

2006 AIR/NPEC RESEARCH GRANT PROPOSAL

***Cooling Out as Institutional Racism:
Does Academic Advising Discourage the Educational Attainment of
Underprepared Students of Historically Disadvantaged Racial Groups?***

Data Set:

Population of 62,945 Remedial Math Students Enrolled in 107 California Community Colleges

Grant Amount Requested: \$29,998.95

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PROJECT SUMMARY

Postsecondary mathematics remediation – variously referred to as “developmental,” “basic skills,” “compensatory,” or “preparatory” education – holds a significant and increasingly high profile position in American higher learning. For the nearly one-third of first-time college freshmen nationwide who require remedial assistance in mathematics, successful remediation represents a critical and decisive step on the road to academic success and status attainment. However, prior research suggests that a large percentage of students do not remediate successfully and that the likelihood of success is correlated strongly with a student's race/ethnicity. Students of historically disadvantaged racial/ethnic groups (e.g., Blacks and Hispanics) experience significantly lower rates of successful mathematics remediation compared with students of other racial/ethnic groups (e.g., Whites and Asians).

Among the explanations for the racial disparities in successful mathematics remediation, evidence has been offered that suggests the *cooling out* of historically disadvantaged racial/ethnic groups by academic counselors in community colleges (the primary venue in which remediation is accomplished). *Cooling out* refers to a gradual disengagement of a student from his/her academic goal. It is accomplished through the substitution of lesser avenues of achievement perceived to be more appropriate for a given student's skills and abilities. However, while intriguing and troubling, the findings regarding *cooling out* of underprepared students of historically disadvantaged racial/ethnic groups are somewhat ambiguous and open to alternate interpretations. This is due, in part, to a failure to account for potential racial/ethnic variation in the timing of academic advising experiences.

The research proposed here will address the ambiguity of prior findings regarding the race-specific *cooling out* of underprepared students through a series of rigorous tests to determine if evidence supports a conclusion of widespread institutionalized racism executed through the vehicle of academic advising. These tests will address: [a] the race-specific relationships between the timing of academic advising and the effects of advising on the likelihood of successful mathematics remediation among remedial math students; [b] the race-specific relationships between the timing of academic advising and the effects of academic advising on transfer to four-year institutions (a more durable outcome measure than successful remediation), net of remedial math outcome (successful versus unsuccessful remediation); and [c] the relationships between college racial composition and the race-specific effects of advising on the likelihood of successful mathematics remediation and transfer to four-year institutions. These tests will be accomplished using two-level hierarchical logistic regression and data addressing a population (not a

sample) of 62,945 White, Black, Hispanic, and Asian remedial mathematics students enrolled in all 107 of California's semester-system community colleges.

This study has profound implications for policy. The celebration in 2004 of the 50th anniversary of the decision of *Brown vs. Board of Education*, by which official segregation of public education was deemed illegal, highlights the importance of educational equity for rectifying longstanding racial differences in status attainment. While many gains have been made in the quest for racial equality over the last fifty years, Blacks and Hispanics still lag behind Whites in both educational outcomes and resulting status attainment. Identifying and resolving the causal forces that underlie racial inequality in educational attainment is among the most important goals of sociological and educational research, particularly when the underlying causal forces constitute expressions of institutionalized racism, as is hypothesized here. Moreover, the identification of *resolvable* problems within colleges that are hindering the academic attainment of underprepared and historically disadvantaged groups is a matter of first-order importance in institutional research. As a result, the findings of this study will be of interest to all stakeholders in the community college system, including policy makers, administrators, researchers, instructors, and offices of academic advising. This study also fits closely with NPEC's focus this year on student decisions, as the questions addressed in this research concern the influence of academic advising on subsequent decision-making and goal-setting by community college students. Among the innovative aspects of the project, the research proposed here represents one of the few large-scale studies of postsecondary remediation involving data addressing a complete and sizeable population ($N_{\text{students}} = 62,945$) enrolled in multiple institutions ($N_{\text{colleges}} = 107$). It also is the first recent study to address the topic of *cooling out* with specific attention to the role of academic advising/counseling. Additionally, the research proposed here constitutes one of only a small handful of studies specifically addressing racial disparities in postsecondary remedial outcomes. Finally, the proposed study employs two differing outcome measures and two differing versions of the key explanatory variable (timing of first academic advising experience), which adds substantially to the strength and credibility of the findings.

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PROJECT DESCRIPTION

Statement of Problem

Postsecondary remediation is a subject of increasing interest in sociological and educational research (Bahr, 2004; Bahr, 2005; Bahr, 2006; Burley, Butner & Cejda, 2001; Illich, Hagan & McCallister, 2004; Kolajo, 2004; Mazzeo, 2002; McCabe, 2000; Merisotis & Phipps, 2000; Perin, 2004) and not without good reason. The sheer scale of postsecondary remedial need is daunting. For example, Parsad, Lewis, and Greene (2003) found that nearly three in ten (28%) first-time college freshmen enrolled in remedial coursework (reading, writing, and/or math) during the Fall term of 2000. Adelman (2004a), employing a larger window of observation, found that four in ten (41%) college students enroll in remedial coursework at some point during postsecondary attendance.

