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Cooling Out in the Community College: What is the Effect of Academic Advising on Students' Chances of Success?

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Abstract Burton Clark's proposition concerning the *cooling out* of underprepared students in community colleges has a controversial history and remains a point of contention. Central to Clark's description of the *cooling out* process is the academic counselor, whose job it is to dissuade underprepared students from goals perceived to be overambitious and ease these students into lesser, presumably better-fitting academic trajectories. In this study, I test a number of hypotheses concerning the effect of advising on students' chances of attaining their goals. I seek to determine what effect advising has on students' attainment, and whether this effect is dependent upon students' academic preparation, students' race/ethnicity, the racial/ethnic composition of the college, or the representation of underprepared students in the college. I use hierarchical discrete-time event history analysis to analyze data that address two subsets of the Fall 1995 cohort of first-time freshmen who enrolled in any of California's 107 semester-based community colleges. I find that advising is actively beneficial to students' chances of success, and all the more so for students who face academic deficiencies, which contradicts deductions drawn from Clark's description of the active role of counselors in the *cooling out* process.

Keywords Cooling out · Advising · Counseling · Transfer · Remediation · Remedial education · Developmental education · Mathematics · Race · Inequality · Community college · Racial composition · Skill composition · Context · Event history analysis

Background

The *Cooling Out* Proposition

Burton Clark's (1960, 1980) proposition that one of the functions of the community college, particularly the community college counselor/advisor, is to *cool out* students

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whose academic ambitions exceed their abilities has a long and contentious history, and it continues as a point of debate (e.g., Adelman 2005; Bahr 2004; Deil-Amen and Rosenbaum 2002). The concept of *cooling out* is drawn from Goffman's (1952) description of the process whereby an individual who has been the victim of a con game is eased out of the recently held identity of "sure winner" by the *cooler* (the agent of *cooling out*) into an alternative identity *other than* "victim." Extending this concept to the community college, Clark (1960, p. 575) described *cooling out* as a "gradual disengagement" of a student from his/her professed academic goal, accomplished primarily through the substitution of lesser avenues of achievement perceived to be more appropriate to a given student's preparation, skills, and abilities.

Central to the *cooling out* process described by Clark is the academic counselor—the most active *cooler* within the institutional structure of the community college. In Goffman's (1952, p. 452) description, "the cooler has the job of handling persons who have been caught out on a limb—persons whose expectations and self-conceptions have been built up and then shattered." Clark (1960) explains that, as the agent of *cooling out*, the counselor works closely with the student, discussing the academic and professional implications of the student's placement exam scores, assisting with course selection, providing information about the requirements and hurdles associated with the student's goals, and advising based on the student's accumulating academic record. For students who do not perform well academically, even the probationary process returns them to the counselor. Throughout these interactions, the counselor is charged with easing from the student's grasp those academic goals that are perceived to be overambitious and substituting goals befitting the perceived capabilities of the student.

Recent Evidence

While Clark focused on the *cooling out* of academically underprepared students without regard to ascribed characteristics, recent evidence suggests a possible racial twist to *cooling out*. In particular, Bahr (2004) found significant differences between racial groups in the effect of academic advising on the likelihood of successful remediation. More specifically, Bahr found that White and Asian remedial math students in community colleges experienced a small, but significant, increase in the likelihood of successful remediation associated with receiving advising. Among Hispanics, this beneficial effect of advising was significantly less than that for Whites and Asians, but the effect remained positive. However, Black students who received advising were slightly *less* likely to remediate successfully than were Black students who did *not* receive advising. One interpretation of this finding is that some aspect of the advising process tends, on average, to discourage underprepared Black students from the pursuit of college-level math skills, perhaps in a fashion akin to the *cooling out* processes described by Clark.

Although the connection between *cooling out* and issues of social conflict, particularly the reproduction of class structure, is far from new (e.g., Alba and Lavin 1981; Dougherty 1987; Karabel 1972; McClelland 1990; Rosenbaum 2001), the proposition that *cooling out* may tend to be moderated by the race of the student is both novel and controversial. Such a proposition, however, is not without contextual support. Recent research indicates that racism is alive and well on college campuses (Rankin and Reason 2005; Suarez-Balcazar et al. 2003; Swim et al. 2003), and that Blacks in particular are likely to be subjected to negative stereotypes regarding academic ability (Davis et al. 2004). Thus, in light of Bahr's findings, one might envision race-specific *cooling out* processes whereby underprepared Black students tend, on average, to be discouraged from ambitious academic goals in favor of lesser goals perceived to be more suitable for historically disadvantaged students of color, particularly students whose basic skills are deficient (Weissman et al. 1998). This does not necessarily indicate behavior by counselors that is overtly racist, but, rather, the tendency for biases and stereotypes to emerge in the course of everyday behavior (Bobo and Fox 2003; Brezina and Winder 2003; Devine 2001).

Yet, this interpretation of Bahr's findings disagrees with several recent studies concerning *cooling out* in community colleges. For example, Deil-Amen and Rosenbaum (2002) observed a shift toward "stigma-free" remediation in community colleges that tends to hide from students their underpreparation. This finding implies that direct, active *cooling out* by counselors occurs less frequently now than in the past. In fact, Deil-Amen and Rosenbaum suggest that this "stigma-free" environment is actively encouraging to underprepared students, although the authors further surmise that allowing students to discover their remedial status (and associated low chances of goal attainment) on their own forestalls high rates of attrition only temporarily. Likewise, Adelman (2005) found a reasonably high level of stability in the long-term educational objectives of traditional-aged community college students and little variation (in this stability) across racial/ethnic groups. This finding suggests that neither community college students generally, nor students of historically disadvantaged racial/ethnic groups specifically, are being discouraged from ambitious educational goals. In fact, Pascarella et al. (2003) found that non-White community college students experienced a *greater* increase in end-of-first-year educational plans than did White students.

These recent findings, which collectively undercut key components of Clark's thesis, are supported by a few small-scale studies, documented by Pascarella and Terenzini (2005), that suggest that advising is actively beneficial to students' attainment (e.g., Metzner 1989; Young et al. 1989). In one particularly noteworthy study, Seidman (1991), using a study design that involved random assignment, observed that advising increased significantly community college students' persistence into the second year of attendance.

However, Deil-Amen and Rosenbaum's study drew on data from only two colleges and did not address the possibility of race-specific effects of advising. Neither Adelman's study nor the study conducted by Pascarella and his colleagues addressed the effect of advising on students' outcomes, nor did either study address underprepared students specifically. Seidman's study employed a small sample from one college and a short observation period, and it explored neither the effect of underpreparation, nor the effect of race, on the effect of advising. In contrast, Bahr's study focused specifically on underprepared students, drew on data collected from over one hundred colleges, employed a 6-year observation period, and examined both the direct and race-specific effects of advising. Thus, Bahr's findings are derived from a different analytical perspective on *cooling out* than that of other recent studies.

Nevertheless, considerable caution must be exercised in interpreting Bahr's findings because the analysis employed in his study effectively forces a cross-sectional design on longitudinal data. Thus, the order of events with respect to advising is not clear. It may be that, on average, advising discourages underprepared Black students from pursuing college-level math competency. Alternatively, it may be that Black and Hispanic students tend, on average, to seek advising at different points in their academic careers than do Whites and Asians, thereby receiving lesser benefits and contributing to the appearance of race-specific effects.

Bahr also does not examine the influence of racial context on the race-specific effects of advising. The role of campus racial climate in the outcomes of historically disadvantaged racial groups has received increased empirical attention in recent years (e.g., Cabrera et al. 1999; Hurtado 1992; Hurtado et al. 1999; McClelland and Auster 1990). Although findings regarding the effect of institutional racial composition are mixed (e.g., Pascarella et al. 1989; Wassmer et al. 2004), the evidence suggests that institutions that have high minority enrollments tend to exhibit more supportive environments for disadvantaged racial groups than do institutions that have low minority enrollments (e.g., Chavous et al. 2004; Fries-Britt and Turner 2002; Hagedorn et al. 2007; Pascarella and Terenzini 2005). Thus, one could theorize that, if historically disadvantaged racial groups are systematically *cooled out*, this process occurs less frequently, or to a lesser degree, in institutions that enroll a disproportionately large percentage of minority students.[1]

Unanswered Questions

Clearly, important questions concerning *cooling out* processes in the community college remain to be explored, and further study of the relationship between advising and attainment is required to explain fully the findings of prior research. Perhaps most important, it is not clear if direct, active *cooling out* by counselors is occurring at all. In fact, with the exception of Bahr's study, no prior large-scale, quantitative studies that purport to address Clark's *cooling out* proposition have included advising as a predictor, which seems a rather important oversight in light of the centrality of academic counselors in Clark's thesis. It follows that one may ask, what effect does advising have on community college students' chances of attaining their academic goals?

Second, while Clarks' original proposition concerning *cooling out* focused primarily on underprepared students, some subsequent explorations of *cooling out* have thrown a wider net, so to speak, and foregone a specific focus on underprepared students (e.g., Adelman 2005). Thus, one might ask whether the effect of advising on students' chances of achieving their goals differs according to students' level of preparation for college coursework.

Third, Bahr's work raises the question of whether the effect of advising is moderated by students' race/ethnicity. Yet, his study failed to account for the timing of advising within students' academic careers. Thus, the internal validity of the identified race-specific effects is suspect. What is needed to confirm or disconfirm Bahr's findings is a test of the race-specific effect of advising that is sensitive to the longitudinal nature of students' academic careers. More specifically, one might ask whether the effect of advising on students' chances of success varies according to students' race, net of any effect of the timing of advising.

