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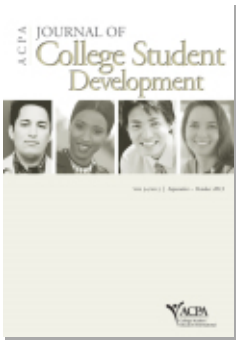

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Using a longitudinal sample of 146 Latino students' in science, technology, engineering, and mathematics majors, the purpose of the study was to examine factors that affect their academic performance. The main premise supporting this study suggested that Latino students perform better academically when they have cultural congruity within their chosen academic major. Although this premise was supported, college experience variables like studying with other students and attending diversity functions were negatively correlated with performance. Such experiences may reveal insight into the cultural incongruity that exists for students in these majors and their peers outside of the majors.

By the year 2050 there will be more than 20 million Latinos between the ages of 5 and 17 living in the United States (Chapa & De La Rosa, 2006). The number of college-age Latinos will increase from 3 million to more than 8 million by 2040. Unfortunately, these numbers are not likely to translate into a significant increase in college enrollments. In fact, according to Chapa and De La Rosa the number of college enrolled Latinos will increase from fewer than 1 million to only about 2 million. The available literature also indicates that Latino students, as well as African American, and American Indian students face the greatest difficulty getting in and out of science and engineering academic programs (Huang, Taddese, & Walter, 2000). According to the National Science Foundation (2006), of the 436,372 bachelor's degrees awarded in science and engineering to U.S. citizens and permanent residents, 7.3% (about 31,855) were earned by Latino students, whereas 65.1% (about 284,078) were earned by White, non-Hispanic students. In addition, the degree attainment in the science, technology, engineering, and mathematics (STEM) fields between male and females in the Latino population is disproportionate. Although Latinas enroll in college at greater numbers than Latinos (National Center for Education Statistics [NCES], 2005), Latinas are underrepresented in the STEM fields. In 2005 Latinas received 60% of the bachelor's degrees awarded to the Latino population, but Latinas only earned 37% of the degrees awarded to this population in STEM fields (NCES).

Research has suggested that the campus climate in which Latinos experience college will likely have a direct effect on both the learning and social outcomes of these students (Antonio, 2001; Chang, 1999; Hurtado, 1994). For example, Cole (in press) suggested that the negative correlation between Latino students' intellectual self-concept and attending diversity-related functions/ activities were likely the result of students' feeling alienated within the academic milieu of college. Other studies have also found that Latino students who experience a hostile campus climate have a greater difficulty forming a sense of attachment to the college and have a complicated time adjusting academically and socially

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(Hurtado, Carter, & Spuler, 1996). Such negative experiences have often been significantly correlated with lower levels of students' academic performance. Yet, few of these findings have been specific to Latinos majoring in the STEM fields.

Thus, the purpose of the study was to examine factors that affect the academic performance of Latino students in STEM majors. The main premise supporting this study was based on prior research, which suggested that Latino students' will perform better academically when they have cultural congruity with their chosen academic major (Gloria & Kurpius, 1996; Jones, Castellanos, & Cole, 2002; Pascarella, Pierson, Wolniak, & Terenzini, 2004). The following assumptions shaped the premise on which this study was based:

1. Cultural capital gained prior to students' college enrollment will significantly contribute to the academic success of these students.
2. A higher level of cultural capital translates into a higher level of cultural congruity.
3. Perceptions of campus climate offer plausible interpretations of students' cultural congruity by examining their college experiences and the related impact on academic performance.

Each of these assumptions were explored more fully throughout this study. The research questions that guided this study were:

1. To what extent does cultural capital and cultural congruity affect the academic performance of Latino students' majoring in STEM fields?
2. To what extent does campus climate, as measured through academic-related experiences of Latino students in STEM majors affect their academic performance?

Minorities in STEM Majors

For both Latinos and other minority students, their selection and persistence in STEM majors has been significantly correlated with their academic preparation in high school (Bonous-Hammarth, 2000; Elliot, Strenta, Adair, Matier, & Scott, 1996; Grandy, 1998; Huang et al., 2000; Simpson, 2000). Bonous-Hammarth emphasized that an interest in in science, mathematics, and engineering (SME) majors and a high grade point average (GPA) of A or A+ while in high school were factors associated with the retention of underrepresented students in SME majors once in college. However, in 2005 the average GPA of Latino high school graduates was a 2.82 compared to a 3.05 of their White counterparts, which suggested that Latino students were less likely to be retained in SME majors (Shettle et al., 2007). According to Elliot et al., "Equally developed ability among students interested in science predicts equal persistence, regardless of ethnic or racial affiliation" (p. 684), which implies that skill development and academic performance prior to enrolling in college, not race or ethnicity, serves as an indicator of how well or how poorly a student will perform in a science-related field.