Mathematics skills are of particular interest within the topic of postsecondary remediation. More students require remedial assistance with mathematics than with any other basic skills subject. For example, in the Fall term of 2000, 22% of first-time college students enrolled in remedial math coursework, compared with 14% who enrolled in remedial writing courses and 11% who enrolled in remedial reading courses (Parsad, Lewis & Greene, 2003). Adelman (2004b), using a slightly different measure, found that 34% of new nonincidental students earn credits in remedial math, while 18% earn credits in remedial English (remedial reading and remedial writing combined). Thus, as it relates to basic skills for the postsecondary environment, mathematics remediation is a topic of great concern.

Even more troubling than the scale of need for mathematics remediation, the average rate of successful remediation in mathematics is remarkably low. While few comprehensive, long-term evaluations of remedial programs have been undertaken (Merisotis & Phipps, 2000), one recent large-scale study found that less than 25% of students in community colleges who begin the remedial math sequence successfully complete a college-level math course within six years (Bahr, 2005). In other words, three out of four students who start down the path toward college-level math never arrive at that destination.

Rates of successful mathematics remediation are even lower for historically disadvantaged racial groups. Racial disparities in educational attainment are well documented in the literature (e.g., Kao & Thompson, 2003), and, as with many other educational outcomes, sizeable gaps in successful mathematics remediation are observed between historically advantaged and historically disadvantaged racial groups. More specifically, Bahr (2005) found that only one-fifth of Hispanic students and less than one-eighth of Black students successfully negotiate the

remedial math sequence, while approximately one-third of White and Asian remedial math students do so. Several other smaller studies have documented similar racial disparities in the rewards of postsecondary remediation (Dumont & Jones, 1983; Hagedorn, et al., 1999).

A number of explanations for the racial gaps in successful mathematics remediation have been posited and examined (Bahr 2005). Among the more provocative of these explanations is the *cooling out* of students of historically disadvantaged racial groups by academic counselors in community colleges. *Cooling out* refers to a gradual disengagement of a student from his/her academic goal and is accomplished through the substitution of lesser avenues of achievement perceived to be more appropriate for a given student's skills and abilities (Clark, 1960). As Clark (1960:575) explains, "[academic] counselors are available who are patient with the overambitious and who work to change their intentions. They believe in the value of the alternative careers, though of lower social status, and are practiced in consoling." Evidence of a negative, race-specific effect of academic advising on the likelihood of successful mathematics remediation among Black and Hispanic students has been documented by Bahr (2005). This finding is consistent with the literature, as prior research indicates that racism is alive and well on college campuses and that Blacks and Hispanics particularly are likely to be subjected to negative stereotypes as less academically able (Davis, et al., 2004; Marcus, et al., 2003; Suarez-Balcazar, et al., 2003; Swim, et al., 2003). Thus, it is not surprising to find evidence of race-specific *cooling out* processes whereby Black and Hispanic students are discouraged from ambitious academic goals in favor of lesser goals perceived by an academic counselor to be more suitable for underprepared students of color (e.g., Weissman, Blukowski & Jumisko, 1998).

However, Bahr's (2005) findings in this regard are limited by the design of his study and by the nature of the outcome variable considered. More specifically, his study forces a cross-sectional design on longitudinal data, so that the order of events with respect to advising is not clear. It may be that academic advising discourages Blacks and Hispanics from pursuing college-level mathematics competency. Alternatively, it may be that Blacks and Hispanics tend to seek academic advising at different points in their academic careers than do Whites and Asians, thereby receiving different (lesser) benefits and contributing to the appearance of race-specific advising effects. Additionally, the outcome examined by Bahr (successful versus unsuccessful mathematics remediation) is an indirect measure of (it precedes) the true outcome of interest, which is the long-term academic attainment of the student. In other words, it is the student's final level of academic attainment within the community college that is of primary interest in questions concerning *cooling out*, rather than the intermediate stage of attainment represented by

the acquisition of college-level math skills. Thus, with respect to the effects of academic advising for historically disadvantaged racial groups, the documented findings are somewhat ambiguous.

Bahr also does not examine the influence of racial context on the race-specific effects of academic advising. In recent years, the role of campus racial climate in the educational outcomes of historically disadvantaged racial groups has received increasing empirical attention (e.g., Cabrera, et al., 1999; Fries-Britt & Turner, 2002; Hurtado, 1992; McClelland & Auster, 1990). Although findings regarding the impact of institutional racial composition on the academic achievement of historically disadvantaged racial groups are mixed (e.g., Pascarella, Smart & Stoecker, 1989; Wassmer, Moore & Shulock, 2004), evidence suggests that institutions with high minority enrollments tend to exhibit more supportive academic environments for historically disadvantaged racial groups than do institutions with low minority enrollments (e.g., Hurtado, et al., 1999). Thus, one reasonably could hypothesize that the *cooling out* of historically disadvantaged racial groups tends to occur less frequently, or to a lesser degree, in institutions with higher minority enrollments compared to institutions with lower minority enrollments.