Finally, although prior research on the effect of college racial composition on students' attainment has produced mixed findings, the literature does beg the question of whether any race-specific effect of advising varies according to the racial composition of the college. In other words, if race-specific *cooling out* is occurring, it may be moderated by racial context, such that, on average, advising is less detrimental (or possibly beneficial) to a student of a given minority group in a college that enrolls a disproportionately large percentage of students of the same race.

[1] While some of the studies cited in this discussion of campus racial climate and institutional racial composition focused specifically on 4-year colleges (e.g., Cabrera et al. 1999), and others focused specifically on community colleges (e.g., Wassmer et al. 2004), the applicability of findings on this topic across types of colleges has not been established.

Going a step further, one might ask a similar question about underprepared students and college skill composition. Namely, does advising in colleges that serve a greater percentage of underprepared students differ in its effect on underprepared students' chances of success, as compared with advising in colleges that serve relatively few underprepared students? At a minimum, it seems intuitively reasonable that colleges that serve a greater percentage of underprepared students will be more focused on, and will offer more support to, such students.

Situating this Study

In this study, I seek to extend prior research on *cooling out* with particular attention to advising as a predictor and with sensitivity to the timing of advising within students' academic careers. I test the effect of advising on the attainment of two different outcomes using two cohorts of first-time freshmen in community colleges. First, I use data that address a cohort of remedial math students to test the effect of advising on the likelihood of successful remediation in math. I focus on remediation because underprepared students are at the heart of Clark's thesis, and I selected math because more students require remedial assistance with math than with any other subject (Adelman 2004; Boylan and Saxon 1999; Parsad et al. 2003). Second, I use data that address a cohort of transfer-seeking students to test the effect of advising on the likelihood of transfer. Transfer is of interest because it was the implied primary outcome in Clark's original discussion of *cooling out*. In both of these analyses, I test the direct, race-specific, and deficiency-specific effects of advising. I also test the effect of college racial composition on the race-specific effect advising and the effect of college skill composition on the deficiency-specific effect of advising.

Methodological Complications

Testing the effect of advising with sensitivity to the timing of advising may appear to be a straightforward task. At first glance, one might think that it would be as simple as generating a single nominal variable with attributes such as: did not receive advising at any point; received first advising experience during first year of attendance; received first advising experience during second year of attendance; and so on. Given such a variable, it would seem that one would need only a set of multiplicative interactions with race to test the race-specific effect of advising and a similar set of interactions to test the deficiency-specific effect of advising.

However, this operationalization of advising can represent the data accurately only when all students who are included in the analysis are retained for all periods addressed by the variable. For example, if the variable includes a category for receiving first advising experience in the third year or later, then all students must be retained for at least 3 years. Otherwise, the effect of advising is confounded by the effect of retention: only those students who were retained for at least 3 years could have received their first advising experience in the third year.

Because persistence varies widely across students, particularly in community colleges, a solution to this problem must take into account both the timing of advising and variation in duration of enrollment. Such a solution can be found in discrete-time event history analysis (Allison 1982, 1995). Event history analysis is used to model the *hazard* of an event of interest, defined loosely as the instantaneous probability of occurrence or, more accurately, as the average probability of occurrence per unit of time. Event history analysis allows for variation in the timing of predictors, the timing of an outcome, and students' entry and exit from the analytical pool. As it pertains to this study, the model allows for variation in the timing of advising, the timing of the outcomes of interest, and persistence.

Hypotheses

I test four sets of hypotheses in this study. With respect to the unanswered questions discussed earlier, these hypotheses presume that active, counselor-driven *cooling out* is occurring in the community college, is focused specifically on underprepared students, is to some extent race-specific in nature, and is to some extent conditional on college racial and skill composition.

Hypothesis #1: *Cooling Out* as a General Phenomenon of Underprepared Students

I hypothesize that the experience of advising is detrimental to underprepared students' chances of success. Specifically, I hypothesize that the net effect of advising on the hazard of successful remediation for students in the remedial math cohort is negative. Likewise, I hypothesize that the effect of advising on the hazard of transfer for underprepared, transfer-seeking students differs significantly and negatively from that of their college-prepared counterparts, and that the net effect for underprepared, transfer-seeking students is negative.

Hypothesis #2: *Cooling Out* as a Specific Phenomenon of the Poorest Skilled Students

Alternatively, it is worthwhile to consider the possibility that only those students who have the poorest academic skills are *cooled out*. In other words, if advising generally is beneficial to remedial math students (in opposition to Hypothesis 1), perhaps it is detrimental to the subset of students who have the poorest math skills at college entry. With this possibility in mind, I offer a conditional hypothesis that, if the average effect of advising on the hazard of successful remediation in math is positive, then the net effect of advising for those remedial math students who have the poorest math skills is negative.

Hypothesis #3: *Cooling Out* as Institutional Racism

I hypothesize that students of historically disadvantaged racial/ethnic groups gain lesser benefits, or incur greater detriments, from the experience of advising than do advantaged groups. In particular, I hypothesize that the net effect of advising on the hazard of successful remediation in math for Black and Hispanic students in the remedial math cohort differs significantly and negatively from that of White students. Likewise, I hypothesize that the net effect of advising on the hazard of transfer for Black and Hispanic transfer-seeking students differs significantly and negatively from that of White students.

Hypothesis #4: *Cooling Out* as a Contextual Phenomenon

I hypothesize that any race- and deficiency-specific effects of advising are conditional on the racial and skill composition of the college. More specifically, I hypothesize that any race-specific effects of advising (Hypothesis 3) on the hazard of successful remediation for the remedial math cohort, and any race-specific effects of advising on the hazard of transfer for the transfer-seeking cohort, vary positively with the percentage representation in the student body of the corresponding racial group. Applying the same rationale, I hypothesize that any deficiency-specific effects of advising (Hypotheses 1 and 2) on the hazard of successful remediation and the hazard of transfer vary positively with the percentage representation of skill-deficient students.

Data & Methods

Data

To test these hypotheses, I draw upon data collected by the Chancellor's Office of California Community Colleges. The Chancellor's Office collects data each term from the 112 community colleges and affiliated adult education centers in California. The data maintained by the Chancellor's Office constitute a census of community college students in California and include transcripts, demographics, financial aid awards, degree/certificate awards, etc. In addition, the database is cross-referenced periodically against the enrollment records of all California public 4-year postsecondary institutions and the National Student Clearinghouse database in order to identify students who transferred to public and private 4-year institutions, both in-state and out-of-state (Bahr 2008; Bahr et al. 2005; Boughan 2001).

I selected for this study the Fall 1995 cohort of first-time college freshmen who enrolled in any of California's 107 semester-based community colleges ($N = 202{,}484$). Valid course enrollment records were available for 93.9% of these students ($N = 190{,}177$). I observed the academic records of these students across *all* of the semester-based colleges (regardless of the first institution of attendance) for 6 years, through the Spring semester of 2001, and then selected two subsets of students, which I describe in detail in the sections that follow.

Remedial Math Cohort

The first subset of students is defined by race and remedial math status. From the larger body of the Fall 1995 first-time freshmen cohort, I retained those students whose first math course was remedial in nature and who enrolled in this course in their first term of attendance ($N = 37{,}577$).[2] From this subset, I retained the students of the four most numerous racial groups—White, Black, Hispanic, and Asian—who constitute 91.1% of the subset ($N = 34{,}217$). I then dropped 614 students (1.8%) whose records were missing data on sex, age, or the ID variable used to monitor records across colleges, and 3,485 additional students (10.2%) who attended college for only one semester. The resulting remedial math cohort is composed of 30,118 students. Frequency distributions of various characteristics of the cohort are provided in Table 1.

[2] Approximately one-half (52.9%) of students whose first nonvocational math course was remedial in nature enrolled in this first math course in the first term of attendance.

Table 1 Frequency distributions of selected variables for the remedial math cohort ($N_{students}$ = 30,118)

Variable	Values	*N*	%
Remediation in math	Remediated successfully	8,984	29.83
	Did not remediate successfully	21,134	70.17
Term of first advising	Fall 1995–Spring 1996	19,328	64.17
	Summer 1996–Spring 1997	1,833	6.09
	Summer 1997–Spring 1998	853	2.83
	Summer 1998–Spring 1999	356	1.18
	Summer 1999–Spring 2000	218	0.72
	Summer 2000–Spring 2001	146	0.48
	Did not receive advising at any point	7,384	24.52
Race	White	14,303	47.49
	Black	2,991	9.93
	Hispanic	9,669	32.10
	Asian	3,155	10.48
Math deficiency	Intermediate Algebra /geometry	7,559	25.10
	Beginning algebra	11,391	37.82
	Pre-algebra	4,491	14.91
	Arithmetic	6,677	22.17
English competency	College-level	8,141	27.03
	Remedial writing	15,383	51.08
	Remedial reading	2,056	6.83
	ESL	2,248	7.46
	None	2,290	7.60
Academic goal	Transfer	6,286	20.87
	Transfer with AS/AA	13,547	44.98
	AS/AA	1,883	6.25
	Vocational degree	820	2.72
	Vocational certificate	513	1.70
	Other job-related goal	2,086	6.93
	Abstract	1,198	3.98
	Remediation	567	1.88
	Undecided	2,976	9.88
	Unreported	242	0.80
First math grade	A	3,898	12.94
	B	4,821	16.01
	C	5,430	18.03
	D	2,588	8.59
	F	3,773	12.53
	Withdrawal	6,401	21.25
	Credit	1,490	4.95
	No credit	803	2.67
	Ungraded	240	0.80
	Unreported	674	2.24

Table 1 continued

Variable	Values	*N*	%
Sex	Male	13,552	45.00
	Female	16,566	55.00
Fee waiver	Received fee waiver at some point	14,879	49.40
	Did not receive fee waiver at any point	15,239	50.60
Grant	Received grant(s) at some point	10,190	33.83
	Did not receive grant(s) at any point	19,928	66.17
Age at start (years)	<18	2,632	8.74
	18–20	22,398	74.37
	21–25	2,247	7.46
	26–30	1,021	3.39
	31–35	753	2.50
	36–40	506	1.68
	41–50	436	1.45
	>50	125	0.42
Total number of enrolled terms	2–3	6,810	22.61
	4–5	5,655	18.78
	6–7	5,448	18.09
	8–9	4,794	15.92
	10–11	3,792	12.59
	12–14	3,014	10.01
	15–17	605	2.01

Transfer-Seeking Cohort

The second subset of students is defined by race and academic goal. From the larger body of the Fall 1995 first-time freshmen cohort, I retained those students who indicated that their primary academic objective was transfer to a 4-year institution, either exclusively or in combination with a nonvocational Associate's degree ($N = 76{,}826$). From this subset, I again retained the students of the four most numerous racial groups, who constitute 91.8% of the cohort ($N = 70{,}540$). I then dropped 1,400 students (2.0%) whose records were missing data on sex, age, or the tracking ID variable, and 899 students (4.0%) who appeared on the enrollment records of a 4-year college in the first term of attendance at the community college (indicating concurrent enrollment). The resulting transfer-seeking cohort is composed of 68,241 students. Frequency distributions of various characteristics of the cohort are provided in Table 2.

