

Summer Research Opportunity Programs (SROPs) for Minority Undergraduates: A Longitudinal Study of Program Outcomes, 1986-1996

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One of the most vexing problems in higher education has been the dramatic underrepresentation of African Americans, Hispanics, and American Indians in the nation's graduate schools and within the ranks of those who hold Ph.D.s, especially in the areas of science, math, engineering, and technology (SMET). While about 30% of whites with a Bachelor of Science degree go on to graduate school, only about 19% of non-Asian minorities with a B.S. do the same (Massey, 1992). In spite of concerted efforts over the last 20 years to enroll more minorities in graduate school, their numbers among SMET Ph.D. holders, though improving, remain low (Manger, 1996; Manzo, 1994; Massey, 1992; Phillip, 1993). In 1995, Blacks accounted for only 2.0% of all SMET Ph.D.s, Hispanics for 2.5%, and American Indians for 0.3%. By comparison, in the same year African Americans made up about 12% of the U.S. population, Hispanics 10.2%, and American Indians 0.7% (U.S. Bureau of the Census, 1995).

Students leave the pathway to a Ph.D. at many different points along the route, but the biggest disparity in the retention rate between minorities and non-minorities occurs in the critical transition between graduating from college and entering graduate school (Massey, 1992; U.S. Bureau of the Census, 1995). Clearly, if our nation desires to increase the diversity of its scientists and scholars and broaden the opportunities for members of its burgeoning minority population, more must be done to encourage minority undergraduates to pursue advanced degrees. Active recruitment strategies that many universities have tried include: sending faculty on recruiting trips to minority colleges, providing minority graduate candidates with all-expense-paid visits to their campus, having minority alumni contact promising minority candidates by letter or phone, and enrolling minority undergraduates in summer research programs sponsored by the recruiting institution (Wagener, 1991).

While some universities have evaluated their graduate recruiting efforts to determine which are the most successful, most have little information about their strategies' effectiveness and even less information about *why* these strategies accomplish or fail to accomplish their objectives (Malany, 1987; Twale, Douvanis, & Sekula, 1992). Longitudinal evaluations of graduate recruitment strategies are needed to develop a reliable understanding of whether these efforts are achieving their goals and to suggest guidelines for how to improve their effectiveness (Sims, 1992; Olson, 1988). In this article, we describe an evaluation we conducted in 1996-97 to assess the effectiveness, long-term impacts, and key strategies of a group of summer research programs designed to recruit and prepare minority undergraduates for enrollment in graduate school within the consortium of 15 Midwestern research universities which includes the "Big Ten." These programs, known collectively as the Summer Research Opportunity Programs (SROPs), are coordinated by the consortium's Committee on Institutional Cooperation (CIC).

The CIC Graduate Deans initiated the SROPs in 1986 in order to increase the racial and ethnic diversity of their graduate schools and, ultimately, the faculty of higher education institutions nationwide. These programs send students to CIC institutions from mid-June to mid-August for

intensive, all-expenses-paid research experiences with faculty mentors, who incorporate the students into their lab or research group for the summer and provide guidance in conducting original research projects of their own. In addition, the students meet weekly with on-campus peers for workshops on taking the GREs, getting admitted to graduate school, and writing research reports. Partway through the summer, students from all 15 schools attend a CIC-wide conference, providing them with the opportunity to network with representatives from CIC graduate schools and to meet and share their experiences with other minority students. At the end of the summer, students present the results of their research projects at campus-wide symposia. Participants are required to fill out an exit survey about their experiences in the program and to provide contact information that allows the CIC to annually track each student's progress towards a baccalaureate degree, enrollment in graduate or professional school, and progress towards advanced degrees.

The SROP programs are designed not only to give minority undergraduates valuable research experience, but to allow them to see what life as a graduate student at a CIC institution would be like. Both of these experiences allow participants to be better informed in their decisions regarding graduate school and better prepared for graduate work should they decide to enroll. Over 5,400 students participated in the programs between 1986 and 1996. Sixty-three percent have been African American, 24% Hispanic, 10% Asian or Pacific Islanders, and 3% Native American. Sixty-two percent of the participants have been female and 38% male, with 33% doing their research in the physical or natural sciences, 30% in the social sciences, 20% in the arts and humanities, 9% in engineering, 4% in business, and 4% in education.