Yet, for Latino students, research has suggested that once in college, factors such as peer and faculty support, and cocurricular involvement play a role in the retention of this student population (Gloria, Castellanos, Lopez, & Rosales, 2005; Hernandez, 2000; Hernandez & Lopez, 2004). Faculty or staff members, in particular, serve as role models and as examples of individuals who have successfully navigated the educational system. Moreover, students who foster relationships with faculty members outside of the classroom are more likely to report higher levels of college satisfaction and persist to graduation (Hernandez & Lopez). Through cocurricular

involvement, Latino students find opportunities to make new friends who are from similar cultural and socioeconomic backgrounds; it is through these peer relationships that they typically find a caring and supportive educational community (Hernandez; Hernandez & Lopez).

Similarly, available research on students majoring in STEM has also reported that supportive educational environments during college were positive indicators of persistence (Bonous-Hammarth, 2000; Grandy, 1998; Leslie, McClure, & Oaxaca, 1998). For racial/ethnic minority (REM) students in particular, such support includes minority or female role models and advisors, advice from advanced students from the same ethnic group, and minority relations staff (Grandy). Whereas Bonous-Hammarth emphasized the importance of connections among peers and mentors, Leslie et al. found that REM students who complete their science and engineering degree typically emphasize the role of a faculty member as instrumental to their success. The support that minority students receive, however, may have little direct effect on college grades; this kind of support appears to have the greatest influence on REM students' commitment to an SME major and the extent to which they enjoy their selected major (Grandy). In addition to early interest in SME fields and academic achievement during high school, REM students are better equipped to succeed in SME fields with mentoring during high school and while in college (Bonous-Hammarth).

Grandy (1998) found that advisors have a small negative effect on the persistence of REM students, because their awareness to serve society in fields outside of science or engineering was enhanced through the contact with advisors. As a result, these students may switch to another major perceived as a better route for enhancing their contribution to society. Active campus involvement outside of SME can also have negative effects on the persistence of REM students within SME majors. According to Bonous-Hammarth (2000), this sort of involvement marginalizes REM students from the customary values of their disciplines. For African American, American Indian, and Latino students, this is particularly a concern because it is reported that these groups depart from SME majors because of the chilly academic climate, which may also be a conflict between the values within their major and the respective disciplines of their peers (e.g., cultural sensitivity; Bonous-Hammarth).

Theoretical Background

Three concepts form the theoretical grounding for the analysis of this study: (a) cultural capital, (b) cultural congruity, and (c) campus climate. *Cultural capital* usually refers to the socialization into cultural activities such as reading literature, listening to classical music, and attending museums and theaters (Kalmijn & Kraaykamp, 1996). Similarly, cultural capital alludes to the familiarity and ease with which one navigates the dominant culture of society, (Bills, 2003). The leading proponent of cultural capital, French sociologist Pierre Bourdiue (1977), argued that the educational system produces a culture that is closer to the dominant culture of society and uses a pedagogy that requires initial familiarity with the dominant culture. Success in the educational system often requires a predisposed cultural competence gained through family upbringing (Bourdiue). Given that a number of Latino students have parents who only have a high school education (Dennis, Phinney, & Chuateco, 2005; Lohfink & Paulsen, 2005; Warburton, Bugarin, & Nuñez, 2001), researchers have theorized that Latino students' cultural capital is different from students with college-educated parents. Consequently, students with

college-educated parents would have better access to cultural capital, which translates into a better understanding of the academic culture in college. As such, students with non-college-educated parents are less likely to know what type of social and academic decisions to make while in college (Pascarella et al., 2004).

The immersion of students from lower socioeconomic levels into a middle-class university environment can result in *cultural incongruence* (Gloria & Kurpius, 1996). Once in college, REM students often encounter situations that are incongruent with their behaviors and values (Jones, Castellanos, & Cole, 2002) because predominantly White universities typically reflect White male, middle-class perspectives. REM students are challenged to balance their participation in their "home" culture and "university" culture (Gloria & Kurpius). Certain context issues, such as an unwelcoming and/or hostile learning environment and encounters with discrimination, also help explain why REM students report lower levels of cultural congruity as well as negative perceptions of the university environment (Gloria et al., 2005; Gloria, Hird, & Navarro, 2001). Lower levels of cultural congruity and negative perceptions of the university environment can cause REM students to question whether they are being treated fairly and in a culturally relevant manner (Gloria, Hird, & Navarro). Overall, because of cultural incongruity, REM students may feel isolated, culturally alienated, and unwanted within their academic context (Gloria & Rodriguez, 2000).

