

Bridging Multiple Worlds: How African American and Latino Youth in Academic Outreach Programs Navigate Math Pathways to College

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Universities have launched outreach programs to enhance their ethnic diversity, yet little developmental research examines students' pathways to college. This study compares capital models (highlighting family background) with challenge models (highlighting students' challenges and resources) in predicting pathways to college. The Bridging Multiple Worlds Model frames this longitudinal study of 120 African American and Latino youth in outreach programs. We examined students' family backgrounds; challenges and resources across family, school, peer, and community worlds; and high school math pathways as predictors of college eligibility and enrollment. African American students more typically had U. S. born, college-educated parents, and Latino students, immigrant parents with high school education or less. Second, students saw parents as greater resources than teachers, siblings, and themselves; peers and teachers were their greatest challenges. Youth distinguished resources and challenges more by their source than form. Third, high school math and English grades rose and fell together, with early math grades predicting college eligibility. Five math pathways emerged: steady, slowly declining, rapidly declining, increasing, and "back on track" toward college, but pathways did not always predict college choices. Fourth, although family background predicted few outcomes, parents' and teachers' help and siblings' challenges predicted grades, eligibility, and admission to prestigious colleges. Findings highlight both capital and challenge models for science, policy, and programs involving diversity and equity.

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In the United States, as each cohort of students moves through secondary school to college, the percentage of African American and Latino adolescents shrinks, a pattern that has become known as the *academic pipeline problem* (Gándara, Larson, Mehan, & Rumberger, 1998; Geiser, 1996). A key indicator of college eligibility, revealed in studies of nationally representative samples, is the sequence of math classes students take in high school. Asian American students take more advanced college-preparatory math than European American students, and both groups take more college-prep math than African American or Latino students (Catsambis, 1994; Davenport, Davidson, Kuang, Ding, Kim, & Kwak, 1998). Research is moving beyond ethnic group differences to map variation within groups and similarities across them in conditions that enhance college and career choices of ethnically diverse students (Gándara, 1995).

California provides a key setting for investigating how African American and Latino youth navigate pathways to college. California law mandates that the top 12.5% of high school graduates be considered eligible for the University of California (UC), the top 33% eligible for the California State University System (CSU), and all 18-year-olds and all high school graduates eligible for the California Community College System. Yet in 1996, only 4.5% of African American and 3.5% of Latino high school graduates in California were eligible for UC, based on college-prep class grades and Scholastic Aptitude Test (SAT) scores (Edgert & Taylor, 1996). Moving beyond UC eligibility, the National Education Longitudinal Survey of 1988, based on nationally representative cohorts of eighth grade students, showed that among California students, African American and Latino students were underrepresented among those in 4-year colleges and overrepresented among those who did not finish high school (Carroll, 1996; cited in Gándara et al., 1998; NELS:88).

When the University of California Board of Regents removed race and ethnicity as considerations in the admission of undergraduate students in 1996, university outreach programs took on a key role in strengthening diversity in California higher education (Hayward, Brandes, Kirst, & Mazzeo, 1997). These range from *competitive* programs, whose graduates typically attend UC or CSU, to *selective* programs whose graduates attend community college, from which they may qualify for 4-year institutions. Despite 30 years of outreach programs, however, little developmental research exists about successful pathways to college among participants.

This article reports findings from an ongoing research partnership with outreach programs that seek to provide bridges through school into college and college-based occupations (Cooper, Jackson, Azmitia, Lopez, & Dunbar, 1995; Cooper, Jackson, Azmitia, & Lopez, 1998). The study focuses on four questions: What were the family backgrounds of youth participating in these programs in terms of immigration history and parents' education? What resources and challenges did students experience from their families, peers, school, and communities? What were students' pathways through math classes required for university eligibility? And how did students' family backgrounds, resources and challenges across worlds, and high school math pathways predict college eligibility and enrollment?

In addressing these questions, we drew on three related models that move beyond ethnic group differences to understand how ethnically diverse youth and their relationships, institutions, and cultural communities interact and change over time. The first is Ecocultural Theory, which integrates ecological and cultural perspectives (Gallimore, Goldenberg, &

Weisner, 1993; Rogoff, 1990; Weisner, Gallimore, & Jordan, 1988). This theory assumes families in all cultural communities work to adapt to changing ecologies through their routines of everyday life. Culture is seen in the dimensions of these routines or *activity settings*, including their typical participants or *personnel*; the *values and beliefs* that give meaning to their lives; and the *scripts* or recurring patterns of communication (Reese, Gallimore, Goldenberg, & Balzano, 1995). Our study built on Ecocultural Theory by tracing the personnel and scripts of ethnically diverse youth who shared the value of attending college.

