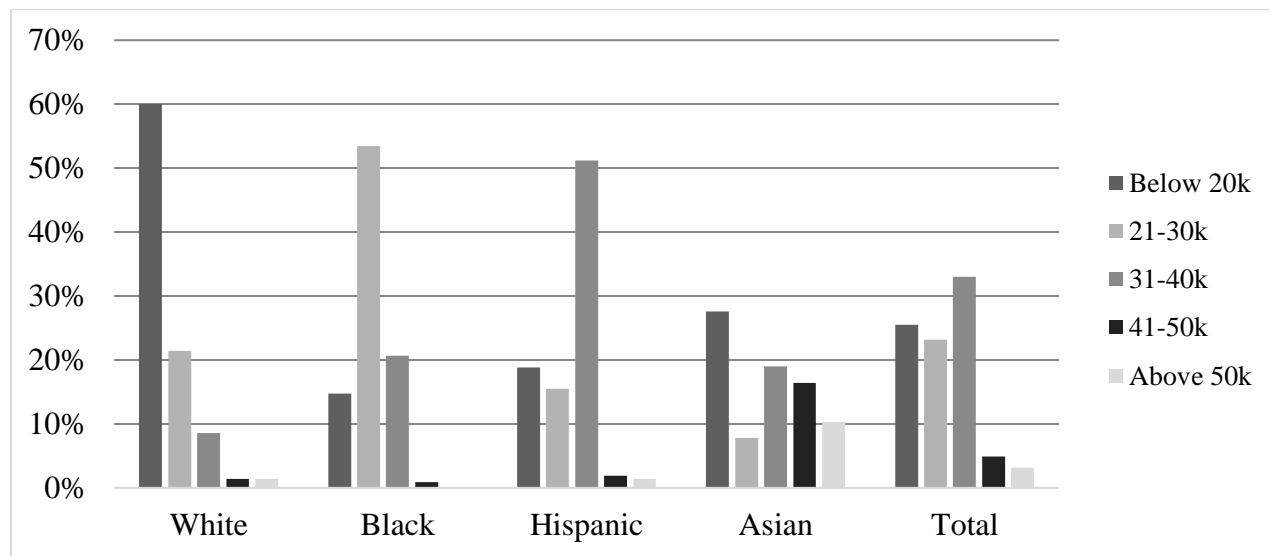


Figure 3. Household income (rates) by race in NRMC ($n = 509$)

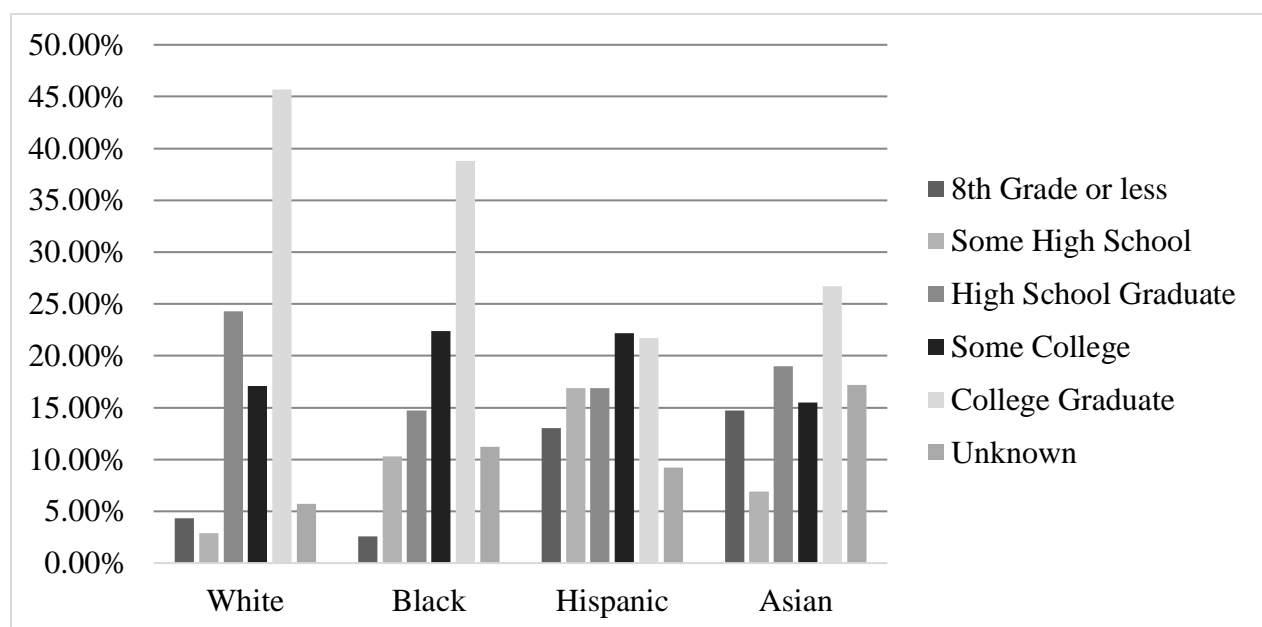


Figure 4. Mothers' education level (rate) by race in NRMC ($n = 509$)

Interrelationships among Students' Background, College Experience, and Graduation

Pearson correlations were computed for all *Input*, *Environment*, and *Output* variables. Due to the long list of variables, the outcomes were reported within *Input*, within *Environment*, and among *Input*, *Environment*, and *Output* variables

Among input variables. The correlation analyses of *Input* variables revealed the associations among all *input* factors as well as identified protective/risk factors that were associated with each racial group. The outcomes described that female gender was positively associated with Asian ($r = .12, p < .001$), place of birth was negatively associated with mother's education ($r = -.16, p < .001$), and foreign-born was positively associated with Asian ($r = .28, p < .001$) but negatively correlated with the Hispanic group ($r = -.18, p < .001$). In other words, the female ratio was higher in the Asian group in comparison to non-Asian groups, students who were born outside of the United States were more likely to have mothers with lower educational attainment than the US-born students, and Hispanic students were more likely and Asian students were less likely to be born in the United States.

Siblings' college enrollment was positively associated with both parents' educational attainment. Father and mother's education were positively associated with each other ($r = .54, p < .001$) and associated with each racial group in different directions; White students were likely to have mothers ($r = .15, p < .001$) and fathers ($r = .15, p < .001$) with higher education, Black students were likely to have mothers with higher education ($r = .11, p < .001$), Asian students were likely to have mothers with lower education ($r = -.11, p < .001$), and Hispanic students were likely to have mothers ($r = -.14, p < .001$) and fathers ($r = -.1, p < .001$) with lower education. In terms of household income, White students were likely to have lower household

incomes ($r = -.19, p < .001$) while Hispanic students were likely to have higher household incomes ($r = .13, p < .001$).

Among *environment* variables. The correlation analyses within *environment* variables revealed significant associations between economic factors, such as source of finance, employment, and college premium, and behavior/psychological factors, such as hours of study, hours of work, length of commute, and stress. In term of source of finance, using self or family savings was negatively associated with receiving loans or grants ($r = -.18, p < .001$). Students who used self or family savings were less likely to register full-time ($r = -.13, p < .001$), more likely to be employed ($r = .15, p < .001$), and work longer hours ($r = .12, p < .001$). Students who relied on loans or grants, on the other hand, were more likely to register full-time ($r = .15, p < .001$) and commute short hours ($r = -.12, p < .001$). Students' employment was negatively associated with the expectation of "college premium" ($r = .11, p < .05$).