The assumption is then that students with higher levels of cultural capital also experience higher levels of cultural congruity. Students from low socioeconomic backgrounds may be more likely to experience cultural incongruity because of their lack of cultural capital. There is also the assumption that with regard to their academic performance, students are influenced by the cultural capital they bring to college and the cultural congruity they perceive once in college (Gloria & Kurpius, 1996; Gloria & Rodriguez, 2000; Gloria, Hird, & Navarro, 2001; Pascarella et al., 2004; Zwick, 2004; Contreras; 2005; Gloria et al., 2005). However, cultural capital and cultural congruity do little to help make sense of students from low socioeconomic backgrounds that do well academically, despite low levels of cultural capital and cultural congruity. Therefore, *campus climate* is used to determine how students interpret the college environment, how they perceive and behave within the environment, and in return how their college experiences are related to their academic success.

Hurtado, Milem, Clayton-Pedersen, and Allen (1998), define campus climate through four interconnected dimensions: (a) institution's historical legacy of inclusion or exclusion of various ethnic/racial groups, (b) its structural diversity in terms of numerical representation of various racial/ethnic groups, (c) the psychological climate of perceptions and attitudes between and among groups, and (d) and the behavioral climate dimension, characterized by intergroup relations on campus. For the context of this study the third and fourth dimensions were significant. The psychological dimension was focused on how Latino students' view relationships with their peers and faculty (Hurtado et al.). For instance, Rankin and Reason (2005) reported that White students were more likely than REM students to rate the institutional responses to racial climate as favorable and were also more likely to view the campus climate as friendly, respectful, and nonracist. Conversely, a greater proportion of REM students viewed the campus climate as hostile, disrespectful, and racist (Rankin & Reason). They also reported being stereotyped and experiencing racial prejudice in the form of unfair treatment from teaching assistants,

faculty, and other students (Ancis, Sedlacek, & Mohr, 2000). Individual perceptions of the campus climate including interactions with diverse peers have been related to learning outcomes like GPA and persistence (Rankin & Reason).

The behavioral climate dimension suggests that individual interpretations of an institution's racial/ethnic climate can also be discerned by how individuals interact with racially different peers and the individuals' level of involvement in campus activities, although students can be involved and still have poor perceptions of the campus climate. For Latino students, cocurricular involvement typically increases their likelihood of feeling welcomed on campus (Hernandez, 2000; Hernandez & Lopez, 2004) and provides a means of staying culturally grounded (Hernandez & Lopez). Yet, to what extent does cocurricular involvement contribute to the academic performance of Latino students?

Conceptual Framework

Cultural capital in this study was measured by the level of parental education. The level of parental education provides an idea of how well a student understands the academic culture and how well a student is able to make social and academic decisions once in college. Although the literature on the role of cultural capital and its direct influence on educational attainment for all students is not conclusive (Bourdieu & Passerson, 1977; DiMaggio, 1982; Gándara, 1995), several studies suggest that level of parental education plays a role in a student's exposure to additional resources (i.e., cultural capital) that have a positive effect on educational achievement (Contreras, 2005; Zwick, 2004). For example, it is known that individuals with college-educated parents have better access to social and cultural capital through family relationships (Pascarella et al., 2004).

Cultural congruity, in some cases, has been measured with a Cultural Congruity Scale comprised of 13 items, which use 4-point scales ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) (Gloria, Hird, & Navarro, 2001; Gloria & Kurpius, 1996). Items included in the scale (i.e., "I feel accepted at school as an ethnic minority"; "As an ethnic minority, I feel as if I belong on this campus") are designed to assess experiences and perceptions of university life and a student's sense of cultural fit within the college environment (Gloria, Hird, & Navarro; Gloria & Kurpius). Although we did not use this particular scale, we used the following variables to measure students' level of interracial interactions, comfort and compatibility (i.e., cultural congruity) with the college environment: "Had a roommate of different race/ethnicity"; "Socialized with someone of a different race/ethnic group"; and "Attended diversity functions."