Our second theoretical perspective, the *Students' Multiple Worlds Model*, was proposed by educational anthropologists Phelan, Davidson, and Yu (1991) to learn how youth navigate across their family, peer, and school contexts. Phelan et al. used geographical metaphors of *world* to refer to the cultural knowledge and expectations held in each context and *navigation* to capture youth's experiences as they try moving across the borders between worlds. In a longitudinal study of California high school students selected to vary in ethnicity, gender, immigration history, and achievement, Phelan et al. found many students whose worlds differed in culture, ethnicity, social class, or religion. Some found crossing borders manageable while others found it difficult. The most vulnerable youth found borders between worlds impenetrable and became alienated from school. And crossing borders did not come without costs; students with bicultural identities were criticized by people in each world for being disloyal. Our study built on the Students' Multiple Worlds Model by adding outreach programs as a key world and a developmental focus to trace how experiences across worlds and high school grades predict college eligibility and enrollment.

Our Bridging Multiple Worlds Model focuses on how youth forge identities that coordinate their cultural and family traditions with those of their peers, schools, and communities; how relationships across worlds are both challenges and resources; and how institutions enhance or impede developmental pathways (Cooper, 1999; Cooper & Denner, 1998). In earlier research, we found that European American youth who experienced both individuality and connectedness in family communication showed greater exploration of their career identities and other domains. Conflict in the context of support, rather than support alone, was associated with adolescent development (for a review of this work, see Grotevant & Cooper, 1998). We also found evidence of continuity across family and peer worlds (Cooper & Cooper, 1992). Drawing on the Bridging Multiple Worlds model, this study examines whether African American and Latino youth who experienced both resources and challenges in their worlds would achieve higher grades and college eligibility.

The World of Outreach Programs

The university academic outreach programs that participated in this study, the Early Academic Outreach Program (EAOP) and Mathematics, Engineering, and Science Achievement (MESA), are known for their effectiveness (Edgert & Taylor, 1996). In earlier work, we observed program activities, interviewed program founders and staff, and conducted focus groups with parents and with junior high, high school, and college students in which we asked about students' *worlds, goals and values, personnel, and scripts* (Cooper et al., 1995; Cooper et al., 1998).

In these focus groups, students readily drew and discussed a wide array of *worlds*, including their families, countries of origin, friends' homes, churches, mosques, outreach programs, shopping malls, video arcades, school clubs, and sports. Rather than seeing their worlds as uniformly positive or negative, students perceived resources and challenges in each world. Resources were reflected in *brokering*, when parents, siblings, teachers, friends, and program staff spoke up for them in their homes, schools, or neighborhoods (Buriel, Perez, De Ment, Chavéz, & Moran, 1998; Weisner et al., 1988) and provided emotional support and instrumental guidance. Students saw challenges in *gatekeeping*, when parents kept students home from school to protect them from dangers or when teachers and counselors discouraged students from taking college-prep math and science classes or tried to track them into remedial classes (Erickson & Schultz, 1993). Some students recounted struggles to maintain both academic goals and ties to friends who were not in school or were in gangs (Phelan et al., 1991). Schools and particularly neighborhoods were worlds where people expected students to fail, become pregnant, leave school, or to engage in delinquent activities. Students stated that outreach programs fostered a sense of family while providing them with skills, information, high expectations, and a sense of moral purpose to "do something good for your people" and "give back", such as by working as engineers in their communities or helping their younger siblings attend college.

This article builds on these findings to investigate—by combining strengths of qualitative and quantitative methods—how experiences of African American and Latino youth participating in outreach programs predicted their pathways to college. First, we examined students' *family backgrounds*, particularly their families' immigration history and parents' education. Kao and Tienda (1995) proposed that the academic motivation of students from newly immigrated families is fueled by the optimism, determination, and agency required for families to immigrate in the first place. Thus, we hypothesized that children of recent immigrants would be more likely to participate in outreach programs than students from second- or

third-generation families. Research also indicates that African American college youth, compared to non-college youth, have more college and professional role models in their families (Coates, 1987; Duster, 1992; Taylor, 1991). Thus, we expected African American youth with college-educated parents to be more likely to participate in outreach programs. From the perspectives of these recent studies, recent family immigration and parents' college education can be both seen as social capital.