"College premium" was positively associated with hours of study ($r = .14, p < .001$). Hours of study was positively associated with stress ($r = .15, p < .001$). Hours of study were negatively correlated with hours of work ($r = -.13, p < .001$). To summarize, students who expected lesser financial benefits from attaining college degrees were likely to study fewer hours but work longer hours, students who worked longer hours tended to study fewer hours, and students who studied longer tended to work fewer hours and experience higher stress. Additionally, it was found that length of commute was associated with employment ($r = -.10, p < .001$), hours of studying ($r = .09, p < .05$), stress ($r = .15, p < .001$), and registration status ($r = .09, p < .05$). This demonstrated that students who commute longer hours were likely to register full time, study long hours, experience high stress, and unemployed. In terms of

satisfaction with college services, the correlations indicated that satisfaction with advising was negatively associated with length of commute ($r = -.13, p < .001$), satisfaction with teaching was positively associated with the expectation of college premium, and satisfaction with library ($r = .2, p < .001$) and satisfaction with teaching ($r = .19, p < .001$) were positively associated.

Among input, environment, and output variables. The correlation analyses among *input, environment, and outcome* variables revealed that there were significant associations between *input* and *environment*, *environment* and *output*, but not *input* and *outcome* variables. In terms of associations between *input* and *environment* variables, the analyses found that female students were more likely to finance college with self/family savings ($r = .10, p < .01$), students who were born outside of the United States were more likely to work ($r = .10, p < .01$) and study ($r = .12, p < .01$) longer hours, and were less satisfied with teaching service ($r = -.11, p < .01$) than students who were born in the United States. Parents' education was associated with a few environment variables: hours of study, employment, length of commute, hours of work, and satisfaction with advising. Both father and mother's education were positively associated with hours of study (Father: $r = .12, p < .001$, Mother: $r = .11, p < .05$) but negatively associated with student employment (Father: $r = -.10, p < .05$, Mother: $r = -.16, p < .001$). Father's education was positively correlated with length of commute ($r = .11, p < .05$), and mother's education was negatively associated with hours of work ($r = -.13, p < .01$) and satisfaction with advising ($r = -.11, p < .05$). In addition, the analyses revealed that students who were getting loans or grants were more likely to have fathers with lower education ($r = -.13, p < .001$) but higher household income ($r = .12, p < .001$), while students who used self or family savings were more likely to have mothers ($r = .11, p < .05$) and fathers with higher education ($r = .10, p < .05$).

In terms of associations between race and *Environment* variables, the outcomes indicated that White students were likely to expect lower college premium ($r = -.09, p < .05$), study longer hours ($r = .13, p < .001$), and commute shorter distances ($r = -.09, p < .05$) than non-White students. Hispanic students were likely to study fewer hours ($r = -.19, p < .001$) than non-Hispanic students, and Asian students tended to study ($r = .15, p < .001$) and commute for longer ($r = .20, p < .001$) than non-Asian students. Race was also associated with financial resource; White students were more likely to use self or family savings ($r = .11, p < .05$) but less likely to receive loans or grants ($r = -.11, p < .05$). Hispanic students, on the other hand, were less likely to rely on self or family saving ($r = -.13, p < .001$) but more likely to get loans or grants ($r = .15, p < .001$). Finally, correlations with the outcome variable showed that college graduation was positively associated with full-time status ($r = .17, p < .001$) and negatively associated with stress level ($r = -.09, p < .05$). This means that students who registered full time and reported lower stress levels relative to when they were in high school were more likely to complete college in the NRMC.

Table 6

Correlations within Input Variables (n = 509)

	1	2	3	4	5	6	7	8	9	10
1. Gender*	—	0.02	-0.07	-0.03	0.02	-0.03	-0.08	-0.06	0.01	0.12*
2. Place of Birth*		—	-0.06	-0.16**	-0.06	-0.03	-0.04	-0.02	-0.18**	0.28**
3. Father's Education			—	0.55**	0.11*	0.04	0.15**	0.06	-0.14**	-0.02
4. Mother's Education				—	0.13**	0.02	0.15**	0.11**	-0.10*	-0.11*
5. Siblings' College Enrolment					—	0.04	0.04	0.02	-0.06	0.01
6. Household Income						—	-0.19**	-0.05	0.13**	0.08
7. Race- White*							—	-0.21**	-0.33**	-0.21**
8. Race- Black*								—	-0.44**	-0.29**
9. Race- Hispanic*									—	-0.44**
10. Race- Asian*										—

Note: $p < .05$, *; $p < .001$, **.

Note: Female = 1, male = 0; Foreign born = 1, US born = 0; White = 1, all others = 0; Black = 1, all others = 0; Hispanic = 1, all others = 0, Asian = 1, all others = 0.

Table 7

Correlations within Environment Variables (n = 509)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Finance-Self/Family*	___	-0.18**	0.15**	-0.01	-0.13**	0.12**	0.03	-0.05	-0.03	-0.04	-0.05	-0.06	-0.03
2. Finance-Loan/Grant*		_____	0.05	-0.02	0.15**	0.02	-0.08	-0.12**	0.02	0.07	0.02	0.02	-0.01
3. Employment*			_____	-0.11*	-0.02	0.80**	-0.18**	-0.10**	0.04	0.05	0.01	0.01	-0.09
4. College Premium				_____	0.01	-0.05	0.14**	0.08	0.00	-0.06	0.06	0.05	0.1*
5. Registration Status*					_____	-0.03	-0.06	0.09*	0.03	0.02	0.06	0.02	0.06
6. Hours of Work						_____	-0.13**	-0.08	0.01	0.04	0	-0.00	-0.07
7. Hours of Study							_____	0.09*	0.16**	-0.03	0.01	0.01	0.01
8. Length of Commute								_____	0.15**	-0.13*	0.03	-0.02	0.05
9. Stress									_____	-0.02	0.06	-0.06	0.03
10. Satisfaction with Advising										_____	0.17	0.13	0.13
11. Satisfaction with Lab											_____	0.20**	0.19**
12. Satisfaction with Library												_____	0.10
13. Satisfaction with Teaching													_____

Note: $p < .05$, *; $p < .001$, **.

Note: Financed = 1, not financed = 0; Employed = 1, not employed = 0; Full-time = 1, part-time = 0.