Cultural capital may influence cultural congruity and in return cultural congruity may shape how a student views the campus climate. Campus climate, in this study, is used to interpret the correlations between students' perceptions, experiences, and their effects on academic performance (GPA); hence, the focus on two of the four dimensions of campus climate theory—psychological and behavioral. The two variables used to explore the psychological dimension were: (a) satisfied with interactions with peers, and (b) satisfied with the amount of contact with faculty. How the student views his or her interactions with peers and faculty can affect the student's perceptions of the campus climate and potentially mediate cultural incongruity (Hurtado et al., 1998). Moreover, peers and faculty can provide cultural support and capital that may not be provided by one's parents and thus minimize cultural incongruity and enhance the negative perceptions of campus climate.

The variables that explore the behavioral

TABLE 1.

Descriptive Data of the Independent Variables

	Latino (n = 146)	
Independent Variables	*M*	*SD*
Institutional Characteristics		
Institutional type	1.62	—
Student Background Characteristics		
Gender of student	1.46	—
Parents' education	10.11	3.60
Pretest Variables		
Average high school grades	6.76	1.25
Peer Involvement		
Studied with other students	2.43	0.58
Tutored another college student	1.66	0.66
Worked on group projects in class	2.42	0.57
Time spent on studying/homework	3.39	0.98
Satisfied with interaction with peers	3.01	0.72
Diversity-Related Activities		
Attended diversity functions	4.36	1.09
Had roommate of different race/ethnicity	1.67	0.47
Socialized with someone of a different ethnic group	2.70	0.53
Student-Faculty Interactions		
Faculty support and encouragement	11.46	2.38
Negative feedback about academic work	1.75	0.60
Satisfied with amount of contact with faculty	3.06	0.78

dimension included three categories of college experiences: (a) peer involvement in academic activities; (b) diversity-related activities; and (c) student-faculty interactions. Cocurricular involvement as well as peer and faculty interaction plays a role in the perception of climate and the academic success of Latino students (Gloria et al., 2005; Hernandez, 2000; Hernandez & Lopez, 2004). For REM students in STEM majors, faculty support also plays an important role in degree completion; yet, involvement outside of their majors can negatively influence persistence within their majors. Thus, the psychological and behavioral dimensions were expected to impact the academic performance of Latino students in STEM majors.

METHODS

Data

The Cooperative Institutional Research Program (CIRP), located in the Higher Education Research Institute at the University of California, Los Angeles, has collected student data for over 40 years. For the purpose of this study a random sample of the freshmen survey data (1999) and the follow-up data

(2003) was obtained. The 1999 freshmen survey (Student Information Form; SIF) was administered during orientation and through the first month of classes, and the follow-up survey, the college senior survey (CSS) collected in 2003 was mailed home to a sample of 1999 SIF students. Most of the 146 students who completed the survey were students (54.1%) who had high school GPAs of A- or better (60.3%), had parents with at least some college education (73.8%), and lived on campus (82.9%).

Variables

The outcome (O) or dependent variable was from the data collected during students' fourth year in college: average college grades (GPA). Input (I) variables, data collected during students' first year of college, were conceptually organized by institutional characteristic (i.e., institutional type—university and four-year college), students' background characteristics (i.e., gender and level of parental education), college entry variable (i.e., live off or on campus), and pretest variables for GPA (i.e., high school GPA; see Figure 1).

Three conceptual categories of environmental (E) variables were included in these analyses: peer involvement in academic activities (i.e., studied with other students, tutored another college student, worked on group projects in class, time spent studying or doing homework, and satisfied with peer interactions), diversity-related interactions (i.e., had roommate of different race/ethnicity, socialized with someone of a different race/ethnic group, attended diversity functions [3 items; $\alpha = .6$]), and student-faculty interactions (i.e., faculty support and encouragement [5 items; $\alpha = .8$], negative feedback about academic work, and satisfied with amount of contact with faculty).

Analysis

Statistical analyses consisted of descriptive statistics, factor analyses and regression analysis. To reduce the number of variables and develop conceptually supported factors across environmental variables, principal component analyses were conducted and Cronbach's alphas were calculated. We considered the clustering effects of individual students nested within institutions and used chi square and intraclass correlations to determine whether ordinary

TABLE 2.