Second, we examined students' *resources and challenges* across their families, schools, peers, and community worlds. Research has shown how African American families draw on extended kin regardless of social class (MacAdoo, 1982), and how Latino and African American parents develop ties to community organizations, both for material support and help with children's future goals (Alva, 1991; Jarrett, 1995). Mexican American high school students in college-prep classes have reported more support and fewer difficulties than those in vocational tracks (Gibson, 1997). In another study, Chicano college students identified siblings as their primary influences, along with parents, outreach program staff, teachers, and counselors (León & McNeil, 1986). Finally, successful Chicana professionals have recalled how friendships with Anglo students helped them learn about college (Gándara & Osugi, 1994). Based on this research and the Ecocultural Students' Multiple Worlds, and Bridging Multiple Worlds models, we predicted that African American and Latino students would report both resources and challenges across their worlds and that both challenges and resources would in turn predict pathways through school.

Third, we traced students' longitudinal *pathways through math classes* required for university eligibility (Catsambis, 1994). We used math as an indicator of academic competence based on the role of math grades in admission to outreach programs and college and on the widespread concern about math as a barrier to academic success for women and ethnic minority students (America Association of University Women [AAUW], 1994). We also examined college-prep English grades and overall college-prep grade point average (GPA). In our sample, the range of math classes was restricted to college-prep courses, because the university outreach programs selected students who were likely to meet University eligibility requirements. In our earlier work, we traced longitudinal patterns of African American and Latino youth in these programs in high school math classes and grades (Cooper, Cooper et al., 1998). Some students stayed on track towards university eligibility with consistently high grades, most began on track, but slowly declined, and still others declined rapidly. As a group, the sample declined on average .21 of a grade point per semester. In this study, we traced students' math pathways across four years of

high school as well as their subsequent college eligibility and enrollment.

Finally, we asked what factors in students' family backgrounds and in their resources and challenges across family, school, peer, and community worlds predicted their pathways to college eligibility and enrollment. A "capital" hypothesis, based on social capital models, suggests that students with more capital (such as high levels of parental education and recent immigration) would achieve at higher levels (Coleman, 1988; Cooper & Denner, 1998). A "challenge" hypothesis, based on the Bridging Multiple Worlds model, suggests that challenges can motivate students to succeed on behalf of their families and prove gatekeepers wrong, and that challenges in the context of support may foster career and college identity formation (Cooper, 1999). According to this hypothesis, students who coordinate resources with challenges would be more successful navigating personal, relational, and institutional pathways to college.

In sum, this study examined the family backgrounds of African American and Latino youth who participate in outreach programs; challenges and resources across their family, school, peer, and community worlds; longitudinal pathways through college-prep math classes; and the role of these three factors in students' later college eligibility and enrollment. We framed these questions to examine both capital and challenge models and to address issues for developmental science, youth policy, and programs that foster access to college for ethnically diverse youth.

Method

Participants

The sample was selected from a larger database to comprise equal numbers of men and women, equally divided among African American and Latino-Latina students. Wave 1 included 60 African American students (30 men, 30 women) and 60 Latino-Latina students (30 men, 30 women) in grades 6-11 ($M = 15$ years old, tenth grade), living in California. Students participated in the EAOP and MESA, both sponsored by the University of California.

Wave 1 data collection took place in 1994, when we recruited students attending jointly held academic enrichment activities of the programs. At Wave 1, data on student and parent ethnicities, education, and immigration were drawn from students' responses to open-ended questions on the Multiple Worlds Survey described below. Analyses of family education and immigration appear with results because of their relevance to the core questions of the study. Wave 2 included 66 of the original 120 students for whom follow-up data were available in 1999.

Academic outreach programs. The EAOP was designed to increase the numbers of underrepresented ethnic minority high school students eligible for the University of California (Hayward et al., 1997). In 1994, when our study began, it focused recruitment on African American, Latino, and Native American students; Asian students from low-income families also participated. Economic backgrounds of students varied, with substantial numbers from low-income families. It conducted summer school at UC for students (on a fee basis with scholarships available) and Saturday schools at community colleges without charge to students enrolling through their schools. Ethnic distributions of students at Saturday schools reflected areas around each community college.

MESA was designed to increase the numbers of ethnic minority students who are prepared for math-based college majors and professions. In 1994, it focused recruitment on African American, Latino, Native American, and Puerto Rican students (Smith, 1985). According to staff and published accounts (Edgert & Taylor, 1996), African American students included those from middle-income families who paid to participate because EAOP was not offered in their schools, whereas participating Latino students more often came from low-income families receiving scholarships and recruited through schools. At Wave 1, EAOP and MESA jointly sponsored summer academies, where we conducted our data collection.