Several other recent studies further add to questions concerning the theory of *cooling out*. For example, Deil-Amen and Rosenbaum (2002) note a shift toward "stigma-free" remediation in community colleges that tends to hide from underprepared students their remedial status. This finding implies that *cooling out* occurs less frequently than in the past. Adelman (2005) found a reasonably high level of stability in long-term educational objectives of community college students and little variation (in stability) across racial/ethnic groups. This finding suggests that community college students are not being discouraged from ambitious educational goals, as indicated by the theory of *cooling out*. However, the former study, which was qualitative in nature, drew conclusions from the self-reported educational philosophies of administrators and counselors at just two community colleges, and it did not address the possibility of race-specific biases in academic advising. The latter study did not address underprepared students specifically (the population most likely to be subjected to *cooling out*) and did not address the role of academic advising/counseling at all. Thus, recent prior work on *cooling out* does not clarify Bahr's (2005) findings and, in fact, adds further to the ambiguity.

Proposal of Work

Clearly, important questions concerning race-specific *cooling out* processes in the community college remain to be explored, and further study of the relationship between academic advising and academic attainment is required to explain fully the findings noted by Bahr. With the purpose of advancing our understanding of race-specific *cooling out* processes, I propose the following three objectives for this research:

- A. Execute a more stringent test of the race-specific effects of academic advising on the likelihood of remediating successfully in mathematics. This test will control for the timing of academic advising in students' academic careers, the absence of which constitutes the main impediment to a clear interpretation of Bahr's findings.
- B. Execute a test of the race-specific effects of academic advising on a more robust and direct academic outcome measure, namely student transfer to four-year institutions.
- C. Execute a test of the effects of college racial composition on the race-specific effects of academic advising on the two outcomes addressed above (successful mathematics remediation and transfer).

To elaborate, if, in fact, race-specific *cooling out* processes underlie the effects identified by Bahr, then one would expect to find that academic advising has a negative relationship to the likelihood of successful mathematics remediation for historically disadvantaged racial groups, net of other variables, regardless of when in a given student's academic career advising is sought. Furthermore, if Bahr is correct in his interpretation, one would expect to find that academic advising has a negative effect on the long-term academic achievement of historically disadvantaged racial groups (measured, in this case, as whether students who indicated transfer as a goal actually transferred), net of the effects of successful versus unsuccessful mathematics remediation. Finally, one would expect to find that the negative effects of advising on the educational outcomes of historically disadvantaged racial groups are less evident (or not evident) in colleges that have disproportionately high minority enrollments. This line of reasoning leads to the following six hypotheses:

1. Among Whites and Asians, the net effect of academic advising on the likelihood of successful mathematics remediation is statistically significant and positive, regardless of when advising occurs in the academic career.
2. Among transfer-seeking Whites and Asians, the net effect of academic advising on the likelihood of transfer is statistically significant and positive, regardless of when advising occurs in the academic career

and net of the effects of remedial math outcome (successful versus unsuccessful remediation in mathematics).

3. Among Blacks and Hispanics, the net effect of academic advising on the likelihood of successful mathematics remediation is significantly less than the effect of academic advising among Whites and Asians, regardless of when advising occurs in the academic career.
4. Among transfer-seeking Blacks and Hispanics, the net effect of academic advising on the likelihood of transfer is significantly less than the effect of academic advising among Whites and Asians, regardless of when advising occurs in the academic career and net of the effects of remedial math outcome (successful versus unsuccessful remediation in mathematics).
5. Among Blacks and Hispanics, the magnitude of the negative race-specific effects of academic advising on the likelihood of successful mathematics remediation varies inversely with the proportion of Black and Hispanic students, respectively, enrolled in the college.
6. Among transfer-seeking Blacks and Hispanics, the magnitude of the negative race-specific effects of academic advising on the likelihood of transfer varies inversely with the proportion of Black and Hispanic students, respectively, enrolled in the college.

Data

To test these hypotheses, I will use a previously assembled and unique data set drawn from a database maintained by the Chancellor's Office of California Community Colleges. The Chancellor's Office, under mandate by the California Legislature, collects data each term via electronic submission from the 112 community colleges and affiliated adult education centers in California. The data maintained by the Chancellor's Office represent a census of community college students in California and include transcripts, demographics, financial aid awards, matriculation records, degree/certificate awards, etc. Furthermore, the Chancellor's Office data have been cross-referenced against the enrollment records of all California public four-year postsecondary institutions and the National Student Clearinghouse in order to identify students who transferred to four-year institutions (Bahr, Hom & Perry, 2005).