Composite Measures With Factor Loadings and Reliabilities

Composite Variable	Latino (*n* = 146)
Attended Diversity Functions	
Enrolled in ethnic studies course	A = .6
Attended racial/cultural awareness workshop	
In racial/ethnic student organization	
Faculty Support	
Professor provided encouragement for graduate school	A = .8
Professor provided respect	
Professor provided emotional support & encouragement	
Professor provided intellectual challenge & stimulation	
Professor provided opportunity to discuss coursework outside class	

FIGURE 1. Variables Used in the Study, Coding, and Value Labels

Variables	Scale	Code
Institutional Type	University, 4 year	1–2
Gender of Student	Male, Female	1–2
Parents' Level of Education	1-6 = H.S. or Less 7-12 = Some College 13-16 = Graduate Ed.	1–18
Average High School Grades	1 = D; 2 = C; 3 = C+; 4 = B–; 5 = B; 6 = B+; 7 = A–; 8 = A or A+	1–8
Peer Involvement		
Studies with Other Students Tutored Another College Student Worked on Group Projects in Class Time Spent on Studying/Homework	1 = Not at all 2 = Occasionally 3 = Frequently	1–3
Satisfied with Peer Interactions	1 = Dissatisfied 2 = Neutral 3 = Satisfied 4 = Very Satisfied	1–4
Diversity-Related Activities		
Attended Diversity Functions (Additive Factor Structure): *Enrolled in ethnic studies course* *Attended racial/cultural awareness workshop* *In racial/ethnic student organization*	3 = Not marked 4 = At least Once 6 = One of each	1–9
Had Roommate of Different Race/Ethnic Group Socialized with Someone of Different Race/ Ethnic Group	1 = Not at all 2 = Occasionally 3 = Frequently	1–3
Student-Faculty Interactions		
Faculty Support and Encouragement (Additive Factor Structure): *Professor provided encouragement for graduate school* *Professor provided respect* *Professor provided emotional support & encouragement* *Professor provided intellectual challenge & stimulation* *Professor provided opportunity to discuss coursework outside class*	5 = Not at all 10 = Occasionally 15 = Frequently	1–15
Negative Feedback about Academic Work	1 = Not at all 2 = Occasionally 3 = Frequently	1–3
Satisfied with Amount of Contact with Faculty	1 = Dissatisfied 2 = Neutral 3 = Satisfied 4 = Very Satisfied	1–4

TABLE 3.

Regression Analysis on the GPA of Latino Students (n = 146) in STEM Majors

Independent Variables	GPA
Institutional Characteristics	
Institutional type (4 year)	.093
Student Background Characteristics	
Student's sex (female)	.178*
Parents' education	.024
Pretest Variables	
High school GPA	.373**
R^2	.294
Peer Involvement	
Studied with other students	–.153*
Time spent on studying/homework	.155*
Tutored another college student	.053
Worked on group projects in class	–.056
Satisfied with interaction with peers	–.005
Diversity-Related Activities	
Attending diversity functions	–.200**
Had roommate of different race/ethnicity	–.061
Socialized with someone of a different ethnic group	.102
Student-Faculty Interactions	
Faculty support and encouragement	.268**
Negative feedback about academic work	.098
Satisfied with amount of contact with faculty	–.033
R^2	.419
Adjusted R^2	.348

*p < .05. **p < .01.

least squares (OLS) regression analysis or multilevel regression analysis would provide more accurate estimates of standard error. As a result, OLS regression analysis was used to examine the academic performance of Latino students' majoring in STEM fields. The regression analysis, according to the I-E-O model (Astin, 1993), entered variables in blocks, which were then regressed and entered onto the dependent variable of average college grades (GPA). Block 1 consisted of institutional and students' background characteristics, college entry, and pretest variables for GPA. Block 2 consisted of peer involvement in academic activities, diversity-related activities, and student-faculty interactions.

FINDINGS

The regression model represented approximately 42.3% (adj R^2 = .357) of the variance for the

GPA of Latino students majoring in STEM. We were interested to note that institution type was not significantly related to Latino students' academic performance. Another research study also reported that institutional variables such as type and control (i.e., public vs. private) were not significantly correlated to African American and Latino students' GPA (Cole, in press).

The only significant student background variable was gender, which was positively related to students' GPA. As such, it suggests that Latina students were more likely than their male counterparts to report good college grades. This finding is consistent with the literature on the academic performance of minority female college students (Cole, in press) and female students in STEM majors (Huang et al., 2000). According to Huang et al., although female, relative to their male counterparts, are less likely to enter science and engineering (SE) majors, female students who do apply to these majors are well prepared with regard to academics. In addition, once in college they continue to do well in SE majors and have strong family support. As a result, the difficulties faced by female students in terms of access, retention, and graduation appear to be more psychocultural in nature rather than academic (i.e., self-esteem in science and engineering; Huang et al., 2000).