Table 8

Correlations among Input, Environment, and Output Variable (n = 509)

	12*	13*	14*	15	16*	17	18	19	20	21	22	23	24	25
1. Gender*	0.10*	-0.01	0.03	0.07	0	-0.01	-0.04	0	-0.02	0.01	-0.01	0.02	0.06	0.04
2. Place of Birth*	0.05	-0.08	0.09	0.04	-0.04	0.10*	0.12**	0.08	0.08	-0.03	0.03	0	-0.11*	0.04
3. Father's Education	0.10*	-0.13**	-0.10*	0.03	-0.02	-0.08	0.12**	0.11*	0.07	-0.11	-0.05	-0.04	0.06	0.01
4. Mother's Education	0.11*	-0.08	-0.16**	0.04	0.02	-0.12**	0.11*	0.03	-0.09	-0.11*	-0.08	-0.01	0.09	0.04
5. Siblings' College Enrolment	-0.06	0	-0.07	-0.02	-0.02	-0.05	0.04	0.05	0.04	0.03	-0.03	0.02	0.08	0.02
6. Household Income	-0.05	0.12**	-0.07	0.05	0.05	-0.06	0.01	-0.04	0.07	0.03	0.05	0.02	0.08	0.03
7. Race- White*	0.11*	-0.11**	-0.02	-0.09*	-0.06	-0.01	0.13**	-0.09*	-0.02	0	-0.05	-0.02	0.03	0
8. Race- Black*	0.07	-0.02	0.07	0.04	-0.03	0.07	-0.06	-0.05	-0.01	0.03	0.03	0.02	0.05	0
9. Race- Hispanic*	-0.13**	0.15**	-0.05	-0.01	0	-0.04	-0.19**	-0.07	-0.03	0	0.01	0.01	0	0.02
10. Race- Asian*	0.01	-0.01	0	0.03	0.07	-0.01	0.15**	0.20**	0.07	-0.03	0.02	-0.03	-0.08	-0.02
11. Graduation	0.02	-0.04	0.01	-0.07	0.17**	0.01	0.03	-0.04	-0.09*	0.07	0.02	0.09	-0.01	_____

*Note: $p < .05$, *; $p < .001$, **.*

Note: 12. Finance -Self or Family, 13. Finance- Loan or Grant, 14. Employment, 15. College Premium, 16. Registration Status, 17. Hours of Work, 18 Hours of Study, 19. Length of Commute, 20. Stress, 21. Satisfaction with Advising, 22. Satisfaction with Lab, 23. Satisfaction with Library, 24. Satisfaction with Teaching, 25. Graduation.

Note: Female =1, male = 0; Foreign born = 1, US born = 0; White = 1, all others = 0; Black = 1, all others = 0; Hispanic = 1, all others = 0, Asian = 1, all others = 0; Financed = 1, not financed = 0; Employed =1, not employed = 0; Full-time = 1, part-time = 0.

Factors Linked with Black and Hispanic Relative to Asian and White

NOMREG analyzes relationships between a categorical dependent variable and numeric variables including binary independent variables. Since NOMREG estimates $k-1$ models, k refers to the number of levels of the dependent variables, the multinomial logistic regression coefficients provide the parameter estimates relative to the reference group as a unit change in the predictor variables (Hosmer, Lemeshow, & Sturdivant, 2013; Schwab, 2002). In the current study, race was used as the dependent variable and White (in Models 1 & 3) and Asian (in Models 2 & 4) were used as reference groups to examine the multinomial log-odds comparing the level of *I-E-O* variables for Black or Hispanic relative to White and Asian, which enabled the group comparisons of each independent variables. Therefore, the analyses determined if the level of independent variables in Black or Hispanic students indicated more or less at risk in comparison to White and Asian students.

Table 9 and 10 presented the estimated multinomial logistic regression coefficients (B), standard errors of the individual regression coefficients (SE), and odds ratios (OR). The multinomial logistic regression coefficients (B) reports the parameter estimates relative to the reference group as a unit change in the predictor variables. In other words, if a unit increase in the predictor (*I-O-E* variables), the logit of outcome relative to the referent group (White or Asian) is expected to increase or decrease. In general, odds ratio (OR) above 1 indicates that the likelihood of being in the comparison group relative to the reference group increases as the score of variable increases. An odds ratio below 1 indicates that the likelihood of being in the comparison group relative to the referent group decreases as the score of variable increases. In this study, odds ratio above 1 indicates that a comparison group having increased levels of the

variable, and odds ratio below 1 indicates that the comparison group having decreased levels of the variable compare to the reference group.

Table 9

Multinomial Logistic Regression Results Linking Input Variables to Students' Race (n = 509)

Group*	Input Variables	Model 1			Model 2		
		Reference Group: White			Reference Group: Asian		
		B	SE	OR	B	SE	OR
1	Father's education				0.09	0.11	1.09
	Mother's education				0.35**	0.12	1.43**
	Household income				-0.62**	0.14	0.54**
	Gender (Male)				0.94**	0.32	2.55**
	Siblings' college enrollment (0)				-0.08	0.32	0.93
2	Father's education	-0.14	0.11	0.87	-0.06	0.09	0.94
	Mother's education	-0.06	0.12	0.94	0.30**	0.10	1.34**
	Household income	0.39**	0.14	1.47**	-0.24*	0.11	0.79*
	Gender (Male)	-0.22	0.31	0.8	0.71**	0.28	2.04**
	Siblings' college enrollment (0)	0.1	0.31	1.1	0.02	0.27	1.02
3	Father's education	-0.23*	0.10	0.8*	-0.14	0.08	0.87
	Mother's education	-0.22*	0.11	0.8*	0.13	0.08	1.14
	Household income	0.63**	0.14	1.89**	0.01	0.09	1.01
	Gender (Male)	-0.48	0.29	0.62	0.46	0.24	1.58
	Siblings' college enrollment (0)	0.27	0.3	1.32	0.2	0.24	1.22
4	Father's education	-0.09	0.11	0.92			
	Mother's education	-0.35**	0.12	0.70**			
	Household income	0.62**	0.14	1.87**			
	Gender (Male)	-0.94**	0.32	0.39**			
	Siblings' college enrollment (0)	0.08	0.32	1.08			

Note: 1 = White, 2 = Black, 3 = Hispanic, 4 = Asian.

Note: $p < .05$, *; $p < .001$, **.

Note: Parameter coding of categorical variables were indicated in the parenthesis.

Table 10

Multinomial Logistic Regression Results Linking Environment Variables to Students' Race (n = 509)

Group*	Environment & Output	Model 3			Model 4		
		Reference Group: White			Reference Group: Asian		
		B	Std. Error	OR	B	Std. Error	OR
1	College Premium				-0.44	0.21	0.64
	Hours of Working				0.13	0.22	1.14
	Hours of Studying				0.10	0.16	1.11
	Length of Commuting				-0.53**	0.14	0.59**
	Stress				-0.18	0.25	0.84
	Satisfaction with Advising				-0.01	0.21	0.99
	with Computer Lab				-0.17	0.22	0.84
	with Library				0.05	0.26	1.06
	with Teaching				0.37	0.20	1.44
	Finance by Self or Family (0)				-0.73	0.46	0.48
	by Loan or Grant (0)				0.39	0.41	1.47
	Employment (0)				0.44	0.55	1.55
	Graduation (0)				0.06	0.34	1.06
2	College Premium	0.55*	0.21	1.72*	0.11	0.18	1.11
	Hours of Working	-0.02	0.21	0.98	0.11	0.18	1.12
	Hours of Studying	-0.47**	0.17	0.63**	-0.36**	0.15	0.7**
	Length of Commuting	0.13	0.13	1.14	-0.4**	0.12	0.67**
	Stress	0.11	0.24	1.11	-0.07	0.21	0.93
	Satisfaction with Advising	0.01	0.22	1.01	0.003	0.18	1
	with Computer Lab	0.15	0.18	1.17	-0.02	0.18	0.98
	with Library	0.01	0.22	1.01	0.06	0.17	1.07
	with Teaching	-0.05	0.20	0.96	0.32	0.17	1.38
	Finance by Self or Family (0)	0.36	0.47	1.44	-0.37	0.35	0.69
	by Loan or Grant (0)	-0.47	0.42	0.63	-0.09	0.39	0.92
	Employment (0)	-0.33	0.55	0.72	0.11	0.46	1.11
	Graduation (0)	-0.14	0.34	0.87	-0.08	0.29	0.92

Note: 1 = White, 2 = Black, 3 = Hispanic, 4 = Asian. Note: $p < .05$, *; $p < .001$, **.