I selected for the proposed analysis the Fall 1995 cohort of first-time college freshmen enrolled in any of California's 107 semester-based community colleges (N = 202,484). Valid course enrollment records are available for 93.9% (N = 190,177) of these students. I observed the course enrollments of these students for six years,

through the Spring term of 2001, and then eliminated all students who did not enroll in any math or whose first math enrollment was not remedial in nature.¹ The resulting remedial math cohort (N = 69,902) represents all of California's community college freshmen who enrolled first in a semester-based community college, whose first term of college attendance was the Fall term of 1995, whose first math course was remedial, and who enrolled in this first math course prior to the Summer term of 2001. Of these, I selected the four most numerous racial groups (White, Black, Hispanic, and Asian; N = 64,018), comprising 91.6% of the total remedial math cohort, and then dropped the 1.7% (N = 1,073) who have missing data on sex, age, or the ID variable used to track students *across* colleges. The result is an analytical cohort of 62,945 remedial math students, the entirety of which will be used to test hypotheses #1, #3, and #5. A subset of these students (N = 39,386) who indicated transfer as among their primary academic goals will be used to test hypotheses #2, #4, and #6.

Outcome Variables

Two outcomes are of interest in the study proposed here. The first outcome is successful mathematics remediation, defined as the attainment of college-level math skill and operationalized as the successful completion (grades of A, B, C, D, or Credit) of a college-level math course within six years of initial college enrollment. The second outcome is successful transfer to a four-year postsecondary institution, operationalized as the appearance of a given student on the enrollment records of any of California's public four-year postsecondary institutions or any of the other four-year institutions contained within the National Student Clearinghouse database within eight years of initial enrollment in college.²

¹ Remedial math courses are structured to provide a "ladder" of coursework leading up to the minimum expected math competency of entering college freshmen. For the purpose of this analysis, I use the commonly accepted definition of remedial math as any math course presenting material below college algebra (e.g., Adelman 2004b; Hagedorn, et al. 1999). To categorize math courses, I used course catalogs and course characteristics in the data to determine the skill-level of each math course in which any member of the cohort enrolled at any point during the six-year observation period. Through this process, I collapsed 2,734 substantive math course listings into five categories: basic arithmetic, pre-algebra, beginning algebra, intermediate algebra/geometry, and college-level math. Basic arithmetic represents the lowest level of math skill, followed in order by pre-algebra, beginning algebra, and intermediate algebra and geometry (the latter two are parallel courses in the institutionalized mathematics progression). The category of college-level math encompasses any course requiring mathematics skill equal to, or greater than, college algebra (e.g., pre-calculus, calculus, trigonometry, finite mathematics, statistics). I ignored nonsubstantive math courses (e.g., math "labs," math tutoring) as well as vocational math courses (e.g., basic mathematics for medical applications) when the vocational math course was not part of a larger remedial mathematics sequence.

² Note that the eight-year lag for the transfer outcome (versus the six-year lag for successful mathematics remediation) is intended to account for students who postponed mathematics coursework until late in the observation period.

Explanatory Variables

Four primary categories of explanatory variables are of interest in the study proposed here. The first is student's self-reported racial/ethnic identification. As mentioned earlier, the proposed analyses will be confined to students who self-identify as White, Black, Hispanic, or Asian. Three dummy variables will be created to represent student's race, with a comparison (excluded) category of "White".

The second category of explanatory variables addresses whether or not the student received academic advising and, if so, when the first experience of advising occurred. Measuring the timing of academic advising is more complex than it may appear at first because it can be calculated relative to any of several points or origin. In this case, I propose to address the timing of first academic advising experience through two methods (in separate models). The first method will measure the timing of academic advising relative to the commencement of postsecondary attendance, which is the same for all students in the analytical cohort (Fall semester of 1995). Three dummy variables will be created to indicate receipt of advising in the *first year of attendance*, the *second year of attendance*, or in *subsequent years*, with a comparison (excluded) category of not receiving academic advising at all. The second method will measure timing of first academic advising experience relative to a student's first math course enrollment. Three dummy variables will be created to indicate receipt of advising in a *term prior to the term of first math enrollment*, in the *same term as the term of first math enrollment*, or in a *term subsequent to the term of first math enrollment*, with a comparison (excluded) category of not receiving academic advising at all.

The third category of explanatory variables is comprised of multiplicative interaction terms of race and timing of academic advising, each of which is the product of the values of these variables. Nine multiplicative interaction terms will be included for each of the two methods of measuring timing of academic advising. In combination with the direct effects of advising, the dichotomous interaction terms estimate the race-specific effects of advising on the outcome of interest and are as follows:

Timing Relative to Initial College Enrollment

*Black * received advising in first year*

*Hispanic * received advising in third or later year*

*Black * received advising in second year*

*Asian * received advising in first year*

*Black * received advising in third or later year*

*Asian * received advising in second year*

*Hispanic * received advising in first year*

*Asian * received advising in third or later year*

*Hispanic * received advising in second year*

Timing Relative to First Math Course

*Black * received advising before first math*

*Hispanic * received advising after first math*

*Black * received advising same term as first math*

*Asian * received advising before first math*

*Black * received advising after first math*

*Asian * received advising same term as first math*

*Hispanic * received advising before first math*

*Asian * received advising after first math*

*Hispanic * received advising same term as first math*

The final category of explanatory variables addresses the racial composition of the 107 colleges addressed in the data. Three continuous variables will be used to measure the percentage of the first-time freshmen cohort self-identifying as Black, Hispanic, and Asian, respectively.