Outcome Variables

Two outcomes are addressed in this study. The outcome of interest for the remedial math cohort is successful remediation in math, operationalized as a passing grade (A, B, C, D, or Credit) in a college-level math course at any point during the 6-year observation window. The outcome of interest for the transfer-seeking cohort is upward transfer to a 4-year postsecondary institution at any point during the 6-year observation window.

Table 2 Frequency distributions of selected variables for the transfer-seeking cohort ($N_{students}$ = 68,241)

Variable	Values	*N*	%
Transfer	Transferred	18,557	27.19
	Did not transfer	49,684	72.81
Term of first advising	Fall 1995–Spring 1996	39,955	58.55
	Summer 1996–Spring 1997	4,725	6.92
	Summer 1997–Spring 1998	2,392	3.51
	Summer 1998–Spring 1999	1,137	1.67
	Summer 1999–Spring 2000	712	1.04
	Summer 2000–Spring 2001	551	0.81
	Did not receive advising at any point	18,769	27.50
Race	White	33,591	49.22
	Black	7,067	10.36
	Hispanic	19,027	27.88
	Asian	8,556	12.54
Math deficiency	College-level math	11,740	17.20
	intermediate algebra/geometry	10,335	15.14
	Beginning algebra	16,176	23.70
	Pre-algebra	6,211	9.10
	Arithmetic	6,975	10.22
	Vocational math only	552	0.81
	No math	16,252	23.82
English competency	College-level	22,159	32.47
	Remedial writing	25,285	37.05
	Remedial reading	3,461	5.07
	ESL	5,220	7.65
	None	12,116	17.75
Academic goal	Transfer	22,520	33.00
	Transfer with AS/AA	45,721	67.00
Sex	Male	33,243	48.71
	Female	34,998	51.29
Fee waiver	Received fee waiver at some point	29,752	43.60
	Did not receive fee waiver at any point	38,489	56.40
Grant	Received grant(s) at some point	18,602	27.26
	Did not receive grant(s) at any point	49,639	72.74
Age at start (years)	<18	6,507	9.54
	18–20	48,684	71.34
	21–25	6,005	8.80
	26–30	2,786	4.08
	31–35	1,776	2.60
	36–40	1,174	1.72
	41–50	1,018	1.49
	>50	291	0.43

Table 2 continued

Variable	Values	*N*	%
Total number of enrolled terms	1–2	13,001	19.05
	3–4	11,625	17.04
	5–6	12,107	17.74
	7–8	11,576	16.96
	9–11	12,858	18.84
	12–14	5,938	8.70
	15–17	1,136	1.66

Data Format

Data for standard regression models generally include only a single record per unit of analysis (e.g., one row of data per student). In contrast, data for discrete-time event history models consist of intervals of time (person-periods) in which a particular event is observed to either occur or not occur for a given individual (Yamaguchi 1991). In this case, the intervals of time are semester terms. The event of interest is a passing grade in a college-level math course (for the remedial math cohort) or upward transfer (for the transfer-seeking cohort).

In reformatting the data for the remedial math cohort from student records to student-term records (person-periods), I retained all terms in which a given student enrolled in any coursework *after* the term of first math enrollment (Fall 1995), up to and including the earlier of (1) the term in which a given student achieved college-level math skill, (2) the last term in which the student was observed in the system, or (3) the last term of observation (Spring 2001). The resulting data define the "risk set," which is the group of students who are "at risk" of remediating successfully in any given term t. In total, these reformatted data include 142,145 student-terms, with a mean number of "at risk" terms per student of 4.72 ($s = 3.27$).

For the transfer-seeking cohort, I retained all terms *after* the term of first attendance, up to and including the earlier of (1) the term in which transfer occurred or (2) the last term of the observation window. Unlike the data for the remedial math cohort, I did *not* drop terms in which a given student was *not* enrolled in coursework because the student is still "at risk" of transfer even when not in attendance (Hagedorn and Lester 2006). Thus, all students who did not transfer within the 6-year window have sixteen "at risk" terms. In total, these reformatted data include 968,584 student-terms, with a mean number of "at risk" terms per student of 15.06 ($s = 2.45$).

Explanatory Variables for the Remedial Math Model

In analyzing the hazard of successful remediation in math for the remedial math cohort, I consider three *levels* of explanatory variables: a *term-level* indicator of receipt of academic advising, *student-level* indicators of race/ethnicity and math skill deficiency, and *college-level* indicators of racial composition and math skill composition. The term-level indicator of receipt of advising is coded *0* for all terms prior to the receipt of advising, coded *1* for the term in which a given student received advising, and coded *1* for all terms subsequent to the term in which advising was received. This variable is set to *0* in all terms for students who did not receive advising at any time. In effect, this variable is treated as an "on/off switch" that is "switched on" (with respect to a given student's record) in the term in which advising occurs, which is comparable to the manner in which academic *milestones* were treated by Calcagno et al. (2007).

The student-level indicator of race/ethnicity is a self-reported, nominal measure of a student's primary racial/ethnic identification—White, Black, Hispanic, or Asian—and is treated as a set of dummy variables. The student-level indicator of math skill deficiency is set to the skill-level of a given student's first remedial math course and is treated as a set of dummy variables. 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 first-time freshmen cohort enrolled at any time during the observation period. In total, I collapsed 3,110 substantive math course listings into six categories: basic arithmetic, pre-algebra, beginning algebra, intermediate algebra/geometry, college-level math, and vocational 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 math progression). The category of college-level math encompasses all math courses of a skill equal to, or greater than, college algebra. I ignored vocational math and nonsubstantive math courses (e.g., math labs, math tutoring).

Four college-level explanatory variables are employed. Three of these address the percentage (logged to approximate normality) of the Fall 1995 first-time freshmen cohort who are Black, Hispanic, or Asian, respectively. The fourth variable measures the percentage (squared) of the first-time freshmen cohort whose first nonvocational math course was remedial in nature. All four of these college-level variables are treated as continuous.

Control Variables for the Remedial Math Model

I include as controls a number of term- and student-level variables found in prior research to be predictors of academic outcomes among remedial students (Bahr n.d.; Burley et al. 2001; Hagedorn et al. 1999; Hoyt 1999). At the level of the term, I control for age (measured in years and treated as a continuous variable) and three proxies of socioeconomic status (SES): a dichotomous indicator of receipt of a fee waiver, a dichotomous indicator of receipt of any grants, and a continuous indicator of the total monetary value of any grants received. All four of these term-level variables vary over time.

At the level of the student, I control for sex, grade in first math course, academic goal, and English competency at college entry. Grade in first math includes ten nominal attributes, which are treated as a set of dummy variables. Academic goal is a self-reported measure of a student's primary objective, collected at the time of application, which I collapsed into ten nominal categories, and which I treat as a set of dummy variables. English competency, like math deficiency, is set to the skill-level of a student's first English course and is treated as a set of dummy variables. Through a process similar to that used to categorize math, I collapsed 6,625 substantive English courses into four categories: remedial reading, remedial writing, English-as-a-Second-Language (ESL), and college-level English. To these four, I added a fifth category to account for students who did not enroll in any English coursework.

Explanatory Variables for the Transfer Model

The explanatory variables for the transfer model are similar to those of the remedial math model. The term-level indicator of receipt of advising is treated in the same manner. At the student-level, I consider three indicators: race, math track, and English track. Race again is treated as a set of three dummy variables. Math track is a four-category nominal variable defined by a student's first nonvocational math course (if any), including: college-level math, remedial math, vocational math only, or no math. Similarly, English track is defined by a student's first English course: college-level English, remedial English, ESL, or no English. At the college-level, I include five continuous variables: the percentage (logged) of the Fall 1995 first-time freshmen cohort who are Black, Hispanic, or Asian, respectively; the percentage (squared) of the first-time freshmen cohort whose first math course was remedial in nature; and the percentage of the first-time freshmen cohort whose first English course was remedial.

Control Variables for the Transfer Model

I include fewer controls in the transfer model than in the remedial math model, in part because some of the controls in the remedial math model are explanatory variables in the transfer model. At the term-level, I again control for age and the three proxies of SES. At the student-level, I control for sex and academic goal, the latter of which takes on only two distinct values, namely transfer (as an exclusive goal) and transfer with an allied objective of a nonvocational associate's degree.