Note: Parameter coding of categorical variables were indicated in the parenthesis.

Table 10

Multinomial Logistic Regression Results Linking Environment Variables to Students' Race (n = 509; Cont'd)

Group*	<i>Environment & Output</i>	<u>Model 3</u>			<u>Model 4</u>		
		<u>Reference Group 1</u>			<u>Reference Group 4</u>		
		<i>B</i>	<i>Std. Error</i>	<i>OR</i>	<i>B</i>	<i>Std. Error</i>	<i>OR</i>
3	College Premium	0.44*	0.2	1.55*	0	0.16	1
	Hours of Working	-0.05	0.21	0.95	0.08	0.17	1.08
	Hours of Studying	-0.63**	0.16	0.53**	-0.53**	0.14	0.59**
	Length of Commuting	0.15	0.13	1.16	-0.38**	0.11	0.68**
	Stress	0.11	0.24	1.12	-0.06	0.19	0.94
	Satisfaction with Advising	-0.04	0.23	0.97	-0.04	0.15	0.96
	with Computer Lab	0.14	0.18	1.15	-0.04	0.15	0.97
	with Library	-0.01	0.26	0.99	0.05	0.16	1.05
	with Teaching	-0.18	0.19	0.84	0.19	0.15	1.21
	Finance by Self or Family (0)	0.95*	0.43	2.6*	0.22	0.29	1.25
	by Loan or Grant (0)	-1.19**	0.43	0.30**	-0.8**	0.39	0.45**
	Employment (0)	0.04	0.52	1.04	0.48	0.44	1.61
	Graduation (0)	-0.23	0.32	0.79	0.17	0.26	0.84
4	College Premium	0.44	0.21	1.55	-	-	-
	Hours of Working	-0.13	0.22	0.88	-	-	-
	Hours of Studying	-0.10	0.16	0.90	-	-	-
	Length of Commuting	0.53**	0.14	1.69**	-	-	-
	Stress	0.18	0.25	1.19	-	-	-
	Satisfaction with Advising	0.01	0.21	1.01	-	-	-
	with Computer Lab	0.17	0.22	1.19	-	-	-
	with Library	-0.05	0.26	0.95	-	-	-
	with Teaching	-0.36	0.20	0.69	-	-	-
	Finance by Self or Family (0)	0.73	0.46	2.08	-	-	-
	by Loan or Grant (0)	-0.39	0.41	0.68	-	-	-
	Employment (0)	-0.44	0.55	0.64	-	-	-
	Graduation (0)	-0.05	0.34	0.94	-	-	-

Note: 1 = White, 2 = Black, 3 = Hispanic, 4 = Asian. *Note:* $p < .05$, *; $p < .001$, **.

Note: Parameter coding of categorical variables were indicated in the parenthesis.

Input variables. The multinomial logistic regression analyses in Model 1 and 2 were statistically significant, $\chi^2(20) = 74.343, p < 0.001$. The models explained 53% (Nagelkerke R^2) of the variance in four racial groups. Among all input variables, mother's education, $\chi^2(4) = 14.093, p < 0.001$, household income, $\chi^2(4) = 31.277, p < 0.001$ and gender ratio, $\chi^2(4) = 11.097, p < 0.05$, were significantly different. This indicated that there were relative risks (or protections) found in mother's education, household income, and gender ratio when compared each racial group to White or Asian.

In Model 1, when White was used as a reference group, the findings showed that the odds of having higher household income increased for Black, Hispanic, and Asian students, the odds of having higher mother's education decreased for Hispanic and Asian students, the odds of having higher father's education decreased for Hispanic students, and the odds of being male decreased for Asian students relative to White students while holding all other variables constant.

In Model 2, when Asian was used as a reference group, the outcomes indicated that the odds of having a mother with high education increased, the odds of being male as opposed to female increased, and the odds of having high household income decreased for Black students while holding all other variables constant. There was no statistically significant difference detected between Hispanic and Asian students.

In sum, the NOMREG of *input* variables (Model 1 & 2) highlighted the relative risks (or protections) for Black and Hispanic to White or Asian in parental education, household income, and gender ratio. When used White as a reference group, Black students had higher household incomes, Hispanic students had mothers and fathers with lower education degrees and higher household incomes. Additionally, Asian students had mothers with the lower education and

were more likely to be females than males relative to White. In other words, there was a significantly larger portion of female students in the Asian group in comparison to the White group. When the *input* variables were analyzed using Asian as a reference group, the outcomes indicated that Black students had mothers with a higher education, lower household income, and higher ratio of male students. Hispanic and Asian students had no significant difference in any *input* variable.

Environment and output variables. The multinomial logistic regression analyses of *environment* and *output* variables in Model 3 and 4 were statistically significant, $\chi^2(48) = 115.72, p < 0.001$, and they explained 21.58% (Nagelkerke R^2) of the variance in four racial groups. Among all *environment* and *output* variables, hours of study, $\chi^2(4) = 29.64, p < 0.001$, length of commute, $\chi^2(4) = 22.21, p < 0.001$, financing college with self/family saving, $\chi^2(4) = 10.44, p < 0.05$, and financing college with loan or grant $\chi^2(4) = 10.28, p < 0.05$ produced statistically significant differences. This indicated that there were relative risks (or protections) found in hours of study, length of commute, and financial resource when compared each racial group with Asian or White students.

In Model 3, when White was used as a reference group, the odds of expecting high college premium increased but the odds of studying long hours decreased for Black and Hispanic. The odds of financing college by not using self or family saving increased but not using loan or grant decreased for Hispanic relative to White. The odds of commuting long hours for Asian students relative to White students increased while holding all other variables constant.

In the model 4, when Asian was used as a reference group, the odds of studying and commute long hours for Black and Hispanic students decreased, and the odds of long commutes

and not using loans or grants for Hispanic students decreased while holding all other variables constant.

To summarize, the NOMREG analyses of *environment* and *output* variables demonstrated significant differences in expectation of college premium, financial resource, hours of study, and length of commute among four racial groups. When using White students as a reference group, Black and Hispanic students demonstrated higher expectations of college premium and fewer hours of study. Hispanic students were less likely to finance college with self or family savings but more likely to use loans or grants, and Asian students were likely to commute longer than White students. When Asian was were used as a reference group, Black and Hispanic students were likely to study and commute fewer hours, and Hispanic students were more likely to finance college with loans or grants.