Control Variables

A large number of student-level control variables are proposed for this study. Among them are sex, age, three proxies of socioeconomic status, three measures of enrollment patterns, student's academic goal, math skill at college entry, English skill at college entry, grade in first math class, and referral to academic advising.

Descriptions of the student-level control variables follow.

- ✓ Age is measured in years, was collected at the time of application for postsecondary attendance, and is treated as a continuous variable.
- ✓ The three variables that serve as proxies of socioeconomic status include a dichotomous variable indicating receipt of a fee waiver during the first year of attendance, a dichotomous variable indicating receipt of any grants during the first year of attendance, and a continuous variable indicating the total monetary value of any grants received during the first year of attendance.
- ✓ The three variables that measure differing aspects of enrollment patterns include persistence, enrollment inconsistency, and delay of first math course enrollment. Persistence is operationalized as the number of terms (including summer terms, but excluding winter intersessions) in which a given student enrolled in courses from Fall 1995 through Spring 2001. Enrollment inconsistency is operationalized as the percentage of terms in which a given student did not enroll in courses from Fall 1995 through the last term the student was observed in the system.³ Delay of first math is operationalized as the term number (sequentially ordered) of first math enrollment, with the Fall term

³ This operationalization is similar in some respects to that offered by Cabrera, Burkum, and La Nasa (2003) to measure the ratio of courses not completed to courses attempted.

- of 1995 assigned a value of one and the Spring term of 2001 assigned a value of seventeen. All three variables addressing aspects of enrollment patterns are treated as continuous variables.
- ✓ Academic goal is a self-report measure of a student's primary academic objective collected at the time of application, which I collapsed into eight nominal categories: [1] transfer to a four-year institution as an exclusive objective, [2] transfer to a four-year institution with an allied objective of a nonvocational Associate's degree, [3] Associate's degree (nonvocational) as an exclusive objective, [4] job-related goals (e.g., vocational Associate's degree or certificate, acquiring or advancing job skills, maintenance of a professional license), [5] abstract educational goals (e.g., discovering educational interests, personal development), [6] remediation in fundamental academic subjects (including students seeking credit for a high school diploma or GED), [7] undecided, and [8] nonreporting.
 - ✓ Math skill at college entry (an ordinal variable) is set to the skill-level of a student's first math course (please see footnote #1) and is treated as a set of dichotomous (dummy) variables, with intermediate algebra/geometry as the excluded category.
 - ✓ As with math skill at college entry, English skill at college entry is set to the skill-level of a student's first English course. However, compared with the math sequence (please see footnote #1), the English sequence exhibits much greater inter-school variability and, consequently, requires a simpler classification scheme. In total, I separated 6,569 substantive English course listings into five nominal categories: remedial reading (including courses in basic reading, phonics, vocabulary, and spelling), remedial writing (including courses in basic writing, grammar, sentence structure, and punctuation), English-as-a-Second-Language (ESL), college-level English, and no English enrollment. College-level English is excluded as the comparison category.
 - ✓ Grade in first math course includes nine nominal categories: A, B, C, D, F, Withdrawal, Credit, No Credit, and Ungraded.
 - ✓ Referral to academic advising is measured using a series of dichotomous variables indicating referral to advising during the time periods specified for the variables indicating receipt of advising (please see the "Explanatory Variables" section), with no referral for advising as the comparison (excluded) category.

Several college-level control variables also will be included in this study. Among these are college size, the global mathematics competency of the entering first-time freshmen cohort, and the accessibility of academic advising services. Descriptions of the college-level control variables follow.

- ✓ College size is operationalized as the number of first-time freshmen commencing attendance in the Fall of 1995.
- ✓ Global mathematics competency is operationalized as the percentage of the first-time freshmen cohort who enrolled in one or more remedial mathematics courses within six years of beginning attendance.
- ✓ Accessibility of academic advising is operationalized as the percentage of first-time freshmen who participated in academic advising during the first year of attendance.