Methods

I employ three-level hierarchical logistic regression to execute the discrete-time event history analysis of successful remediation in math (Raudenbush and Bryk 2002). In total, three nested models were estimated, the most complex of which is detailed in Appendix A. Note that the left-hand side of the first equation represents the natural log of the odds of the probability that student i, who is enrolled in college j, remediates successfully in term t, given that the student is in attendance in term t and has not completed successfully a college-level math course prior to term t. Furthermore, note that the term-level effect of advising (A_{1ij}) on this outcome is allowed to vary as a function of race (B_{11j}, B_{12j}, B_{13j}), degree of math deficiency (B_{14j}, B_{15j}, B_{16j}), and a random error term (ε_{1ij}). In turn, the race-specific effects of advising are allowed to vary as a function of college racial composition (C_{111}, C_{121}, C_{131}; grand mean-centered) and a set of random error terms (u_{11j}, u_{12j}, u_{13j}). Likewise, the deficiency-specific effects of advising are allowed to vary as a function of college math skill composition (C_{141}, C_{151}, C_{161}; grand mean-centered) and a set of random error terms (u_{14j}, u_{15j}, u_{16j}). In sum, this model tests whether the effect of advising on the hazard of successful remediation varies as a function of race and math deficiency, and, in turn, whether the effects of race and math deficiency on the effect of advising vary as a function of racial context and math context, respectively. Note that, since no particular functional form of time dependence is specified, the hazard is assumed to be constant across intervals of time, contingent on the time-dependent covariates.

The discrete-time event history analysis of the hazard of transfer for the transfer-seeking cohort is treated in a similar fashion, and, again, three nested models are estimated, the most complex of which is detailed in Appendix B. The effect of advising (A_{1ij}) is allowed to vary as a function of race (B_{11j}, B_{12j}, B_{13j}), math track (B_{14j}, B_{15j}, B_{16j}), English track (B_{17j}, B_{18j}, B_{19j}) and a random error term (ε_{1ij}). In turn, the race-specific effects of advising are allowed to vary as a function of college racial composition (C_{111}, C_{121}, C_{131}; grand mean-centered) and a set of random error terms (u_{11j}, u_{12j}, u_{13j}). Concerning the skill-specific effects of advising, only the effects of the remedial math and English tracks vary conditionally, in this case as a function of college math and English skill composition (C_{141}, C_{171}; grand mean-centered), respectively, and a set of random error terms (u_{14j}, u_{17j}). The remaining math and English track variables are allowed to vary randomly and unconditionally (u_{15j}, u_{16j}, u_{18j}, u_{19j}). Taken as a whole, this model tests whether the effect of advising on the hazard of transfer varies as a function of race, math track, and English track, and, in turn, whether the effects of these variables on the effect of advising vary as a function of college racial, math skill, and English skill context, respectively.

Strengths and Weaknesses

The data employed in this study have a number of strengths and weaknesses. Among the strengths are access to a population (rather than a sample), a population that is larger than any used in prior studies of this topic, the length of time over which academic careers are observed, the capacity to distinguish between temporary breaks in enrollment and long-term exit from the postsecondary system, and the capacity to observe students' records despite horizontal transfer between colleges. However, several weaknesses of the data also must be noted.

First, the data do not address four control variables found to be important in prior studies of educational outcomes, namely credit course load, employment intensity, parenting status, and first-generation status. Findings concerning the effect of course load generally indicate that part-time students are somewhat less likely to experience desirable outcomes than are full-time students (Hoyt 1999; O'Toole et al. 2003; Stratton et al. 2007; Szafran 2001). While a variable that measures course load could be constructed from the transcripts, it would face the same problems described by Adelman (2004, p. 96). Employment intensity has been found to be moderately negatively correlated with degree expectations, persistence, and other desirable outcomes (American Council on Education 2003; Carter 1999; Hoyt 1999; Toutkoushian and Smart 2001), although this finding is not entirely consistent across studies (Titus 2004). Parenting—whether or not a given student has responsibility for one or more children—tends to be negatively correlated with various desirable academic outcomes (e.g., Adelman 1999; DesJardins et al. 2002), as does first-generation status (i.e., students whose parents did not graduate from college) since such students face many disadvantages not shared by students whose parents are college educated (Ishitani 2003). Unfortunately, information about employment intensity, parenting, and first-generation status were not available in these data.

Second, in terms of the outcome for the remedial math cohort (completing a college-level math course), the data do not account for academic progress accomplished outside of California's semester-based community colleges. More specifically, students who enter one of the 107 colleges included in this analysis, enroll in a remedial math course in their first term of attendance, and subsequently transfer to one of the quarter-system community colleges, to a private 2-year college, or to a community college outside of California, effectively are treated as unsuccessful in these data because academic progress that occurs outside of the 107 colleges is unobserved. Although such unobserved progress is expected to represent only a small fraction of the total progress, due consideration should be given to the possible impact on the findings.

The third weakness of the data concerns the external validity of the findings. While the use of a population has substantial advantages over the use of a sample, the population addressed here was drawn exclusively from California's community colleges. Although California's community college system, which has annual enrollment of 2.9 million students (Turnage 2003), is the largest postsecondary system in the world, the external validity of the findings of this analysis to other states is uncertain. In addition, the population includes only first-time college freshmen, who constitute a segment of a larger population of first-time *and* returning students. Consequently, any inferences drawn from this study are limited to the former, which is an important, but not all encompassing, segment of the population served by community colleges.

Finally, one possible source of bias in the remedial math models should be mentioned. Students who remain in the system for a longer time prior to remediating successfully may exhibit an artificially depressed hazard rate relative to students who advance quickly through the remedial sequence. To illustrate, consider *Student A* who enrolled in her first math class in her first term of attendance, passed this math class, enrolled in a college-level math course in the next term, passed this college-level math class, and then continued to attend college for two additional semesters. In contrast, consider *Student B* who enrolled in his first math class in his first term, passed this class, and then continued to attend college for two semesters without enrolling in any math. In his fourth semester, *Student B* completed a college-level math course and then departed from the system. Although *Student A* and *Student B* both achieved the same end, and both enrolled in college for a total of four semesters, *Student B* has two additional terms of attendance included in the calculation of his hazard rate, resulting in a lower hazard of successful remediation relative to *Student A*. A problem could arise in the remedial math models if this pattern of halting progress varies systematically with the experience of, or the timing of, advising. I have no prior reason to believe that such a systematic relationship exists, but some consideration should be given to this possibility as the findings of this study are contemplated. Note, however, that this possible source of bias does not apply to the transfer models.

Analysis

In Table 3, I present the results of three nested event history models of successful remediation in math for the remedial math cohort. In Model 3A (the baseline model), I exclude the following student- and college-level effects from the model presented in Appendix A: B_{11j}–B_{16j} and C_{111}–C_{161}. In Model 3B (the intermediate model), I reintroduce the following student-level effects: B_{11j}–B_{16j}. In Model 3C (the complete model), I add to Model 3B the excluded contextual effects: C_{111}–C_{161}.

Likewise, I present in Table 4 the results of three nested event history models of transfer for the transfer-seeking cohort. Model 4A is the baseline model, which excludes from the model presented in Appendix B the following effects: B_{11j}–B_{19j}, C_{111}–C_{141}, and C_{171}. Model 4B is the intermediate model, which reintroduces the following effects: B_{11j}–B_{19j}. Model 4C is the complete model, which adds to Model 4B the following effects: C_{111}–C_{141} and C_{171}.

Hypothesis #1: *Cooling Out* as a General Phenomenon of Underprepared Students

As discussed previously, if *cooling out* of underprepared students is occurring as an active, counselor-driven process in community colleges, one would anticipate that advising is detrimental to the likelihood of successful remediation among students in the remedial math cohort, all else being equal. In other words, on average, advising reduces the hazard of successful remediation. None of the models offered in Table 3 supports this conclusion. Across all three models, the effect of advising is positive and statistically significant, which

Table 3 Estimated coefficients and standard errors for the hierarchical discrete-time event history analysis of *successful mathematics remediation* on selected variables (N_{terms} = 142,145; $N_{students}$ = 30,118; $N_{colleges}$ = 107; control variables not shown)

	Model 3A	Model 3B	Model 3C
Effect of advising	0.357*** (0.050)	0.225*** (0.059)	0.229*** (0.059)
Effect of race on the effect of advising			
Black (vs. White)	–	−0.076 (0.118)	−0.078 (0.127)
Hispanic (vs. White)	–	−0.023 (0.068)	−0.009 (0.070)
Asian (vs. White)	–	−0.240* (0.096)	−0.207 (0.107)
Effect of math deficiency on the effect of advising			
Beginning algebra (vs. Inter Alg/Geom)	–	0.261*** (0.076)	0.265*** (0.078)
Pre-algebra (vs. Inter Alg/Geom)	–	0.695*** (0.127)	0.711*** (0.129)
Basic arithmetic (vs. Inter Alg/Geom)	–	0.313* (0.150)	0.316* (0.150)
Effect of racial composition on the race-specific effect of advising			
Effect of % Black (logged) on advising for Blacks	–	–	0.007 (0.066)
Effect of % Hispanic (logged) on advising for Hispanics	–	–	−0.067 (0.059)
Effect of % Asian (logged) on advising for Asians	–	–	−0.053 (0.058)
Effect of math composition on the deficiency-specific effect of advising			
Effect of % math deficient (squared) on advising for beginning algebra students	–	–	−0.00002 (0.00003)
Effect of % math deficient (squared) on advising for pre-algebra students	–	–	−0.00004 (0.00004)
Effect of % math deficient (squared) on advising for basic arithmetic students	–	–	0.00002 (0.00009)

Notes: * $p \leq 0.05$; *** $p \leq 0.001$; results presented here are based on the unit-specific model, rather than the population-average model

Table 4 Estimated coefficients and standard errors for the hierarchical discrete-time event history analysis of *transfer* on selected variables ($N_{terms} = 968{,}584$; $N_{students} = 68{,}241$; $N_{colleges} = 107$; control variables not shown)