Factors Affecting College Completion

Binary logistic regression models estimated the effects of *input* an *environment* variable on graduation. Table 9 and 10 shows the logistic regression coefficient (*B*), the standard errors associated with coefficients (*SE*), and odds ratios for the predictors (*OR*). *B* values estimate the relationship between independent variables and the dependent variable on the logit scale. It describes the amount of increase or decrease in the log-odds that would be predicted by one unit increase or decrease in the predictor while holding all other predictors constant. *SE* refers to the standard errors, which demonstrates how accurately the model estimates the unknown values of coefficients. It also can be used to create confidence intervals. *OR* refers to the odd ratio, which is the exponentiation of coefficients. *OR* demonstrates the increase or decrease of chance for students' graduation ($OR > 1$ = increase, $OR < 1$ = decrease) in each independent variable.

Among all input variables, the *well-established* variables were entered in block 1, and the *underexamined* variables were added in block 2, to perform the binary logistic regression analyses. The logistic regression model for *input* variables was statistically nonsignificant in Model 1, $\chi^2(7) = 2.559, p > .05$, and Model 2, $\chi^2(7) = 4.44, p > .05$. The model 1 explained 7.0% (Nagelkerke R^2) and the Model 2 explained 12.0% (Nagelkerke R^2) of the variance in graduation, and both models correctly classified 66.9% of cases. The binary logistic regression analyses in Model 1 and 2 demonstrated that none of the *input* variables predicted students' graduation.

Table 11

Input Variables Predicting College Completion (n = 509)

<i>Input (Parameter Coding*)</i>	<u>Model 1</u>			<u>Model 2</u>		
	<i>B</i>	<i>SE</i>	<i>OR*</i>	<i>B</i>	<i>SE</i>	<i>OR*</i>
Block 1.						
Race						
Black (0)	-0.05	0.32	0.95	-0.05	0.32	0.96
Hispanic (0)	-0.1	0.3	0.91	-0.12	0.3	0.89
Asian (0)	0.03	0.33	1.03	0.10	0.33	1.11
Male (1)	-0.17	0.19	0.84	-0.18	0.19	0.84
Father's education	-0.02	0.06	0.98	-0.03	0.06	0.98
Mother's education	0.06	0.07	1.07	0.07	0.07	1.08
Household income	0.05	0.08	1.05	0.06	0.08	1.06
Block 2.						
No siblings in college (1)				-0.27	0.22	0.76
US born (1)				-0.09	0.19	0.92
Constant	0.63	0.64	1.88	0.76	0.66	2.15

Note: Parameter coding of categorical variables were indicated in the parenthesis.

Note: $p < .05$, *; $p < .001$, **.

Note: 95% Confidence Intervals for *OR* were described in Appendix F.

Among *environment* variables, the *well-established* variables were entered in block 1, and the *underexamined* variables were added in block 2 to conduct the binary logistic regression analyses. The regression models for *environment* variables were statistically significant; Model 3: $\chi^2(4) = 20.1638, p < 0.001$, Model 4: $\chi^2(13) = 35.155, p < 0.001$. Model 3 explained 53.6%

(Nagelkerke R^2) and Model 4 explained 92.4% (Nagelkerke R^2) of the variance in graduation, and both models correctly classified 68.18% of cases.

Table 12

Environment Variables Predicting College Completion (n = 509)

	<u>Model 3</u>			<u>Model 4</u>		
	<i>B</i>	<i>SE</i>	<i>OR*</i>	<i>B</i>	<i>SE</i>	<i>OR*</i>
<i>Environment (Parameter Coding*)</i>						
Block 1.						
College premium	-0.21	0.12	0.81	-0.23	0.13	0.8
Finance- Family/Self (0)	-0.16	0.23	0.86	-0.16	0.24	0.85
-System/Institution (0)	0.43	0.31	1.54	0.51	0.32	1.66
Part-time registration (1)	-1.15**	0.3	0.32**	-1.26**	0.3	0.29**
Constant	1.34	0.33	3.88			
Block 2.						
Hours of working				0.04	0.14	1.04
Hours of studying				0.15	0.11	1.17
Employment (0)				-0.08	0.09	0.93
Commuting length				0.03	0.34	1.03
Stress				-0.32*	0.16	0.73*
Satisfaction						
in Advising /Tutoring				0.12	0.11	1.13
in Computer Lab				-0.01	0.10	1
in Library				0.17	0.10	1.18
in Teaching				-0.07	0.12	0.94
Constant	1.35	0.33	3.88	1.21	0.94	3.36

Note: Parameter coding of categorical variables were indicated in the parenthesis.

Note: $p < .05$, *, $p < .001$, **.

Note: 95% Confidence Intervals for *OR* were described in Appendix F.

Table 13 showed that part-time registration was associated with a reduction in the likelihood of graduation, and an increase in stress was associated with a decrease in the likelihood of graduation. To be specific, every one-unit increase in part-time status led to a decrease in the log-odd for graduation by 1.15 unit, and every one-unit increase in stress led to a decrease in the log-odd for graduation by 0.32 unit. The odd ratios in Model 3 described that a student with part-time status is 68% less likely to graduate than a student who was registered

full-time. The odd ratios in Model 4 demonstrated that a part time student is 71% less likely to graduate than a full time student, and a student who perceived more stress in college relative to high school is 27% less likely to graduate than students who perceived less stress.

The outcomes of the binary logistic regression analyses demonstrated that (1) the *well-established* factors, such as parental education, household income, gender, and financial support, which have been known to be good predictors in previous studies, did not predict graduation, (2) the factors predicted college retention in the previous study (Rozon, 2015), mother's educational attainment and expectation of college premium, did not predict college completion in the current study, (3) none of the *input* variable, either *well-known* or *underexamined*, predicted college completion, and (4) only two *environment* variables, which demonstrates students' psychological experience and behavioral intention, were associated with college completion at the NRMC.

Discussions

Previous studies indicated that achievement gaps among ethnic/racial group exist in all education levels, from kindergarten to post-secondary (Fletcher & Tienda, 2010; Fryer & Levitt, 2006; Kao & Thompson; 2003; Reardon & Galindo, 2009; Snyder, et al., 2016). To explain the low academic enrollment and performance, researchers have discussed that low academic achievement of Black and Hispanic students were linked to their low social and economic status relative to Asian and White students (Rector, Johnson, & Fagan, 2001; Rincón, & Rincón, 2008; Wells, 2008)). Interestingly, in the NRMC, there was no significant gap found among racial groups in terms of the graduation rates. In fact, Black and Hispanic female students outperformed Asian and White male students, and Hispanic and Black students had similar or

higher social and financial status, such as parental education, household income, and immigration status, in comparison to White and Asian students.

Graduation Rates of Racial and Gender Groups

The racial disparities in graduation rates were nonsignificant in the current study. Instead, in a college setting where there is no racial majority or target group for support, Black and Hispanic students graduated at higher rates than the national average, Black and Hispanic females outperformed White and Asian males, the racial gaps in graduation were smaller than the ones found in national samples. In addition, the gender differences in college completion were more pronounced than racial differences in college completion.