Method of Analysis

The data will be analyzed using a series of two-level hierarchical logistic regression models (Raudenbush & Bryk, 2002), estimated with the software package *HLM 6.0*. A total of four models will be estimated, each an intersection of one of the two methods of measuring timing of first academic advising experience (relative to commencement of attendance and relative to the term of first math course enrollment) and one of the two outcome variables (successful mathematics remediation and transfer). The hierarchical logistic regression model, as employed here, is specified according to the elaborated set of equations that follow.

$$\log[P_{ij} / (1 - P_{ij})] = \beta_{0j} + \beta_{1j}(\text{Black}) + \beta_{2j}(\text{Hispanic}) + \beta_{3j}(\text{Asian}) + \beta_{4j}(\text{Advising}_{\text{time1}}) + \beta_{5j}(\text{Advising}_{\text{time2}}) + \beta_{6j}(\text{Advising}_{\text{time3}}) + \beta_{7j}(\text{Black} * \text{Advising}_{\text{time1}}) + \beta_{8j}(\text{Black} * \text{Advising}_{\text{time2}}) + \beta_{9j}(\text{Black} * \text{Advising}_{\text{time3}}) + \beta_{10j}(\text{Hispanic} * \text{Advising}_{\text{time1}}) + \beta_{11j}(\text{Hispanic} * \text{Advising}_{\text{time2}}) + \beta_{12j}(\text{Hispanic} * \text{Advising}_{\text{time3}}) + \beta_{13j}(\text{Asian} * \text{Advising}_{\text{time1}}) + \beta_{14j}(\text{Asian} * \text{Advising}_{\text{time2}}) + \beta_{15j}(\text{Asian} * \text{Advising}_{\text{time3}}) + \beta_{kj}X_{ij}$$

$$\beta_{0j} = \gamma_{00} + W_{1j}(\text{Number of FTF}) + W_{2j}(\% \text{ Requiring Remedial Math}) + W_{3j}(\% \text{ Receiving Advising in 95/96}) + W_{4j}(\% \text{ Black}) + W_{5j}(\% \text{ Hispanic}) + W_{6j}(\% \text{ Asian}) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + W_{7j}(\% \text{ Black}) + u_{1j}$$

$$\beta_{9j} = \gamma_{90} + W_{12j}(\% \text{ Black}) + u_{9j}$$

$$\beta_{2j} = \gamma_{20} + W_{8j}(\% \text{ Hispanic}) + u_{2j}$$

$$\beta_{10j} = \gamma_{100} + W_{13j}(\% \text{ Hispanic}) + u_{10j}$$

$$\beta_{3j} = \gamma_{30} + W_{9j}(\% \text{ Asian}) + u_{3j}$$

$$\beta_{11j} = \gamma_{110} + W_{14j}(\% \text{ Hispanic}) + u_{11j}$$

$$\beta_{4j} = \gamma_{40} + u_{4j}$$

$$\beta_{12j} = \gamma_{120} + W_{15j}(\% \text{ Hispanic}) + u_{12j}$$

$$\beta_{5j} = \gamma_{50} + u_{5j}$$

$$\beta_{13j} = \gamma_{130} + W_{16j}(\% \text{ Asian}) + u_{13j}$$

$$\beta_{6j} = \gamma_{60} + u_{6j}$$

$$\beta_{14j} = \gamma_{140} + W_{17j}(\% \text{ Asian}) + u_{14j}$$

$$\beta_{7j} = \gamma_{70} + W_{10j}(\% \text{ Black}) + u_{7j}$$

$$\beta_{15j} = \gamma_{150} + W_{18j}(\% \text{ Asian}) + u_{15j}$$

$$\beta_{8j} = \gamma_{80} + W_{11j}(\% \text{ Black}) + u_{8j}$$

$$\beta_{kj} = \gamma_{k0} + u_{kj}$$

The outcome of interest is represented by $\log[P_{ij} / (1 - P_{ij})]$, which is the log-odds of the probability of individual i , who is enrolled in school j , remediating successfully or transferring (differing outcomes treated in separate models).

The outcome of interest is conditioned upon a vector of explanatory variables for individual i in school j (i.e., race, receipt of advising at selected time periods, the interaction terms for race and advising, and a set of student-level controls represented collectively by X_{ij}) and a vector of student-level coefficients for school j ($\beta_{1j}, \beta_{2j} \dots \beta_{kj}$). The term β_{0j} represents the constant term for school j , which is an estimate of the log-odds of the probability of successfully remediating for all individuals in school j when each X is set to zero. This constant term is allowed to vary from the school-level constant (γ_{00}) conditional upon a vector of explanatory variables for school j (e.g., the size of the college, the percentage of first-time freshmen requiring remedial math assistance, the percentage of first-time freshmen receiving advising in 95/96, and three measures of the racial composition of the body of first-time freshmen), a vector of associated college-level coefficients for school j ($W_{1j}, W_{2j} \dots W_{6j}$), and a random school-level error term (u_{0j}). The student-level coefficients representing each category of race ($\beta_{1j}, \beta_{2j}, \beta_{3j}$) and the race-specific

effects of advising are allowed to vary conditional upon the respective composition of that racial group in the college, associated college-level coefficients ($W_{7j}, W_{8j} \dots W_{18j}$), and random school-level error terms. The remaining student-level coefficients (the direct effects of advising and the student-level control variables) are allowed to vary randomly and unconditionally. Students are assigned to the school in which they are observed to be enrolled as of the Fall of 1995, or, in the case of multiple institutions in the Fall of 1995, to the school in which a given student is enrolled in the greatest number of courses in that term. With respect to these equations, my hypotheses predict the following:

1. The direct effects of advising ($\beta_{4j}, \beta_{5j}, \beta_{6j}$) are positive and statistically significant.
2. The race-specific effects of advising for Blacks and Hispanics ($\beta_{7j}, \beta_{8j}, \beta_{9j}, \beta_{10j}, \beta_{11j}, \beta_{12j}$) are negative and statistically significant.
3. The effects of racial context on the race-specific effects of advising for Blacks and Hispanics ($W_{10j}, W_{11j}, W_{12j}, W_{13j}, W_{14j}, W_{15j}$) are positive and statistically significant.