	Model 4A	Model 4B	Model 4C
Effect of advising	0.556*** (0.041)	0.492*** (0.051)	0.503*** (0.051)
Effect of race on the effect of advising			
Black (vs. White)	–	−0.182* (0.087)	−0.173* (0.088)
Hispanic (vs. White)	–	0.077 (0.060)	0.085 (0.060)
Asian (vs. White)	–	−0.057 (0.057)	−0.095 (0.059)
Effect of math track on the effect of advising			
Remedial math (vs. College-Level)	–	0.228*** (0.037)	0.204*** (0.038)
Vocational math only (vs. College-Level)	–	−0.373 (0.347)	−0.410 (0.346)
No math (vs. College-Level)	–	−0.383*** (0.066)	−0.384*** (0.066)
Effect of english track on the effect of advising			
Remedial english (vs. College-Level)	–	0.234*** (0.052)	0.221*** (0.052)
English-as-a-second-language (vs. College-Level)	–	0.529*** (0.099)	0.529*** (0.099)
No english (vs. College-Level)	–	−0.251** (0.084)	−0.254** (0.084)
Effect of racial composition on the race-specific effect of advising			
Effect of % Black (logged) on advising for Blacks	–	–	−0.014 (0.046)
Effect of % Hispanic (logged) on advising for Hispanics	–	–	−0.091* (0.044)
Effect of % Asian (logged) on advising for Asians	–	–	0.055 (0.031)
Effect of math/english composition on the track-specific effect of advising			
Effect of % math deficient (squared) on advising for remedial math students	–	–	0.00008*** (0.00002)
Effect of % english deficient (identity) on advising for remedial english students	–	–	0.002 (0.002)

Notes: * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$; results presented here are based on the unit-specific model, rather than the population-average model indicates that the receipt of advising increases the hazard of remediating successfully, net of controls.

Turning to the transfer models (Table 4), if *cooling out* of underprepared students is occurring, one would anticipate that the *net* effect of advising (i.e., sum of additive and multiplicative effects) on the hazard of transfer is negative for students on the remedial math and remedial English tracks. Again, there is no evidence to support this supposition. In fact, for students on the remedial math and remedial English tracks, advising has a significantly greater positive effect on the hazard of transfer than it does for students on the college-level math and college-level English tracks, respectively. In other words, students on the remedial tracks appear to benefit *more* from advising than do students on the corresponding college-level tracks.

Taken together, the findings presented in Tables 3 and 4 suggest that active, counselor-driven *cooling out* is not a general phenomenon of *underprepared* community college students. In addition, the net effect of advising for transfer-seeking students on the *college-level* math and English tracks is statistically significant and positive, which suggests that active, counselor-driven *cooling out* is not a general phenomenon of the community college either (i.e., applicable even to college-prepared students), as might be implied by the research on *cooling out* that has not distinguished between underprepared and college-prepared students (e.g., Adelman 2005).

Hypothesis #2: *Cooling Out* as a Specific Phenomenon of the Poorest Skilled Students

Alternatively, as discussed earlier, one might reason that only those remedial math students who have the poorest math skills are actively *cooled out* by counselors. The models presented in Table 3 do not provide evidence to support this conclusion. To the contrary, in Models 3B and 3C, the positive effect of advising on the hazard of successful remediation is significantly *greater* among students who entered college at any of the bottom three rungs of the remedial math hierarchy relative to those who entered at the top rung. Thus, this analysis does not support a conclusion that active, counselor-driven *cooling out* is occurring among mathematically deficient students generally, nor among those remedial math students who have the poorest skills, nor among underprepared transfer-seeking students. In fact, advising appears to be more beneficial for those students who face greater disadvantages with respect to academic preparation than it is for better-prepared students.

Hypothesis #3: *Cooling Out* as Institutional Racism

Another possibility considered here is that active, counselor-driven *cooling out* is race-specific in nature. In other words, *cooling out* may be predominantly a phenomenon of students of historically disadvantaged racial/ethnic groups, particularly Blacks and Hispanics. The analysis presented in Table 3 does not support this conclusion. Instead, I find no significant differences between White, Black, and Hispanic remedial math students in the effect of advising on the hazard of successful remediation. In other words, advising is, on average, equally beneficial for these three groups.

However, the effect of advising for Asian remedial math students is less clear. In Model 3B, the *net* effect of advising on the hazard of successful remediation in math for Asians effectively is zero, which differs significantly from the positive *net* effect of advising for Whites, Blacks, and Hispanics. Yet, this race-specific effect becomes statistically insignificant once racial context is introduced in Model 3C, which suggests that Asians do *not* differ from Whites in terms of the effect of advising on the hazard of successful remediation. Thus, it appears that advising may or may not be beneficial, but is not detrimental, for Asian remedial math students in terms of the outcome addressed here.

This finding is ambiguous for several reasons. First, none of the newly added variables in Model 3C is statistically significant, which is contrary to what one would anticipate in light of the change in significance for the Asian-specific effect of advising from Model 3B to Model 3C. In other words, one would anticipate that the change in (loss of) statistical significance for this race-specific effect is due to the moderating effect of context, but none of the contextual variables proves to be statistically significant, which indicates that context does not play a role in the race- or deficiency-specific effects of advising. Second, the literature does not lead one to anticipate that the effect of advising for Asian remedial math students would differ significantly from that of White students. Thus, the Asian-specific effect of advising noted in Model 3B is a mystery.

Concerning the hazard of transfer for the transfer-seeking cohort (Table 4), one race-specific effect of advising emerges as statistically significant in Models 4B and 4C. On average, Black students appear to be benefit significantly less from advising than do White students, which is consistent, in part, with the hypothesis offered here. However, the *net* effect of advising on the hazard of transfer for Black students remains positive, so Black transfer-seeking students *do* benefit from advising, but to a lesser degree than do White students.

Hypothesis #4: *Cooling Out* as a Contextual Phenomenon

I hypothesized that any race-specific effect of advising on the hazard of successful remediation in math varies as a function of the context in which it occurs. More specifically, it may be that any race-specific effect of advising is conditional on, and varies positively with, the representation of the corresponding racial group within a college. Model 3C does not support this conclusion. The race-specific effects of advising on the hazard of successful remediation in math do not vary significantly as a function of college racial composition.

The transfer model (Table 4) tells a different story, but a story that is not consistent with the hypothesis offered here. In Model 4C, the race-specific effect of advising on the hazard of transfer for Hispanic students varies significantly and *negatively* with the percentage (logged) of Hispanics in the first-time freshmen cohort. This indicates that, on average, advising is *less* beneficial for Hispanic students as the percentage of Hispanics in the college *increases*.

The absolute size of this effect, however, is somewhat difficult to interpret due to the transformed (logged) nature of the variable and the centering of the variable around its grand mean. To aid in interpretation, I illustrate in Fig. 1 the additive effect of this variable on the hazard of transfer. The most important point to draw from Fig. 1 is that the additive effect never declines so far below zero that the *net* effect of advising for Hispanic students is less than zero. Put succinctly, an increasing percentage of Hispanic students *is* associated with a reduction in the benefits of advising for Hispanic transfer-seeking students, but advising is *not* detrimental for Hispanic students even in colleges that serve a disproportionately large number of Hispanics. Thus, it does not appear that colleges that serve a disproportionate percentage of Hispanics exhibit active, counselor-driven *cooling out* of Hispanic transfer-seeking students.

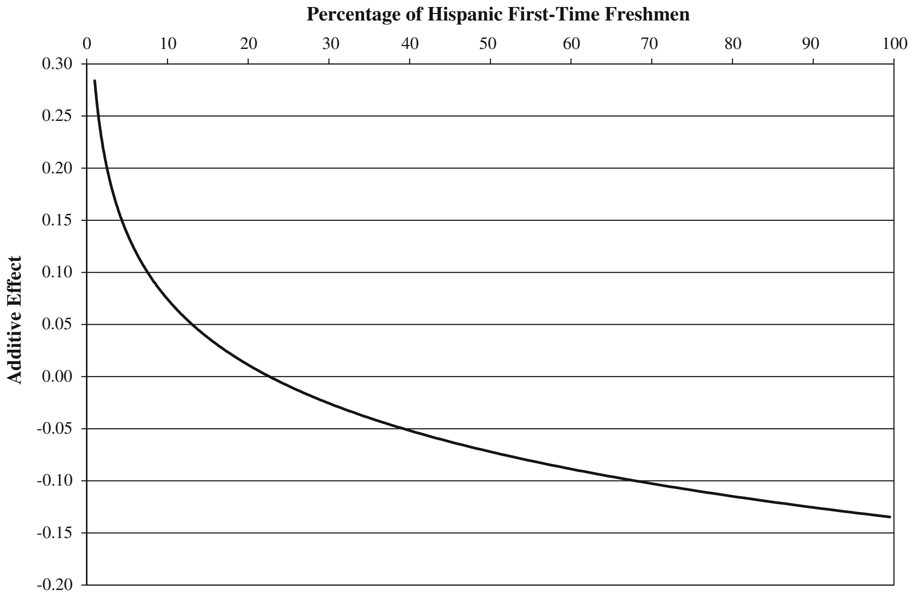

Fig. 1 Additive effect of the college-level percentage of Hispanic first-time freshmen on the effect of advising on the hazard of transfer for Hispanic transfer-seeking students (based on estimated coefficients from Model 4C)

Lastly, I hypothesized that any deficiency-specific effect of advising varies positively with the percentage of students in a college who require remedial assistance. Model 3C does not support this conclusion. None of the three deficiency-specific effects of advising on the hazard of successful remediation in math varies significantly by math skill context.