Factors Affecting Graduation

The current study demonstrated novel findings in terms of college graduation and associated factors. First, although previous studies have shown that students' social and economic background, such as race, immigration status, and gender, play a critical role in college retention (Buchman & DiPrete, 2006; Ewert, 2002; Fuligni & Witkow, 2004; Ishitani & DesJardins, 2002; Kao & Thompson, 2003; Keller & Tillman, 2008), none of these *input* variables predicted college completion at the NRMC. Second, the significant factors of college retention in the previous study (Rozon, 2015), mother's educational attainment and the expectation of college premium, were not associated with college completion in the present study. Considering that the previous study (Rozon, 2015) followed 251 freshmen out of 514 participants after four years and analyzed only seven variables (three *input* and four *environment* variables), the differences in the study designs, such as follow-up duration and sample size, may explain the divergent findings. Third, two significant environmental predictors in the current study, registration status and stress, demonstrate students' experience during college, rather than

their cultural, social, or economic backgrounds. This may suggest that individuals' experience in college could have a more powerful impact than demographic, cultural, and economic factors in a no-racial majority setting.

Registration Status. Similar to previous studies, the present study showed that students who registered part-time were less likely to graduate in comparison to students who registered full time at the NRMCC. A prior study (Stratton, O'toole, & Wetzel, 2007) demonstrated that after controlling underlying differences, such as marital/parental/employment status, between part-time and full-time students, there was no significant difference in their probability of dropping out. Stratton et al. (2007) also pointed out that protective/risk factors affect part-time students differently than full-time students; parental education, academic grade, and household characteristics (such as marital and parental status) had weaker associations with the part-time as compared to the full-time students; race and ethnicity affected part-time students' retention more significantly than full-time students; Hispanic students enrolled part-time were more likely to drop out in comparison to their counterpart who enrolled full-time.

In the current study, there were no significant differences found between part-time and full-time students in terms of household income, parental education, employment status, race, or gender. Instead, we found that students who registered full-time were more likely to use loans or grants, less likely to use self or family savings, and commute longer. Since financial resource and commuting length were not associated with college graduation, the registration status affected students' college completion independently from other *input* and *environment* variables' influences.

In addition, Stratton et al. (2007) cautioned that the sample size of part-time students tends to be small since there are fewer students enrolled part-time than full-time, and a single outlier may have a disproportionate impact and increase the likelihood of collinearity. The current study encountered similar issues, the part-time sample ($n = 62$) was smaller than full-time sample ($n = 452$), but there was no outlier observed, and the collinearity was controlled prior to all analyses. Therefore, the small sample size alone would not have biased the parameter estimates, and we concluded that registering part-time raised the probability of college incompleteness at the NRMC.

Stress. Stress has generated mixed results in the previous studies. In some studies, stress had negative associations with academic performance (Chartrand, 1992) and college retention (Perrine, 1999; Saunders-Scott et al., 2017), in other studies, stress affected neither college performance (Petrie & Stoeber, 1997) nor intention to stay in college (Sandier, 2000a). And, in one study (Zajacova, Lynch, & Espenshade, 2005), surprisingly, stress was positively related to student's retention. In the present study, the findings indicate that students who perceived less stress in college in comparison to high school were more likely to graduate than students who perceived more stress in college. Since the shifts in perceived stress level from high school to college were associated with college graduation, we suggested that stress in this study might have reflected students' abilities to cope with the transition from high school to college. Additionally, two *environment* variables, hours of study and commuting length, were associated with stress, which suggested that longer commute and extended study hours in college compared to high school contributed to the level of perceived stress.

Stress was not associated with students' gender, race, household income, parental education or employment, which indicated that students' demographics or

cultural/social/economic background did not significantly differentiate their perceived stress levels. Furthermore, most *environment* variables, except length of commute and hours of study, were not associated with stress, and it demonstrates that the level of stress was independent from students' employment status, registration status, hours of work, finance resource, or satisfaction in college services.

To extend the interpretation, we speculated that stress in this study might have reflected individuals' traits, since it was independent from all demographic, economic, and most behavioral variables. We conceptualized that stress represented individuals' stable and steady features as opposed to temporary reactions to situations. Thus, individuals' innate tendency to perceive, interpret, and process stress could affect their abilities to complete college education.

Personality traits associated with academic performance in postsecondary education have been abundantly discussed in previous studies for over 100 years (Ackerman & Kanfer, 2009; Acrman, Chamorro-Premuzic, & Furnham, 2011; Bernreuter & Goodman, 1941; Cronbach & Snow, 1977; Poropat, 2009; Thorndike, 1920). These studies, however, have mostly focused on the aptitudes, motivations, and skill-based traits rather than the emotion-related traits, such as trait anxiety or stress reactivity. Furthermore, their observations were limited to knowledge attainment and test performance rather than college completion. A strand of studies in cognitive psychology have discussed the link between trait anxiety and stress (Derakshan, Ansari, Hansard, Shoker, & Eysenck, 2009; Edwards, Edwards, & Lyvers, 2017; Pacheco-Unguettie, Acosta, Lupiáñez, Román, & Derakshan, 2012). They found that high cognitive (versus physical) trait anxiety was associate with poor effectiveness in task performance under both low and high stress. Therefore, we suggest that students who tend to perceive stress high are less

likely to perform adequately to meet criteria for college graduation in comparison to students prone to perceive stress low.

Limitations and Directions for Future Research

This study has several limitations that were accompanied by its strengths. Linking the eight-year-old survey data with the current institutional data enabled us to observe the final graduation rates, as opposed to the retention rate, and investigate a wide range of factors including student's social, economic, and cultural backgrounds, college satisfaction and experience, finance methods, employment, perception of benefits from college degree, and commitment. The survey, however, was developed specifically for the students at the NRMC, and it hindered the comparison of outcomes to other studies and limited generalization. For instance, household income in the survey only ranged from below 20,000 to above 50,000 dollars, since the developer of the survey considered economic characteristics of the NRMC students. Therefore, the income range in the survey was efficient for the NRMC but would not be applicable to other settings with broader income ranges.

In addition, the reliability and validity of the survey were not examined, and it relied highly on face validity, content validity, and ecological validity. There was no specific method used to assess or improve the internal consistency, since the survey was constructed with single items measuring each construct. Lastly, East, South, and Other Asians in the survey were merged into Asian to align with the institutional data, but it also took away an opportunity to observe each Asian subgroup separately. At a glance, the graduation rate of Other Asians was the lowest among all group but have not addressed thoroughly in this study.

The list of limitations suggests directions for future research. Future studies are encouraged to implement standardized measures with established validity and reliability in order

to improve the rigor of the study. In addition, using validated measures will allow researchers to compare their outcomes to other studies that used the same measures. Additionally, Asian subgroups, especially who are suspected of being at risk, should be studied separately from East Asians. This will allow researchers to identify groups who are struggling but not receiving appropriate attention and supports. Lastly, conducting studies in other NRMC settings is encouraged, since there has been little understanding of ethnic minority students' performance in the racially proportionate setting.

Implications

The review of the graduation rates at the NRMC had led to questions such as, "What helped Black and Hispanic students to graduate with higher rates than national averages?" and "What influenced Black and Hispanic female students to graduate with higher rates than White and Asian male students?" To answer these questions, we reviewed the descriptive data of the current study and the NRMC's history that portrayed its culture and role that might contribute to the success of Black and Hispanic students.

Atypicality in Racial Stratification. The current study was designed to observe risk factors that were associated with racial minority students' college graduation in the NRMC based on the assumption that Black and Hispanic students struggle more due to their low social and economic resources in comparison to White and Asian students. Contrary to the assumption, we found that the racial stratifications in social and economic capital were somewhat reversed at the NRMC; White students had lower household income than Hispanic and Black students, and Black students had mothers with higher education than Asian students. The reversed

stratification raised a concern, “Are White and Asian economically and socially marginalized in this setting?” If they are, “Are they receiving sufficient resources and institutional supports?”.