Surprisingly, parents' level of education had no significant impact on Latino students' GPA. According to the literature (Dennis et al., 2005; Lohfink & Paulsen, 2005; Warburton et al., 2001), students who have highly educated parents also have higher levels of cultural capital and are believed to have higher levels of cultural congruity, which positively affects academic success. Given that most parents of participants in this study had, at most, *some* college education (73.8%) and not a college degree may explain why this variable was not significant; a college degree may be the minimum threshold needed for the level of parental education to have a significant and positive effect on students' academic performance. Or, prior academic performance (i.e., high school GPA) may share some variance with level of parental education and thus, suppress the significant contribution of this variable in explaining the outcome. Notably, high school GPA had a significant and positive influence on students' GPA ($\beta = 0.365$, $p < .001$) and had the largest beta weight of all the variables significant in the regression model. Because high school preparation has been highly correlated with the retention and persistence of students in STEM majors, this finding was expected. This finding also supports the theoretical assumption that students' academic performance in college is influenced by the cultural capital they bring to college; as long as high school GPA is considered a measure of cultural capital.

Out of the 10 variables in the three environmental categories, the only significant variables were: studied with other students, attending diversity functions, time spent on studying/homework, and faculty support and encouragement. The findings indicated that studying with another student and attending diversity functions negatively affected Latino students' GPA. Some of the literature exploring the college impact of racial/ethnic diversity on students' educational gains has suggested that diversity-related activities have positive effects on students' educational gains (Montelongo, 2003); although, more recent studies have reported findings similar to those found in the current analysis (Cole, in press). Latino students may use these types of interpersonal interactions as a support mechanism in response to feelings of alienation and marginalization experienced within their academic programs. Further, time spent immersed in nonacademic activities is time away from studying, which can negatively impact grades (Astin, 1993;

Pascarella & Terenzini, 2005). Yet, the latter rationale does not explain the negative correlation between GPA and studying with other students.

Time spent on studying and faculty support and encouragement were positively related to GPA, given prior research on students' academic success (Pascarella & Terenzini, 2005). It was, however, noteworthy that "negative feedback about academic work" did not significantly impact students' performance, especially when more than 60% of students in this sample indicated that they occasionally have at least one of these interactions with faculty. Although no significant relationship is better than a negative one, opportunities for improving students' academic performance are not being captured when students interact with faculty about their study skills or through the critiques of their coursework.

In sum, the input variables explained 28% of the variance for Latino students' college GPA. As a result, the college experience variables added about 8% to the total variance explaining the outcome measure. The relative contribution of these variables are consistent with the theoretical grounding used to support this analysis, that is, that cultural capital and cultural congruity predict how well a student does academically in college, and campus climate helps to explain the relationship between college experiences and academic performance.

DISCUSSION

Given the analysis in this study, several findings warrant a more complete discussion. First, the findings indicated that out of all the pretest variables, high school GPA had a significantly positive influence on the college GPA of Latino students' majoring in STEM. Yet, the use of high school GPA as an indicator and predictor of academic performance for REM students once in college remains controversial, particularly when used in policy decisions. For instance, prior research suggested that for underrepresented students, an interest in an SME major and a high GPA while in high school, were correlated to retention in an SME major once in college (Bonous-Hammarth, 2000). Elliot et al. (1996) also noted that academic performance in science-related topics prior to enrolling in college indicated how well or poorly a student will do in a science-related topic while in college. Hernandez and Lopez (2004), however, labeled GPA as a "traditional measurement" and criticized college admissions policies that continued to employ it as a prerequisite for college acceptance; they argued that applying GPA as a measure of college performance for Latino students is problematic because GPA has little connection to the full potential of their academic skills or their determination to succeed in college. Similarly, Hurtado et al. (1996) indicated that high school GPA was not related to the academic adjustment of Latinos in the second year of college; opportunities for students to interact with faculty and attending a college with student-centered faculty are reportedly more likely to predict college adjustment and success, than high school GPA (Hurtado et al.). But, these conclusions were not based on findings specific to STEM majors. Research that is major specific has demonstrated that for REM students pursuing a degree in a STEM field, high school GPA plays a significant role. As such, we argue that the current findings support high school-to-college transition programs that focus on increasing academic performance for students' interested in STEM majors, but we warn against the use of academic achievement as the major point in which access is determined, because of mediating environmental factors experienced within the college environment.