Yet, the transfer model (Model 4C) again tells a somewhat different story. The experience of advising grows more beneficial for students on the remedial math track as the percentage (squared) of remedial math students in the first-time freshmen cohort increases. This finding is consistent with my hypothesis in that it suggests that colleges that serve a greater percentage of remedial math students may offer more encouragement or support (with respect to advising) to mathematically underprepared, transfer-seeking students.

Once more, the absolute size of this contextual effect is difficult to interpret, so I illustrate in Fig. 2 the additive effect of this variable on the hazard of transfer. Figure 2 demonstrates that the beneficial effect of advising for transfer-seeking students on the remedial math track grows substantially as the percentage of underprepared students increases above the mean of the squared values for the 107 colleges. More importantly, however, the additive effect of this variable never declines so far below zero (as the percentage of mathematically underprepared students declines) that the *net* effect of advising would be less than zero for students on the remedial math track. Thus, a declining percentage of mathematically underprepared students *is* associated with a reduction in the benefits of advising for students on the remedial math track, but advising is *not* detrimental to students on the remedial math track even in colleges that serve relatively few underprepared students. It does not appear that colleges that serve relatively few remedial math students exhibit active, counselor-driven *cooling out* of mathematically underprepared, transfer-seeking students.

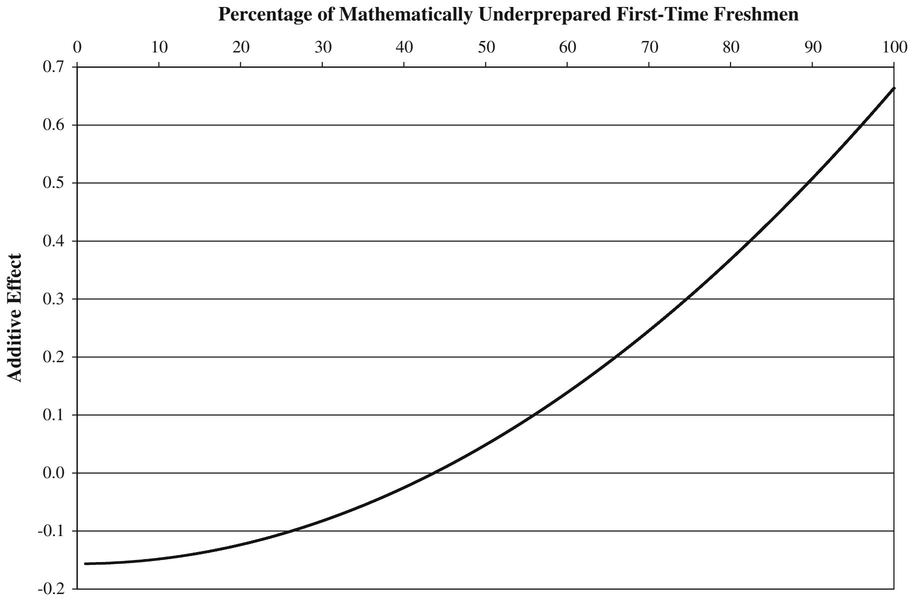

Fig. 2 Additive effect of the college-level percentage of mathematically underprepared first-time freshmen on the effect of advising on the hazard of transfer for transfer-seeking students on the remedial math track (based on estimated coefficients from Model 4C)

Discussion

As discussed at the outset of this paper, Clark's (1960) thesis concerning the *cooling out* of underprepared community college students by academic counselors has a controversial history and continues as a point of contention. In this study, I sought to answer several fundamental questions concerning the effect of advising on students' attainment. In particular, what effect does advising have on students' attainment, and does this effect depend upon students' academic preparedness or students' race/ethnicity? Additionally, does the effect of advising on the attainment of academically underprepared students depend upon the skill composition of the college? Similarly, does the effect of advising on the attainment of minority students depend upon the representation of a given minority group in the college? To answer these questions, I drew upon data from 107 of California's 112 community colleges and affiliated adult education centers in an analysis of two separate outcomes (successful remediation in math and transfer to a 4-year institution) for two cohorts of first-time college freshmen (a remedial math cohort and a transfer-seeking cohort), each of which was observed for 6 years.

The findings of this analysis provide no evidence to support direct, active, counselor-driven *cooling out* as a general phenomenon of transfer-seeking community college students, nor as a specific phenomenon of the academically underprepared segment of the larger transfer-seeking group. This analysis also provides no evidence to support counselor-driven *cooling out* as a phenomenon that is specific to mathematically underprepared students, nor even as a phenomenon that is specific to those students who exhibit exceptionally poor mathematical preparation at college entry. To the contrary and without exception, underprepared students appear to benefit more from advising than do their college-ready counterparts.

The concentration of underprepared students in a college appears to have little consequence for the deficiency-specific effects of advising, with just one exception. Regarding the hazard of transfer, an increasing concentration of mathematically underprepared first-time freshmen is associated with an increasing benefit of advising for remedial math students. This finding is consistent with my hypothesis as it suggests that colleges that serve a great percentage of underprepared students provide advising that is characterized by greater support for such students than do colleges that serve few underprepared students. However, my findings indicate that advising is *not* detrimental to the attainment of mathematically underprepared students even in colleges that serve few such students. Thus, this analysis does not sustain a conclusion that favors counselor-driven *cooling out* as a phenomenon that is dependent upon skill context.

Students' race appears to have comparatively little influence on the effect of advising on both the hazard of successful remediation in math and the hazard of transfer, although two exceptions regarding this generality must be noted. First, although the findings in this regard are uncertain, Asian remedial math students may not benefit as much from advising as do White, Black, and Hispanic students in terms of the hazard of successful remediation in math. Second, Black transfer-seeking students do not benefit as much from advising as do White, Hispanic, and Asian students in terms of the hazard of transfer. The latter of these two exceptions somewhat parallels Bahr's (2004) finding concerning the differential effect of advising for Black remedial math students and may be informed by Aronson and Inzlicht's (2004) work on stereotype vulnerability and Steele's (1997) work on stereotype threat. However, in neither of these two exceptions do I find that advising is detrimental to students' chances of success, as one would anticipate if race-specific, counselor-driven *cooling out* is occurring. Thus, this analysis does not a support a conclusion that favors *cooling out* as a race-specific phenomenon, which parallels Adelman's (2005) finding regarding the stability across racial groups of traditional-aged students' educational objectives.

College racial composition also appears to have little consequence for the race-specific effects of advising, with just one exception. With regard to the hazard of transfer, an increasing concentration of Hispanic first-time freshmen is associated with a reduced benefit of advising for Hispanic students. Nevertheless, even in colleges that serve relatively few Hispanics, the effect of advising for Hispanic transfer-seeking students remains positive. Thus, this analysis does not sustain a conclusion that favors *cooling out* as a phenomenon that is dependent on racial context.

Of note, this finding concerning the effect of Hispanic concentration appears contrary to work presented by Hagedorn et al. (2007), which suggests that Hispanic students benefit academically from a "critical mass" of Hispanics. On the other hand, it parallels work presented by Wassmer et al. (2004) concerning the effect of Hispanic composition on institutional transfer rates. Yet, caution must be exercised in comparing the findings presented here with those of the aforementioned studies because the focus of this analysis is the effect of racial context on the effect of advising on the hazard of transfer, rather than the direct effect of context on the outcomes of Hispanic students or the effect of context on institutional outcomes. Thus, my findings do not contradict directly the study of Hagedorn and her colleagues, nor do they corroborate directly the findings of Wassmer and his colleagues. However, the seeming discrepancy of the findings of these various studies is a matter that warrants further research.

Considered holistically, my findings fail to support Clark's proposition concerning the active role of counselors in the *cooling out* process. If *cooling out* is occurring, it does not appear to be associated directly with students' participation in academic advising. Instead, advising appears to be beneficial to students' chances of success, and all the more so for students who face academic deficiencies, which supports indirectly Deil-Amen and Rosenbaum's (2002) argument concerning the implicit benefits of the contemporary "stigma-free" approach to remediation. This finding should put to rest much of the debate surrounding Clark's controversial thesis.

However, this study should not be construed as indicating that *cooling out*, as a broad institutional objective, is not occurring. To the contrary, *cooling out* may be an ongoing process in community colleges. Case in point, comparatively few remedial math students remediate successfully (e.g., Bahr 2007), and many transfer-seeking students do not succeed in transferring (e.g., Grubb 1991). In these data in particular, less than one-third of students achieved the end goal indicated indirectly by their course taking decisions (remediation in math) or directly by self-reports (transfer). Why this is the case is the subject of longstanding debate and much research that, no doubt, will continue for decades, and this study cannot rule out untested *cooling out* processes as possible causes of the low rates of attainment. Nevertheless, the findings of this study do *not* support a conclusion that favors a systematic relationship between the experience of advising and diminished attainment. Instead, the opposite has been found. Therefore, one may say with reasonable confidence that direct, active, counselor-driven *cooling out* is not occurring in community colleges, at least in so far as these data are concerned. In other words, academic advising is *not* hurting students' chances of success, neither generally nor selectively.

Future Research

Up to this point, I have treated advising as a unified concept that is relatively invariant across colleges. Although this was expedient and necessary to achieve the analytical objectives of the study, in truth advising is a multifaceted concept with a wide variety of expressions both within and across colleges (Biggs et al. 1975). For example, King (2002) described several common methods of delivering advising services to students and several different practitioners involved in its delivery, including professional counselors, advisors, and faculty. Grubb and Gardner (2001) discussed a number of dimensions on which advising programs may vary, including: the resources available to a college (e.g., advisor-to-student ratio, part-time versus full-time advisors), the types of services provided (e.g., career counseling, transfer counseling, counseling for personal problems and other obstacles to academic success), the format of delivery (e.g., individual counseling, group counseling, seminars, workshops), the organization of services (i.e., distributed versus centralized), the timing of provision of services with respect to students' academic careers, and the counseling strategies employed (e.g., trait and factor approach, holistic counseling). Thus, the term *advising* refers to a complex and diverse family of phenomena that varies considerably across colleges, rather than to a single, undifferentiated process.