The poverty threshold for 2009 for four family member household was \$21,954 and the median household income was \$51,425 (United States Census Bureau, 2018). At the NRMC, over 90% of White students’ household incomes were below the national median, and more than 60% were below the poverty threshold. Although more than 80% of students at the NRMC had household incomes below the national median regardless of their ethnicity, the poverty rate of White students was higher than all others, and Asian students’ poverty rate was higher than Hispanic and Black students (see Figure 3 and Appendix D).

Interestingly, even with the highest poverty rate, White students were more likely to rely on self or family savings than loans or grants. Hispanic students who had higher household income relative to White students, however, were more likely to use loans or grants instead of using personal savings. This may suggest that White students may be less informed about available federal/institution supports or more hesitant to utilize public resource than Hispanic students. A possible explanation is that the positive stereotype of White, rich and privileged might hinder a White individual from seeking financial assistance from public resources and blind the institution in identifying White students who were in great need. Additionally, unlike previous studies (DesJardins, Ahlburg, & McCall, 2002; Hu & St. John, 2001, Ishitani & DesJardins, 2003; Whalen et al, 2009) having financial aid from public sources, such as grants or loans, did not affect graduation rates at the NRMC. Ironically, this suggested that expanding financial aid might not improve students’ graduation rates in a setting composed of White and Asian students with high poverty rates.

In terms of mother's education level, figure 4 and appendix E showed that White students' parents had more college degrees than any other group, and Black students had more mothers with college degrees than Asian students. This indicated that parents of White students might have been underpaid even with their college degrees, and Asian students might have been receiving less academic support and guidance from their mothers relative to Black students. In addition to low mother's education and high poverty rate, Asians might be dealing with acculturation issues since they were more likely to be born outside of the US. Therefore, these risk factors in White and Asian groups might be attributed to lower graduation rates at the NRMC in comparison to the NCES and NSC.

To conclude, although the findings from previous studies (Fuligni & Witkow, 2004; Kao & Thompson, 2003) highlighted the negative impact of low socioeconomic status on education achievement, the average graduation rate of the NRMC was not below but similar to the national averages. Even with the socioeconomic disadvantages, Hispanic and Black students were graduating at the notably higher rates than national average rates, and Asian and White students were still maintaining the first and second positions in the graduation rate at the NRMC.

History of the NRMC. The participating college, the NRMC, was founded in 1847 in a metropolitan city in the United States. It was the very first public college that provided free education to people who could not access higher education, especially immigrants and children of low-income families (Van Nort, 2007). The first president of the institution said, "...the experiment is to be tried, whether the children of the people, the children of the whole people, can be educated, and whether the institution of the highest grade, can be successfully controlled by the popular will, not by the privileged few" (Ronda, 2017, p. 29). In 1870, the NRMC established the Female Normal and High School to prepare the city's public-school teachers. In

the late 1890s, the college accepted large numbers of immigrants, Jewish, Russians, and Polish, and focused on supporting acculturation and socialization of new groups (Renfro & Armour-Garb, 1999). In 1969, a group of Black and Puerto Rican students claimed that the racial ratio of the college should reflect the ratio of Black and Puerto Rican students in the city's public high schools (Renfro & Armour-Garb, 1999). After the students shut down the campus, the administration revised their admission plans and decided to admit 50% of the freshman from designated poor neighborhoods (Renfro & Armour-Garb, 1999). Currently, the NRMCC serves large numbers of immigrants and ethnic minorities, promotes integration and success of diverse students under a slogan 'We Are One (the college name)' and protects undocumented immigrant students from the repeal of DACA by declaring they have a 'sanctuary' campus. The NRMCC has a house for student citizenship, which helps students and families to get US citizenship and resolve immigration-related issues. Furthermore, between 1970 and 2014, the NRMCC produced ten Nobel prize winners, which demonstrated the excellence in both its education and students. Thus, we suggest that the supportive culture, high-quality education, and excellence in students at the NRMCC contributed to racial minority students' high graduation rates.

Minority Status Stress. Another plausible explanation for Black and Hispanic students' success is that the "minority status stress" (Arbona, Fan, & Olvera, 2018) might be mitigated in the NRMCC. According to Arbona et al. (2018), "minority status stress" refers to the results of perceptions of an unwelcoming campus environment, direct experiences of discrimination, within-group pressure, and perception of academic disadvantage. Therefore, racial minority students experience additional stress that is distinctive from general college stressors related to academic, social, and financial demands (Arbona & Jiménez, 2014). Studies have found that minority status stress was positively associated with depression symptoms (Arbona & Jiménez,

2014; Rodriguez, Myers, Morris & Cardoza, 2000; Saldaña, 1994; Smedley, Myers & Harrell, 1993; Wei, Ku, Liao, 2011) and negatively associated with the sense of belonging (Hurtado & Carter, 1997) and intentions to stay in college (Hurtado & Kamimura, 2003, Wei, Ku, & Liao, 2011). Considering that the minority status stress is not only triggered by racial discrimination but also instigated from within racial group pressures (Arbona & Jiménez, 2014; Rodriguez, Myers, Morris & Cardoza, 2000; Saldaña, 1994), having ethnically proportionate peers on campus might help reduce the chance of experiencing discrimination from a racial majority group or the pressure generated from their own ethnic group whose number is dominant on the campus. Therefore, we suggested that Black and Hispanic students at the NRMC might experience less minority status stress relative to other institutions, and it contributed to the improvement in Black and Hispanic students' graduation rates.

To conclude, the findings from the present study suggested that (1) Black and Hispanic students' educational achievement can be improved in a setting with proportionately diverse groups rather than one dominant group, (2) low income Asian and White students who are in great need might have been overlooked in college retention studies due to positive stereotypes, (3) the influence of students' background factors, such as parental education level, household income, and race/ethnicity on education might not be as strong as experience factors, such as stress and number of credits registered, on college graduation, especially in a setting with economically disadvantaged but proportionally diverse racial groups.

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Appendices

Appendix A: 2009 Survey Questionnaire

College Experience

1. How much more do you think college graduates earn in the United States than high school graduates and college dropouts?

- (1) 20%-39%
- (2) 40%-59%
- (3) 60%-79%
- (4) 80%-100%

2. Which personal sources of financial support do you use to help pay your college expenses (tuition, fees, books, other costs directly related to attending college)?