Even after controlling for high school

grades, Latinas in this sample (i.e., 79 males and 69 females) were more likely than their male counterparts to report higher GPAs, which is the second discussion point in this study. This result indicated that despite their underrepresentation in STEM fields, Latinas are managing to do well academically, which is consistent with prior research on female students in STEM. Research examining female students in science and engineering (SE) indicated that although women enroll in SE programs at lower rates than men (Huang et al., 2000), those who do enroll are as academically prepared as their male counterparts (Grandy, 1998; Huang et al.). Moreover, Huang et al. found that once in the pipeline, women when compared to men in SE do better academically, have higher degree completion (48.6% vs. 40.4%) , and were less likely to switch majors (11.5% vs. 19.4%; Huang et al.). Overall, relative to men, women in SE programs are not inadequately prepared and they do not perform poorly. As noted above, the difficulties faced by women appear to be more psycho-cultural in nature rather than academic (Grandy; Huang et al.), which according to Leslie et al. (1998) is an issue of high self-concept (perception of self) and self-esteem in science and mathematics. High school adolescents are more likely to take more math courses when they perceive themselves to have high math ability. Yet, female students in high school tend to lack such confidence compared to their male counterparts. Female students who lack a positive self-concept are less likely to enroll in SME fields (Leslie et al.). Therefore, promoting female students' self-concept in STEM-related courses through pedagogical practices like master learning versus performance-driven methods (i.e., competitive) will likely increase academic performance in high school and college for these female students (Cole, 2007).

The third discussion issue is based on the percentage (73.8%) of the students in the sample that have parents with a high school diploma and some college education. A mean score of 10.11 indicates that the parents' educational level is closer to that of a high school graduate, than to a college graduate. As such, the cultural capital of students in this sample appears to parallel that of students with non-college-educated parents; in that, the level of parental education as a pretest variable has no significant impact on GPA. This finding is consistent with the cultural capital theory, especially because we theorized that the cultural capital of students with college-educated parents is different from the cultural capital of students with non-college-educated parents. In other words, a lower level of cultural capital translates into less familiarity with the academic culture in college (Pascarella et al., 2004). As such, the limitations in parental knowledge and social networks minimize the potential for parents to directly influence the academic decisions that can positively affect students' college GPA; yet, the findings suggest that college faculty and peers can help students with non-college-educated parents create new networks and sources of knowledge important for improving students' academic performance. Academic performance or GPA is important because it is a predictor of persistence, bachelor's degree attainment, and the pursuit or attainment of an advanced degree (Pascarella & Terenzini, 2005).

The positive effects of faculty support and encouragement on Latino students' college GPA is the fourth discussion point. This finding is consistent with literature investigating the influence of faculty interactions on the academic achievement of Latino students. Although not specific to STEM, Anaya and Cole (2001) indicated that academic achievement of Latino students was enhanced when professors were viewed as supportive and accessible. This is important especially because

the retention of Latinos, and more specifically the degree completion of Latinos in STEM majors, have reportedly been enhanced by faculty support (Gloria et al., 2005; Hernandez, 2000; Hernandez & Lopez, 2004; Leslie et al., 1998). Theoretically, according to the behavioral dimension of the campus climate model, individual interpretations of an institution's racial/ethnic climate are based on how individuals are involved in their campus community (Hurtado et al., 1998). In this case, a positive interpretation of the campus climate is likely created through the support, intellectual challenge, and encouragement provided by faculty members (Hurtado et al.). In return, positive interpretations of the campus climate allows for cultural congruity (Gloria, Hird, & Navarro, 2001; Gloria & Rodriguez, 2000), which appear to enhance GPA. Notably, student satisfaction with the amount of faculty contact had no effect on GPA. Perhaps the behavioral measure assessing the nature and frequency of faculty support and encouragement shared variance with the psychological measure of studying with another students and student-faculty interactions.

Fifth, the findings revealed that participation in diversity functions had a negative affect on college GPA. This finding was surprising given that cocurricular activities typically serve as a positive factor in the college experience and retention of Latino students. Through cocurricular involvement, Latino students typically find supportive communities and form new friendships (Hernandez, 2000; Hernandez & Lopez, 2004). As a behavioral dimension, however, Hurtado et al. (1998) suggested that by becoming involved in the campus community, students form a positive interpretation of the campus climate and are likely to do well as a result. Given that this was not the case, "time on task" may be the simplest explanation of the negative relationship between attending diversity functions and GPA. The more time a student spends on nonacademic activities can translate into less time spent on academic work such as preparing for class or studying for an exam. The importance of studying was also stressed by the results of this study, which showed that time spent studying and/or doing homework was positively associated with GPA.