One potentially rich area of future inquiry is the manner in which variation on these dimensions influences the observed effect of advising on students' attainment. For example, it may be that some types of advising services have a greater positive influence on attainment generally, or a greater positive influence on the attainment of particular outcomes, than do other types. Likewise, some expressions of advising may have greater or lesser effects on the attainment of one group of students (e.g., males, Asians) as compared with another group of students (e.g., females, Hispanics). Perhaps more importantly for this paper, it is possible that some aspects or expressions of advising actually *are* detrimental to the attainment of certain groups of students, but this effect may be masked by a strongly positive effect of other aspects or expressions of advising. Ultimately, the next step in this line of research is to begin the daunting process of disentangling the unique effects of the various features of advising for particular groups of students under the varying circumstances and contexts in which advising occurs.

Conclusion

The idea that academic counseling may be detrimental to students' chances of attaining their goals has haunted community colleges for decades, and, heretofore, no large-scale, longitudinally sensitive tests of the effect of advising on community college students' chances of success have been conducted. In this study, I used three-level hierarchical discrete-time event history analysis to test a number of hypotheses concerning the effect of advising on the academic attainment of students in two large first-time freshmen cohorts enrolled in 107 community colleges. Specifically, I tested the effect of advising across variation in students' underpreparation for college coursework, students' race (focusing on the four largest racial groups represented in California's community college system), minority representation in the college, and representation of skill-deficient students in the college, while controlling for a set of confounding variables. In all cases, I found no evidence of the active, counselor-driven *cooling out* processes described in Burton Clark's seminal paper. In fact, under nearly all conditions, advising appears to be actively beneficial to students' attainment.

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Appendix A

$$\ln\left(\frac{P(y_{tij}=1)}{1-P(y_{tij}=1)}\right) = A_{0ij} + A_{1ij}(ADVISING)_{tij} + A_{kij}(TERM\ LEVEL\ CONTROLS)_{tij}$$

$$\begin{aligned} A_{0ij} = {} & B_{00j} + B_{01j}(BLACK)_{ij} + B_{02j}(HISPANIC)_{ij} + B_{03j}(ASIAN)_{ij} + B_{04j}(BEG\ ALG)_{ij} \\ & + B_{05j}(PRE\ ALG)_{ij} + B_{06j}(BASIC\ ARITH)_{ij} \\ & + B_{0mj}(STUDENT\ LEVEL\ CONTROLS)_{ij} + \varepsilon_{0ij} \end{aligned}$$

$$\begin{aligned} A_{1ij} = {} & B_{10j} + B_{11j}(BLACK)_{ij} + B_{12j}(HISPANIC)_{ij} + B_{13j}(ASIAN)_{ij} + B_{14j}(BEG\ ALG)_{ij} \\ & + B_{15j}(PRE\ ALG)_{ij} + B_{16j}(BASIC\ ARITH)_{ij} + \varepsilon_{1ij} \end{aligned}$$

$$A_{kij} = B_{k0j} + \varepsilon_{kij}$$

$$B_{00j} = C_{000} + u_{00j}$$

$$B_{01j} = C_{010} + u_{01j}$$

$$B_{02j} = C_{020} + u_{02j}$$

$$B_{03j} = C_{030} + u_{03j}$$

$$B_{04j} = C_{040} + u_{04j}$$

$$B_{05j} = C_{050} + u_{05j}$$

$$B_{06j} = C_{060} + u_{06j}$$

$$B_{0mj} = C_{0m0}$$

$$B_{10j} = C_{100} + u_{10j}$$

$$B_{11j} = C_{110} + C_{111}(\%\ BLACK)_j + u_{11j}$$

$$B_{12j} = C_{120} + C_{121}(\%\ HISPANIC)_j + u_{12j}$$

$$B_{13j} = C_{130} + C_{131}(\%\ ASIAN)_j + u_{13j}$$

$$B_{14j} = C_{140} + C_{141}(\%\ MATH\ DEFICIENT)_j + u_{14j}$$

$$B_{15j} = C_{150} + C_{151}(\%\ MATH\ DEFICIENT)_j + u_{15j}$$

$$B_{16j} = C_{160} + C_{161}(\%\ MATH\ DEFICIENT)_j + u_{16j}$$

$$B_{k0j} = C_{k00}$$

Appendix B

$$\ln\left(\frac{P(y_{tij}=1)}{1-P(y_{tij}=1)}\right) = A_{0ij} + A_{1ij}(ADVISING)_{tij} + A_{kij}(TERM\ LEVEL\ CONTROLS)_{tij}$$

$$\begin{aligned} A_{0ij} = {} & B_{00j} + B_{01j}(BLACK)_{ij} + B_{02j}(HISPANIC)_{ij} + B_{03j}(ASIAN)_{ij} \\ & + B_{04j}(INT\ ALG\ or\ GEOM)_{ij} + B_{05j}(BEG\ ALG)_{ij} + B_{06j}(PRE\ ALG)_{ij} \\ & + B_{07j}(BASIC\ ARITH)_{ij} + B_{08j}(VOC\ MATH\ ONLY)_{ij} + B_{09j}(NO\ MATH)_{ij} \\ & + B_{010j}(REM\ WRIT)_{ij} + B_{011j}(REM\ READ)_{ij} + B_{012j}(ESL\ ENGL)_{ij} \\ & + B_{013j}(NO\ ENGL)_{ij} + B_{0mj}(STUDENT\ LEVEL\ CONTROLS)_{ij} + \varepsilon_{0ij} \end{aligned}$$

$$\begin{aligned} A_{1ij} = {} & B_{10j} + B_{11j}(BLACK)_{ij} + B_{12j}(HISPANIC)_{ij} + B_{13j}(ASIAN)_{ij} + B_{14j}(REM\ MATH)_{ij} \\ & + B_{15j}(VOC\ MATH\ ONLY)_{ij} + B_{16j}(NO\ MATH)_{ij} + B_{17j}(REM\ ENGL)_{ij} \\ & + B_{18j}(ESL\ ENGL)_{ij} + B_{19j}(NO\ ENGL)_{ij} + \varepsilon_{1ij} \end{aligned}$$

$$A_{kij} = B_{k0j} + \varepsilon_{kij}$$

$$B_{00j} = C_{000} + u_{00j}$$

$$B_{01j} = C_{010} + u_{01j}$$

$$B_{02j} = C_{020} + u_{02j}$$

$$B_{03j} = C_{030} + u_{03j}$$

$$B_{04j} = C_{040} + u_{04j}$$

$$B_{05j} = C_{050} + u_{05j}$$

$$B_{06j} = C_{060} + u_{06j}$$

$$B_{07j} = C_{070} + u_{07j}$$

$$B_{08j} = C_{080} + u_{08j}$$

$$B_{09j} = C_{090} + u_{09j}$$

$$B_{010j} = C_{0100} + u_{010j}$$

$$B_{011j} = C_{0110} + u_{011j}$$

$$B_{012j} = C_{0120} + u_{012j}$$

$$B_{013j} = C_{0130} + u_{013j}$$

$$B_{0mj} = C_{0m0}$$

$$B_{10j} = C_{100} + u_{10j}$$

$$B_{11j} = C_{110} + C_{111}(\%\ BLACK)_j + u_{11j}$$

$$B_{12j} = C_{120} + C_{121}(\%\ HISPANIC)_j + u_{12j}$$

$$B_{13j} = C_{130} + C_{131}(\%\ ASIAN)_j + u_{13j}$$

$$B_{14j} = C_{140} + C_{141}(\%\ MATH\ DEFICIENT)_j + u_{14j}$$

$$B_{15j} = C_{150} + u_{15j}$$

$$B_{16j} = C_{160} + u_{16j}$$

$$B_{17j} = C_{170} + C_{171}(\%\ ENGL\ DEFICIENT)_j + u_{17j}$$

$$B_{18j} = C_{180} + u_{18j}$$

$$B_{19j} = C_{190} + u_{19j}$$

$$B_{k0j} = C_{k00}$$

References

Adelman, C. (1999). *Answers in the tool box: Academic intensity, attendance patterns, and bachelor's degree attainment*. Washington, DC: Office of Educational Research and Improvement. ERIC ED431363.

Adelman, C. (2004). *Principal indicators of student academic histories in postsecondary education, 1972–2000*. Institute of Education Sciences: Washington, DC.

Adelman, C. (2005). Educational 'anticipations' of traditional age community college students: A prolegomena to any future accountability indicators. *Journal of Applied Research in the Community College, 12*, 93–107.

Alba, R. D., & Lavin, D. E. (1981). Community colleges and tracking in higher education. *Sociology of Education, 54*, 223–237.

Allison, P. D. (1982). Discrete-time methods for the analysis of event histories. *Sociological Methodology, 13*, 61–98.

Allison, P. D. (1995). *Survival analysis using the SAS system: A practical guide*. Cary, North Carolina: SAS Institute, Inc.

American Council on Education. (2003). *Issue brief: Student success: Understanding graduation and persistence rates*. Washington, DC: American Council on Education.

Aronson, J., & Inzlicht, M. (2004). The ups and downs of attributional ambiguity: Steretotype vulnerability and the academic self-knowledge of African American college students. *Psychological Science, 15*, 829–836.

Bahr, P. R. (2004). *The rough and rocky road of remediation: Racial inequalities in postsecondary remedial mathematics*. Doctoral dissertation, Department of Sociology, University of California, Davis.

Bahr, P. R. (2007). Double jeopardy: Testing the effects of multiple basic skill deficiencies on successful remediation. *Research in Higher Education, 48*, 695–725.