- a) Income from a current job
- b) My personal savings
- c) Income or savings from a parent/spouse/partner
- d) More than one of the above
- e) None

3. What other sources have you used?

- a) Employer contribution
- b) Grants or scholarships (Such as Pell, TAP, Vallone scholarship or other scholarship)
- c) Student loan
- d) Other type of loan
- e) Public assistance
- f) More than one of the above
- g) None

4. This semester, are you working for pay?

- a) No
- b) Yes, on campus
- c) Yes, off campus
- d) Yes, Both

5. Over the last week (7 full days), about how many hours did you spend working for pay? (Total for all paying jobs)

- a) 0
- b) 1-10
- c) 11-20
- d) 21-34
- e) 35 or more

6. Over the last week (7 full days), about how many hours did you spend studying? (Select only one answer)

- a) 0 hrs
 - b) 1-5 hrs
 - c) 6-10 hrs
 - d) 11-20 hrs
 - e) Over 20 hrs
7. How long is your commute to college?
- a) I live in dormitories
 - b) 15 - 30 minutes
 - c) 31-60 minutes
 - d) 1.5 hours
 - e) More than 1.5 hours
8. Indicate your level of satisfaction with academic advising and tutoring services. If you have not used the service, select the last option.
- a)Very Satisfied b)Satisfied c)Neutral d) Dissatisfied e)Very Dissatisfied f)Not Applicable
9. Indicate your level of satisfaction with Computer lab services. If you have not used the service, select the last option.
- a)Very Satisfied b)Satisfied c)Neutral d) Dissatisfied e)Very Dissatisfied f)Not Applicable
10. Indicate your level of satisfaction with library services. If you have not used the service, select the last option.
- a)Very Satisfied b)Satisfied c)Neutral d) Dissatisfied e)Very Dissatisfied f)Not Applicable
11. Indicate your level of satisfaction with the teaching at the College.
- a)Very Satisfied b)Satisfied c)Neutral d) Dissatisfied e)Very Dissatisfied f)Not Applicable
12. How do you find College compared to your High School?
- a) Less stressful
 - b) Equally stressful
 - c) More stressful

Self-reported Demographics and Family Background

13. Were you born in the United States?
- a) Yes
 - b) No
14. What is the ethnic background you most closely associate yourself with?
- a) White
 - b) Black or African-American
 - c) Latino/a
 - d) East Asian
 - e) South Asian
 - f) Other Asian
 - g) American Indian or Alaska Native

h) Other

15. What is the main ethnic group in your neighborhood?

- a) White
- b) Black or African-American
- c) Latino/a
- d) East Asian
- e) South Asian
- f) Other Asian
- g) American Indian or Alaska Native
- h) Other

16. What is the main ethnic group you spend time with?

- a) White
- b) Black or African-American
- c) Latino/a
- d) East Asian
- e) South Asian
- f) Other Asian
- g) American Indian or Alaska Native
- h) Other

17. What is the highest level of education attained by your father?

Post-graduate or professional degree

- a) 8th grade or less
- b) Some high school
- c) High school graduate
- d) Some college
- e) College graduate
- f) Don't know

18. What is the highest level of education attained by your mother?

- a) 8th grade or less
- b) Some high school
- c) High school graduate
- d) Some college
- e) College graduate
- f) Don't know

19. Do you have any brothers or sisters who are currently attending or have attended college?

- a) No
- b) Yes

20. Do you have any brothers or sisters who have graduated from college?

- a) No
- b) Yes

21. What is your best estimate of the total income in your household last year? (Consider income from all sources before taxes).

- a) Less than 20,000
- b) 21,000-30,000
- c) 31,000-40,000
- d) 41,000-50,000
- e) Above 50,000

Appendix B

Comparisons of Freshmen Graduation Rates by Gender and Race

		NSC	NCES	NRMC
Male	White	59.6	60	56.96
	Black	37.1	34.3	50.85
	Hispanic	46.8	49.2	50.16
	Asian	67.1	69.2	61.65
Female	White	67.7	66.1	65.73
	Black	46.8	43.2	62.28
	Hispanic	55	57	64.29
	Asian	73.3	75.1	71.2

Appendix C

Racial and Gender Gaps in NRMC, NSC, and NCES in Graduation Rates

	Racial gap in male	Racial gap in female	Racial gap (both gender)	Gender gap
NRMC	11.49	8.92	8.18	9.92
NSC	30	26.5	25.8	6.8
NCES	34.9	31.9	33.5	5.9

Appendix D

Frequency Data (%) of Household Income by Race

	Below 20k	21-30k	31-40k	41-50k	Above 50k	Invalid	Total
White	42 (60)	15 (21.4)	6 (8.6)	1 (1.4)	1 (1.4)	5 (7.1)	70 (13.75)
Black	17 (14.7)	62 (53.4)	24 (20.7)	1 (0.9)	0 (0)	12 (10.3)	116 (22.79)
Hispanic	39 (18.8)	32 (15.5)	106 (51.2)	4 (1.9)	3 (1.4)	23(11.1)	207 (40.67)
Asian	32(27.6)	9 (7.8)	22 (19)	19 (16.4)	12 (10.3)	22 (14.1)	116 (22.79)
Total	130 (25.54)	118 (23.18)	158 (33.04)	25 (4.91)	16 (3.14)	62 (12.18)	509 (100)

Appendix E

Frequency Data (%) of Mother's Education by Race

	Unknown	8 th grade or less	Some high school	High school graduate	Some college	College graduate
White	4 (5.7)	3 (4.3)	2 (2.9)	17 (24.3)	12 (17.1)	32 (45.7)
Black	13(11.2)	3 (2.6)	12 (10.3)	17 (14.7)	26 (22.4)	45 (38.8)
Hispanic	19 (9.2)	27 (13)	35 (16.9)	35 (16.9)	46 (22.2)	45 (21.7)
Asian	20 (17.2)	17 (14.7)	8 (6.9)	22 (19)	18 (15.5)	31 (26.7)
Total	56 (11)	50 (9.8)	57 (11.2)	91 (17.9)	102 (20)	153 (31.1)

Appendix F

95% Confidence Interval for *OR* in Binary Logistic Regressions of*Input Variables*

<i>Input (Parameter Coding)</i>	<u>Model 1</u>		<u>Model 2</u>	
	Lower	Upper	Lower	Upper
Block 1.				
Race				
Black (0)	0.51	1.76	0.51	1.78
Hispanic (0)	0.51	1.63	0.5	1.60
Asian (0)	0.54	1.94	0.58	2.13
Male (1)	0.58	1.22	0.58	1.22
Father's education	0.86	1.11	0.86	1.11
Mother's education	0.94	1.21	0.94	1.23
Household income	0.90	1.23	0.92	1.23
Constant	0.53	6.62		
Block 2.				
No siblings in college (1)			0.63	1.34
US born (1)			0.5	1.16
Constant			0.59	7.83

Note: $p < .05$, *; $p < .001$, **.

Appendix G

95% Confidence Interval for *OR* in Binary Logistic Regression of *Environment* Variables

<i>Environment (Parameter Coding)</i>	<u>Model 3</u>		<u>Model 4</u>	
	Lower	Upper	Lower	Upper
Block 1.				
College premium	0.72	0.92	0.62	1.02
Finance- Family/Self (0)	0.55	1.34	0.53	1.37
-System/Institution (0)	0.85	2.82	0.88	3.13
Part-time registration (1) **	0.18	0.55	0.16	0.51
Constant	2.05	7.32		
Block 2.				
Hours of working			0.79	1.36
Hours of studying			0.94	1.43
Employment (0)			0.52	2.01
Commuting length			0.78	1.09
Stress *			0.53	0.99
Satisfaction				
in Advising /Tutoring			0.9	1.41
in Computer Lab			0.81	1.22
in Library			0.97	1.45
in Teaching			0.73	1.19
Constant			0.53	21.11

Note: $p < .05$, *; $p < .001$, **.