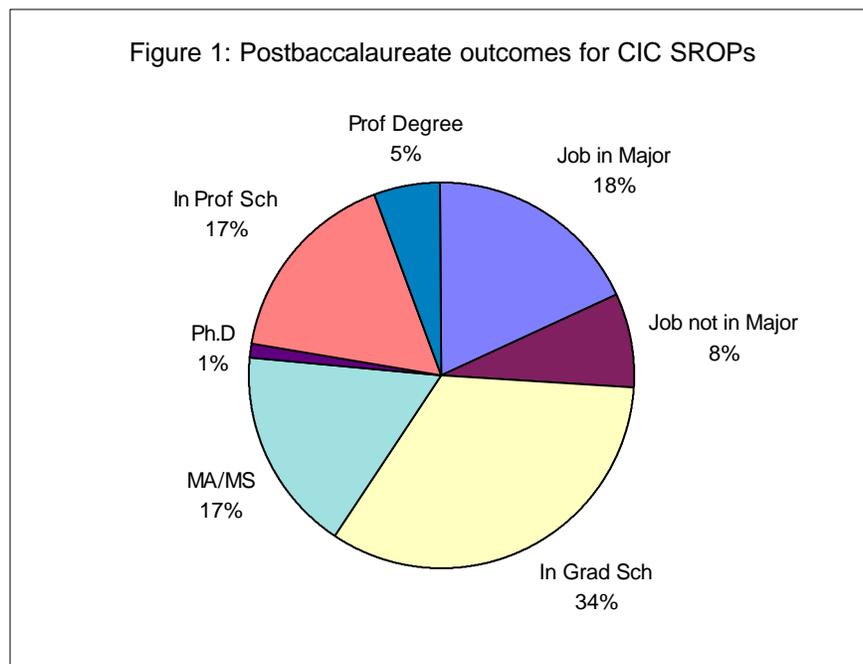
The evaluation described here was funded by the University of Wisconsin-Madison's Graduate School and a grant from the Spencer Foundation. Its overarching goal was to determine what effect the SROPs had on the students who participated in the first eleven years of the program, both in terms of their educational attainment and in terms of their confidence, interests, and future plans. The UW-Madison was particularly interested in how effective its SROPs had been in recruiting minority participants into UW-Madison's graduate programs. The Spencer Foundation was interested in what strategies or factors across the 15 different institutions' programs were critical to producing their outcomes.

The evaluation, conducted by a research team from the UW-Madison's Learning Through Evaluation, Adaptation, and Dissemination (LEAD) Center, used both qualitative and quantitative methods. On a CIC-wide-level, our qualitative methods included structured, open-ended interviews with 14 universities' SROP directors (UW-Madison's multiple directors were interviewed later), 3 minority college representatives, and 5 SROP alumni who had later enrolled in CIC graduate schools. On the local level, we conducted in-depth interviews with the directors of the 7 UW-Madison summer research programs supported by the CIC, with a representative sample of 16 former student participants in these programs, and with a representative sample of 10 faculty mentors. Our quantitative methods included analyzing the CIC's exit survey of SROP participants, surveying in greater depth 36 former participants in the UW-Madison's programs, and analyzing the pre-existing CIC tracking database, which included demographic and academic progress data for 4,585 minority students who had participated in the programs since 1986. We integrated the quantitative outcome data with the qualitative data from the interviews to determine which program strategies led to the desired outcomes, as well as to identify extra-

programmatic factors that worked against desired outcomes. For a complete copy of the UW-Madison evaluation results, see Foertsch, Alexander, & Penberthy (1996).

Summary of selected findings from the CIC database:

Because of the difficulties in tracking this highly mobile student population, it has not been possible to update the file of every student every year, but for those students who have been successfully tracked (90%), the outcomes are impressive. Across the entire CIC, 52% of minority SROP participants who are known to have already graduated have gone on to enroll in graduate school, and of these students, 35% are known to have already completed their advanced degrees (see Figure 1). Another 23% of the SROP's minority participants have gone on to enroll in professional schools, and of these, 23% are known to have received their professional degrees. By comparison, according to the Baccalaureate & Beyond longitudinal survey done by the National Center for Educational Statistics, only 8.8% of all underrepresented minorities who received baccalaureate degrees from 1992-1993 went on to enroll in graduate schools and 8.2% in professional schools within 16 months after graduation.



Not unexpectedly, the SROPs at the various CIC institutions have differed in how successfully they have fulfilled three ultimate program goals: encouraging participants to enroll in graduate schools (a goal for all the programs), encouraging students to enroll in professional schools (a goal only if the primary goal of graduate school enrollment is not reached), and recruiting participants to graduate school at the host institution (the major goal for some programs, like UW-Madison's, but only a minor goal for others). Table 1 shows how well each CIC institution did at achieving the program goals of graduate school or professional school enrollment. Table 2 shows how well each institution did at recruiting SROP participants back to its *own* graduate

programs as opposed to those at another institution. As can be seen from these figures, there was a considerable range in the degree of success on these three measures.

Table 1: Graduate and professional school enrollment of each CIC institution’s SROP participants.