Policy Relevance

This study has profound implications for policy. The celebration in 2004 of the 50th anniversary of the decision of *Brown vs. Board of Education*, by which official segregation of public education was deemed illegal, highlights the importance of educational equity for rectifying longstanding racial differences in status attainment. While many gains have been made in the quest for racial equality over the last fifty years, Blacks and Hispanics still lag behind Whites in both educational outcomes and resulting status attainment (e.g., Cancio, Evans & Maume, 1996; Farkas, 2003; Kmec, 2003; Roscigno, 1998). Identifying and resolving the causal forces that underlie racial inequality in educational attainment is among the most important goals of sociological and educational research, particularly when the underlying causal forces constitute expressions of institutionalized racism, as is hypothesized here. Moreover, the identification of *resolvable* problems within colleges that are hindering the academic attainment of underprepared and historically disadvantaged groups is a matter of first-order importance in institutional research.

Innovative Aspects of Project

Among the innovative aspects of the project, the research proposed here represents one of the few large-scale studies of postsecondary remediation involving data addressing a complete and sizeable population ($N_{\text{students}} = 62,945$) enrolled in multiple institutions ($N_{\text{colleges}} = 107$). It also is the first recent study to address the topic of *cooling out* with specific attention to the role of academic advising/counseling. Additionally, the research proposed here constitutes one of only a small handful of studies (e.g., Bahr, 2004; Bahr, 2005) specifically analyzing racial disparities in postsecondary remedial outcomes. Finally, the use of two differing outcome measures and two differing versions of the key explanatory variable (timing of first academic advising experience) adds substantially to the strength and credibility of the findings.

Target Audience

The findings of this study will be of interest to community college policy makers, administrators, researchers, instructors, and offices of academic advising. This study also fits closely with NPEC's focus this year on student decisions, as the questions addressed in this research concern the influence of academic advising on subsequent academic decision-making and goal-setting by community college students.

Connection to Principal Investigator's Long-Term Research Agenda

The project proposed here represents the natural evolution of my research on mathematics remediation and racial inequality in educational attainment. It employs a unique, complex, and multifaceted data set that I spent four years assembling while completing my doctoral dissertation (June 2004). A number of research projects have arisen from my work on these data including two manuscripts currently are under review (by *Sociology of Education* and *Research in Higher Education*, respectively) and three manuscripts currently in development. However, the research proposed here arguably represents the most potent set of questions I have yet to examine on the topics of racial inequality in postsecondary remediation.

Dissemination Plan

Regardless of the findings with respect to the proposed hypotheses, the results of this research are important and likely will be received with considerable interest by sociologists and educational researchers alike. In addition to submitting the work for presentation at the 2007 Annual Forum of the Association for Institutional Research, I will seek publication of the findings in the *American Educational Research Journal*, one of the leading journals in the field of educational research.

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BIOGRAPHICAL SKETCH

Autobiographical Statement

Dr. Peter Riley Bahr, Ph.D., is an Assistant Professor of Sociology at Wayne State University (Detroit, Michigan). His primary area of research is postsecondary remediation in community colleges. His prior work on the topic includes his 2004 doctoral dissertation entitled "The Rough and Rocky Road of Remediation: Racial Inequalities in Postsecondary Remedial Mathematics," his 2005 manuscript (currently under review) entitled "Preparing the Underprepared: An Analysis of Racial Disparities in Postsecondary Remedial Mathematics," and his 2006 manuscript (currently under review) entitled "Double Jeopardy: Testing for Interaction Effects of Multiple Basic Skills Deficiencies on Successful Remediation." He currently is pursuing comparative research (funded through April 30, 2006, by a research grant from Wayne State University) on the educational outcomes of community college students who remediate successfully versus those who do not.

Prior to his appointment as Assistant Professor at Wayne State University, he was employed for two years as a high-level quantitative researcher with the Chancellor's Office of California Community Colleges, under the direct supervision of the Director of Research and Planning (Willard Hom) and the Vice Chancellor of Technology, Research, and Information Services (Patrick Perry). During his employment with the Chancellor's Office, Dr. Bahr completed a number of major research projects of statewide significance addressing methodological problems in community college research. He since has published two peer-review articles documenting segments of his work with the Chancellor's Office, including a paper addressing the measurement of student transfer rates and a paper addressing the measurement of student academic preparation.