Bahr, P. R. (2008). Does mathematics remediation work? A comparative analysis of academic attainment among community college students. *Research in Higher Education, 49*, 420–450.

Bahr, P. R. (n.d.). *Preparing the underprepared: An analysis of racial disparities in postsecondary mathematics remediation*. Manuscript under review, Wayne State University, Detroit, Michigan.

Bahr, P. R., Hom, W., & Perry, P. (2005). College transfer performance: A methodology for equitable measurement and comparison. *Journal of Applied Research in the Community College, 13*, 73–87.

Biggs, D. A., Brodie, J. S., & Barnhart, W. J. (1975). The dynamics of undergraduate academic advising. *Research in Higher Education, 3*, 345–357.

Bobo, L. D., & Fox, C. (2003). Race, racism, and discrimination: Bridging problems, methods, and theory in social psychological research. *Social Psychology Quarterly, 66*, 319–332.

Boughan, K. (2001). Closing the transfer data gap: Using National Student Clearinghouse data in community college outcomes research. *Journal of Applied Research in the Community College, 8*, 107–116.

Boylan, H. R., & Saxon, D. P. (1999). *Remedial courses: Estimates of student participation and the volume of remediation in U.S. community colleges*. Boone, North Carolina: National Center for Developmental Education.

Brezina, T., & Winder, K. (2003). Economic disadvantage, status generalization, and negative racial stereotyping by white Americans. *Social Psychology Quarterly, 66*, 402–418.

Burley, H., Butner, B., & Cejda, B. (2001). Dropout and stopout patterns among developmental education students in Texas community colleges. *Community College Journal of Research and Practice, 25*, 767–782.

Cabrera, A. F., Nora, A., Terenzini, P. T., Pascarella, E., & Hagedorn, L. S. (1999). Campus racial climate and the adjustment of students to college. *Journal of Higher Education, 70*, 134–160.

Calcagno, J. C., Crosta, P., Bailey, T., & Jenkins, D. (2007). Stepping stones to a degree: The impact of enrollment pathways and milestones on community college student outcomes. *Research in Higher Education, 48*, 775–801.

Carter, D. F. (1999). The impact of institutional choice and environments on African-American and white students' degree expectations. *Research in Higher Education, 41*, 17–41.

Chavous, T. M., Harris, A., Rivas, D., Helaire, L., & Green, L. (2004). Racial stereotypes and gender in context: African Americans at predominantly Black and predominantly White colleges. *Sex Roles, 51*, 1–16.

Clark, B. R. (1960). The 'cooling-out' function in higher education. *American Journal of Sociology, 65*, 569–576.

Clark, B. R. (1980). The 'cooling out' function revisited. *New Directions for Community Colleges, 32*, 15–31.

Davis, M., Dias-Bowie, Y., Greenberg, K., Klukken, G., Pollio, H. R., Thomas, S. P., et al. (2004). 'A fly in the buttermilk': Descriptions of university life by successful black undergraduate students at a predominantly white southeastern university. *Journal of Higher Education, 75*, 420–445.

Deil-Amen, R., & Rosenbaum, J. E. (2002). The unintended consequences of stigma-free remediation. *Sociology of Education, 75*, 249–268.

DesJardins, S. L., McCall, B. P., Ahlburg, D. A., & Moye, M. J. (2002). Adding a timing light to the 'tool box'. *Research in Higher Education, 43*, 83–114.

Devine, P. G. (2001). Implicit prejudice and stereotyping: How automatic are they? *Journal of Personality and Social Psychology, 81*, 757–759.

Dougherty, K. (1987). The effects of community colleges: Aid or hindrance to socioeconomic attainment? *Sociology of Education, 60*, 86–103.

Fries-Britt, S., & Turner, B. (2002). Uneven stories: Successful black collegians at a black and a white campus. *Review of Higher Education, 25*, 315–330.

Goffman, E. (1952). On cooling the mark out: Some aspects of adaptation to failure. *Psychiatry, 15*, 451–463.

Grubb, N. W. (1991). The decline of community college transfer rates: Evidence from national longitudinal surveys. *Journal of Higher Education, 62*, 194–222.
Grubb, N. W., & Gardner, D. (2001). *'Getting into the world': Guidance and counseling in community colleges*. New York, NY: Community College Research Center, Teachers College, Columbia University.
Hagedorn, L. S., Chi, W., Cepeda, R. M., & McLain, M. (2007). An investigation of critical mass: The role of Latino representation in the success of urban community college students. *Research in Higher Education, 48*, 73–91.
Hagedorn, L. S., & Lester, J. (2006). Hispanic community college students and the transfer game: Strikes, misses, and grand slam experiences. *Community College Journal of Research and Practice, 30*, 827–853.
Hagedorn, L. S., Siadat, M. V., Fogel, S. F., Nora, A., & Pascarella, E. T. (1999). Success in college mathematics: Comparisons between remedial and nonremedial first-year college students. *Research in Higher Education, 40*, 261–284.
Hoyt, J. E. (1999). Remedial education and student attrition. *Community College Review, 27*, 51–73.
Hurtado, S. (1992). The campus racial climate: Contexts of conflict. *Journal of Higher Education, 63*, 539–569.
Hurtado, S., Milem, J., Clayton-Pedersen, A., and Allen, W. (1999). Enacting diverse learning environments: Improving the climate for racial/ethnic diversity in higher education. *ASHE-ERIC Higher Education Reports,* Vol. 26, Number 8. Washington, DC: The George Washington University.
Ishitani, T. T. (2003). A longitudinal approach to assessing attrition behavior among first-generation students: Time-varying effects of pre-college characteristics. *Research in Higher Education, 44*, 433–449.
Karabel, J. (1972). Community colleges and social stratification. *Harvard Educational Review, 42*, 521–562.
King, M. C. (2002). Community college advising. Retrieved October 26, 2007, from *NACADA Clearinghouse of Academic Advising Resources* website: http://www.nacada.ksu.edu/Clearinghouse/AdvisingIssues/comcollege.htm.
McClelland, K. E. (1990). The social management of ambition. *Sociological Quarterly, 31*, 225–251.
McClelland, K. E., & Auster, C. J. (1990). Public platitudes and hidden tensions: Racial climates at predominantly white liberal arts colleges. *Journal of Higher Education, 61*, 607–642.
Metzner, B. S. (1989). Perceived quality of academic advising: The effect on freshmen attrition. *American Educational Research Journal, 26*, 422–442.
O'Toole, D. M., Stratton, L. S., & Wetzel, J. N. (2003). A longitudinal analysis of the frequency of part-time enrollment and the persistence of students who enroll part-time. *Research in Higher Education, 44*, 519–537.
Parsad, B., Lewis, L., & Greene, B. (2003). *Remedial education at degree-granting postsecondary institutions in Fall 2000 (NCES 2004-010)*. National Center for Education Statistics: Washington, DC.
Pascarella, E. T., Smart, J. C., & Stoecker, J. (1989). College race and the early status attainment of blacks. *Journal of Higher Education, 60*, 82–107.
Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students, volume 2: A third decade of research*. San Francisco, CA: Jossey-Bass.
Pascarella, E. T., Wolniak, G. C., & Pierson, C. T. (2003). Influences on community college students' educational plans. *Research in Higher Education, 44*, 301–314.
Rankin, S. R., & Reason, R. D. (2005). Differing perceptions: How students of color and white students perceive campus climate for underrepresented groups. *Journal of College Student Development, 46*, 43–61.
Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.
Rosenbaum, J. E. (2001). *Beyond college for all: Career paths for the forgotten half.* New York: Russell Sage Foundation.
Seidman, A. (1991). The evaluation of pre/post admissions/counseling process at a suburban community college: Impact on student satisfaction with the faculty and the institution, retention, and academic performance. *College and University, 66*, 223–232.
Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist, 52*, 613–629.
Stratton, L. S., O'Toole, D. M., & Wetzel, J. N. (2007). Are the factors affecting dropout behavior related to initial enrollment intensity for college undergraduates? *Research in Higher Education, 48*, 453–485.
Suarez-Balcazar, Y., Orellana-Damacela, L., Portillo, N., Rowan, J. M., & Andrews-Guillen, C. (2003). Experiences of differential treatment among college students of color. *Journal of Higher Education, 74*, 428–444.
Swim, J. K., Hyers, L. L., Cohen, L. L., Fitzgerald, D. C., & Bylsma, W. H. (2003). African American college students' experiences with everyday racism: Characteristics of and responses to these incidents. *Journal of Black Psychology, 29*, 38–67.

Szafran, R. F. (2001). The effect of academic load on success for new college students: Is lighter better? *Research in Higher Education, 42*, 27–50.
Titus, M. A. (2004). An examination of the influence of institutional context on student persistence at 4-year colleges and universities: A multilevel approach. *Research in Higher Education, 45*, 673–699.
Toutkoushian, R. K., & Smart, J. C. (2001). Do institutional characteristics affect student gains from college? *Review of Higher Education, 25*, 39–61.
Turnage, R. (2003). 2004–2005 Comprehensive 5-year capital outlay plan. Presentation to the Board of Governors of California Community Colleges, July 14–15, Sacramento, California.
Wassmer, R., Moore, C., & Shulock, N. (2004). Effect of racial/ethnic composition on transfer rates in community colleges: Implications for policy and practice. *Research in Higher Education, 45*, 651–672.
Weissman, J., Bulakowski, C., & Jumisko, M. (1998). A study of white, black, and Hispanic students' transition to a community college. *Community College Review, 26*, 19–32.
Yamaguchi, K. (1991). *Event history analysis*. Thousand Oaks, CA: Sage.
Young, R. B., Backer, R., & Rogers, G. (1989). The impact of early advising and scheduling on freshmen success. *Journal of College Student Development, 30*, 309–312.