Given that this study did not determine directionality (i.e., nonrecursive causal model) or whether a student had a low or high GPA before participating in a diversity function, there was no way to know whether a low GPA was truly a result of participating in such events and activities. Montelongo (2003) suggested that students with low GPAs might join racial/ethnic organizations in an attempt to seek out academic support. In other words, students' low GPAs comes before participation and therefore are not due to their participation in diversity-related activities (Montelongo). However, the literature on REM students in SME majors indicated that active campus involvement outside of these majors negatively influence persistence within the major (Bonous-Hammarth, 2000). Active involvement outside of SME disciplines is believed to marginalize REM students from the customary values of their disciplines (Bonous-Hammarth). Ironically, Bonous-Hammarth also reported that African American, American Indian, and Latino students leave SME majors because of the disconnect between the values within these academic programs and those shared by their peers outside of the STEM majors. So, although these students may seek a connection through involvement outside of their major, the connection can jeopardize their academic performance.

Finally, the disconnect between values as noted above, as well as time spent studying may also explain the negative effects between studying with other students and GPA. Given the CIRP survey questions, we could not

determine whether the "other students" are within STEM majors or not. Dennis et al. (2005) reported that peer support is a stronger predictor of college grades and adjustment than support from parents whose highest educational attainment does not go beyond high school degree. Unlike the findings in the current study, this relationship is supposed to be positive, insomuch as peers can provide support that is more directly related to college outcomes, such as forming study groups, sharing notes and experiences, and giving advice about what classes to take (Dennis et al.). Although the findings suggest that students were satisfied with their peer interactions, we have no indication of what type of studying was being done—whether students are studying together for the same exam or whether they are studying together to keep each other company. More research is needed to examine the nature of this peer contact and its impact on Latino students' academic performance.

Limitations

Two limitations in this study constrain the generalizability of these findings. First, the sample used in this study, although obtained from a national database is unweighted and is not representative of all Latino students in college. The size of the sample, although sufficient for the regression model used in this analysis, was modest. A larger sample would have allowed for a more complex and robust analysis with more independent variables. Second, the sample consisted of mostly private (68%) higher education institutions. The dependent variable (i.e., average college grades) that we used in this study was self-reported. Kuncel, Credé, and Thomas (2005) and Benton (1980), however, have argued that self-reported GPAs are reasonable reflections of actual grades. Additionally, Latinos represented a slightly higher percentage of the sample, which is unexpected when compared to the representation of Latinas in higher education. Male students, however, are typically overrepresented in STEM majors (NCES, 2005) even as the percentage of female students in higher education has exceeded that of their male counterparts (NCES).

CONCLUSION

In conclusion, the model used in this study explained more than one third of academic performance of Latino students' in STEM majors. High school GPA seems to be the most salient independent variable explaining Latino students' GPA after 4 years of college. As a result, it would seem reasonable to target low-achieving students who have an interest in STEM fields, to promote their self-esteem with regard to science and math, and to enhance their knowledge and skills through carefully designed enrichment programs. A critical mass of Latino peers interested in STEM fields would likely be an important by-product that could also improve the retention and success of these students.

Although there were only a few significant college experiences, they were important in explaining GPA. For instance, these findings should give pause to how the effects of these interactions on Latino students' academic performance are interpreted. While one interpretation, like "time on task" seems plausible, students' involvement in diversity-related activities may also be a response to their academic underperformance and/or a "chilly climate" within their academic majors. This college experience, as well as studying with other students seems to reveal important insight about the cultural incongruity that likely exists for Latino students in these majors and with their peers outside of the major.

Yet, the nature of student-faculty interactions, in terms of faculty support and

encouragement cannot be overlooked as the most important college experience impacting academic performance. To enhance Latino students' GPAs, educators must continue to develop strategies that promote long-term and intellectually challenging student-faculty interactions. Academic and student affairs personnel can assist with this process by organizing social events, campus-wide lectures and discussions linked to courses and course topics, developing living-learning centers, and other such interventions that facilitate meaningful interactions between Latino students in STEM majors and their faculty.

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