Measures

The Multiple Worlds Survey was developed from focus group interviews with African American and Latino junior high, high school, and college students participating in the two programs (Cooper, Jackson, Azmitia, Lopez, & Dunbar, 1994). Some questions were adapted from Ecocultural Theory (Gallimore et al., 1993) and Students' Multiple Worlds Theory (Phelan et al., 1991). The survey asks students to describe their worlds and expectations held by people in each world. It taps challenges and resources across worlds by asking students who helps them and who causes them difficulties (*personnel*) for *instrumental scripts* (who helps you with school work; who helps you with math; who helps keep up with your responsibilities and stay organized; who helps you stay on track to college); and *emotional scripts* (who encourages you in math, who helps you feel confident; and who helps you with sexism or racism). The survey asks students to list up to three people who help or cause difficulties for each script rather than asking them to rate standardized lists of personnel. Questions about difficulties take the same form. To learn about diverse family forms, students are asked to list members of their family, where they were born, their education and job, their ethnicity or ethnicities, and the languages spoken

with this person, among other questions. This open-ended response format enhances rapport with students, who routinely express appreciation for being asked about the realities of their lives rather than to respond to items based on assumed standard family structures and to “please check one box”.

Academic achievement. At Wave 1, students brought copies of their report cards or transcripts and reported math and English grades. Official and self-reported grades were highly correlated for English, $r = .79$, and math, $r = .87$, and did not differ significantly in either subject. If report cards were unavailable, self-reported grades were used in analyses. Additional evidence of reliability was reflected in the correlation between student-reported grades from Wave 1 and grades in the same classes from the program database used for Wave 2 ($r = .87$).

For students in Wave 1, we assessed achievement by computing the following variables: junior high math GPA to assess competence entering high school and grades in Pre-algebra, Algebra 1, Geometry, and Algebra 2. For students remaining in Wave 2, we assessed achievement from program records of grades in math and English each semester from ninth to twelfth grade and college-prep GPA. In California, the 15 required college-prep courses are known as the “a through f” courses from their listing as (a) history or social science, 2 years; (b) English, 4 years; (c) math, 3 years, 4 recommended (covering algebra, geometry, and advanced algebra); (d) laboratory science, 2 years required, 3 recommended; (e) language other than English, 2 years required, 3 recommended; and (f) college-prep electives, 2 required.

Finally, to assess students’ transition to college, we used the UC *eligibility index* computed by programs, based on college-prep GPA, SAT scores, and submitting all required materials, and we used the *college type* each student chose to attend (UC, CSU, California Community College, or other college).

Procedure

Recruiting participants began at the annual outreach program orientation, when the research staff explained the study and distributed flyers in English and Spanish. We mailed a letter, also in English and Spanish, to each family inviting them to participate. Students completed the Multiple Worlds Survey during Saturday or summer sessions, where we served pizza. Students were asked to bring copies of their report cards or transcripts and paid \$5 for participating. A newsletter mailed to students’ families reported preliminary findings to them.

All Wave 2 data were obtained from program records. As part of their ongoing record-keeping and formative evaluation, the programs gathered follow-up

data on each graduate, with students’ files including parents’ education as well as students’ grades, UC eligibility, college acceptance, and enrollment, indicated by students filing an official “Statement of Intent to Register”. To maintain their records, programs mailed a survey to each home and made two attempts to reach the family and obtain data by telephone if families did not return the survey.

Results

The analyses were designed to help illuminate relationships among factors that might play a role in African American and Latino students’ successful progress through the academic pipeline as they move through high school and into college. Three broad groups of variables were assessed: (a) *demographic variables*, to address the family backgrounds of program participants; (b) *helps and difficulties*, to address students’ challenges and resources across their worlds; and (c) *academic variables*, including high school grades and college eligibility and enrollment, to map students’ academic pathways to college. The analysis strategy was first to examine variables in each of these three groups to produce a descriptive picture of our sample and develop summary variables for further analyses. Then we systematically examined relationships among the three groups of variables to assess the role of family background and resources and challenges in predicting pathways to college. First we used multivariate analysis of variances (MANOVAs) to test ethnic and gender differences among each group of variables, followed by analysis of variances (ANOVAs) and tests for differences between means when appropriate. To assess other relations among variables, we used correlation, chi-square, and *t*-tests as appropriate.

Who Participates?

The participants were self-selected by their participation in the outreach programs and for this study by ethnicity, gender, and their parents’ willingness for them to participate. The 60 African American students in the sample were primarily born in the United States (97% men, all women). For parents from whom we had data, 98% of the 47 African American fathers were born in the United States, as were 87% of the 55 mothers. A very different pattern was present for the 60 Latino–Latina students: 23% of Latinas and 20% of Latinos were born outside the United States, most in Mexico. Of parents from whom we had data, 68% of the 59 mothers and 78% of the 54 fathers were born outside the United States; of these, 85% were born in Mexico.

We obtained two measures of parental education. One, gathered on the entire sample in Wave 1 as part of