During his doctoral work, Dr. Bahr specialized and trained specifically in quantitative methodology, working under such notable methodologists as Dr. Diane Felmlee (University of California – Davis) and Dr. Xiaoling Shu (University of California – Davis). Also of note, among his dissertation committee members was Dr. Linda Serra Hagedorn, Chair of the Department of Educational Administration and Policy at the University of Florida. Dr. Bahr is well versed in the application of hierarchical nonlinear models (the analytical technique proposed for this study), having completed graduate coursework on the topic and having employed such models in his dissertation, in one manuscript currently under review, and in two additional manuscripts currently in development. Additionally, he regularly teaches a graduate course in statistics and an undergraduate course in research methods at Wayne State University.

Education

- 2004** **Ph.D.**, Sociology, University of California – Davis
Dissertation Title: *The Rough and Rocky Road of Remediation: Racial Inequalities in Postsecondary Remedial Mathematics*
- 2000** **M.A.**, Sociology, University of California – Davis
- 1997** **B.S.**, Criminology, California State University – Sacramento
- 1995** **A.S.**, Chemistry, Solano Community College
- 1995** **A.A.**, General Science, Solano Community College
- 1994** **A.A.**, Liberal Arts, Solano Community College
- 1993** **A.S.**, Water and Wastewater Technology, Solano Community College

Relevant Academic and Research Appointments

- 2004 – present** **Assistant Professor**
Department of Sociology, Wayne State University
- 2001 – 2003** **Institutional (Educational) Researcher**
Research & Planning Unit
Chancellor's Office of the California Community Colleges
- 2000 – 2001** **Research Program Specialist**
Child, Youth and Family Services Branch
California Department of Education
- 1999 – 2000** **Research Assistant**
Department of Sociology
University of California – Davis

Refereed Publications and Manuscripts under Review by Refereed Journals

Bahr, Peter Riley, Willard Hom, and Patrick Perry. 2004. "Student Readiness for Postsecondary Coursework: Developing a College-Level Measure of Student Average Academic Preparation." *Journal of Applied Research in the Community College* 12(1):7-16.

Bahr, Peter Riley, Willard Hom, and Patrick Perry. 2005. "College Transfer Performance: A Methodology for Equitable Measurement and Comparison." *Journal of Applied Research in the Community College* 13(1):73-87.

Bahr, Peter Riley. 2005. "Preparing the Underprepared: An Analysis of Racial Disparities in Postsecondary Mathematics Remediation." Under second review by *Sociology of Education*.

Bahr, Peter Riley. 2006. "Double Jeopardy: Testing for Interaction Effects of Multiple Basic Skills Deficiencies on Successful Remediation." Under review by *Research in Higher Education*.

Bahr, Peter Riley. 2005. "Race and Nutrition: An Investigation of Black-White Differences in Health-Related Nutritional Behaviors." Under second review by *Sociology of Health & Illness*.

Felmlee, Diane, Heather Kohler Flynn, and **Peter Riley Bahr**. 2005. "Too Much of a Good Thing: Disenchantment in Marriages and Intimate Relationships." Under review by *Social Psychology Quarterly*.

BUDGET

GRANT PROJECT TITLE:

Cooling Out as Institutional Racism: Does Academic Advising in Community Colleges Discourage the Educational Attainment of Historically Disadvantaged Racial Groups?

Peter Riley Bahr	1.963 FTE summer months @ \$5962.22 per month	\$11,703.84
	2.250 FTE academic year months @ \$5962.22 per month	\$13,415.00
Total Salaries and Wages		\$25,118.84
Summer Fringe Benefits @ 13.5%		\$ 1,580.02
Academic Year Fringe Benefits @ 24.6%		\$ 3,300.09
Total Fringe Benefits		\$ 4,880.11
<hr/> TOTAL AMOUNT OF AWARD		\$29,998.95

I am requesting partial summer salary (1.963 FTE months) and 50% teaching release (one-quarter of nine-month salary) so that I can devote an extended, uninterrupted period to data processing, data analysis, writing, and the publication of findings. Funds for travel to the 2007 AIR Forum in New Orleans, Louisiana, will be provided by preexisting sources within my university.⁴

⁴ A few thousand dollars for travel and other research activities were allocated to me upon commencement of my current position in 2004. These funds will be used to attend the 2007 AIR Forum.

CURRENT AND PENDING SUPPORT

I have no current or pending support for the project proposed here or for any other research project scheduled for the period of June 1, 2006, through May 30, 2007, nor have I applied for any alternative source of funding for that period. I currently am pursuing comparative research on the educational outcomes of community college students who remediate successfully versus those who do not, which is funded through April 30, 2006, by a research grant from Wayne State University.

FACILITIES, EQUIPMENT AND OTHER RESOURCES

All facilities, equipment, and resources (including software) necessary to bring this project to fruition have been acquired, and no further resources are needed to complete the work other than the time necessary to realize the proposed goals of the work.