CIC institution	% to graduate school	% to professional school	Total % to advanced education
U of Chicago	49	23	72
U of I-Chicago	56	23	79
U of I-UC	53	23	76
Indiana U	35	37	72
IU/PU-Indianapolis*	64	29	93
U of Iowa	45	36	81
U of Michigan	58	17	75
Michigan State U	60	15	75
U of Minnesota	60	18	78
Northwestern U	42	26	68
Ohio State U	50	20	70
Pennsylvania State U*	64	14	79
Purdue U	52	27	79
U of WI-Madison	42	25	68
U of WI-Milwaukee	44	14	58
CIC average	52	23	75

*Note: IU/PU-Indianapolis and Pennsylvania State joined the SROP programs in 1990 and 1992, respectively, and have had far fewer participants than other programs, so conclusions drawn from these programs’ outcome data are somewhat less reliable.

Table 2: For each CIC institution, the percent of all SROP graduate school enrollees who enrolled at the host’s graduate school (as opposed to some other graduate school).

CIC institution	% to host’s graduate school
IU/PU-Indianapolis*	67
U of WI-Milwaukee	61
U of WI-Madison	60
Ohio State U	55
U of Illinois-Chicago	51
U of Minnesota	50
Michigan State U	47
U of Illinois-UC	46
Pennsylvania State U*	44
U of Iowa	37
Purdue U	37
Indiana U	30
U of Michigan	30
U of Chicago	25
Northwestern U	20
CIC average	42

There was considerable diversity in where the various SROP programs turned to find participants, with some programs recruiting primarily from within their institution and others primarily from without. Across the CIC, 66% of program participants have been local undergraduates who do research at their own institutions for the summer, 9% have been recruited from historically black and Hispanic institutions that are partnered with the CIC through the Alliance for Success, and the other 23% have been recruited from other colleges and universities, generally those with limited research facilities of their own. Only 3 of the 15 CIC institutions (Penn State, Purdue, and the UW-Madison) got more than half of their SROP participants from another campus. The institutions that do most of their recruiting from within, like Michigan State and the UW-Milwaukee, have comparatively higher minority populations from which to draw participants and see the programs as opportunities to encourage persistence and scholarly aspirations in their own minority students. At such institutions, the summer research program is often coupled with year-round minority access programs.

In contrast, SROPs that get most of their participants from off campus not only tend to have smaller on-campus minority populations from which to draw, but often view their summer programs as recruiting tools—and hence are less likely to use a program “slot” on a student already familiar with the university and what it has to offer. For the UW-Madison, this practice of recruiting SROP participants from other institutions paid off: Although it had a comparatively low number of local participants (25%) it had one of the highest rates of return to their graduate school (60% of all participants who went to graduate school). Generally, however, programs which recruited a large number of students from their *own* campuses tended to be more successful at encouraging participants to return to the host institution for their advanced degrees. The percent of local students in an SROP had a moderate positive correlation with the percent of participants who chose the host institution over other institutions when enrolling in graduate school ($r = .31, p < .05$). Although the program directors we interviewed generally assumed that they would be more successful recruiting minorities for their graduate programs if they looked off campus for SROP participants, local minority participants often proved to be more willing to return because: (1) they were already highly familiar with the campus and what it has to offer, (2) they had at least four years to become comfortable with the (comparatively cool) local climate and the (predominantly white) local environment, and (3) they were more likely to have family, friends, and jobs nearby.

There were two other variations in program strategies across the 15 institutions which demonstrated significant correlations with program outcomes. First, SROPs which had a higher percentage of participants doing research in the physical sciences, natural sciences, or engineering tended to have a higher percentage of participants going on to graduate school ($r = .34, p < .05$). Second, there was a strong negative correlation between the percentage of on-campus students in an SROP and the percentage of participants doing research in the physical sciences, natural sciences, or engineering ($r = -.68, p < .01$). In other words, local SROP participants were more likely to be in fields like the humanities and the social sciences, while participants from off campus were more likely to be in science and engineering. This is not surprising because fields like science and engineering require expensive laboratories for research, and program participants who came from off-campus tended to be from smaller institutions that lacked such facilities, necessitating that they go to other institutions to get summer research experience.

Across the CIC, SROPs differed considerably in their organizational structure. Some program directors placed a great deal of emphasis on their ties with the CIC and saw the annual summer conference as a major component of the program, while other program directors saw neither their CIC connections nor the CIC conference as particularly important. Most of the programs were highly centralized and had a single director, but there were exceptions. At the UW-Madison, for example, the SROP consists of 7 separate programs, each closely tied with various departments but only loosely-linked with each other, and each having its own director and goals. However, these differences in organizational structure were not reliably correlated with program outcomes.

Summary of selected findings from the interviews and surveys:

In addition to these quantitative outcomes, a great deal was learned from our analyses of interviews and the UW-Madison and CIC surveys. Below is a summary of the most important findings regarding the impact of the SROPs on the students who participate in them.

First, the SROPs are successfully meeting their goal of recruiting participants to CIC graduate schools, or graduate school in general, and this outcome can be tied to program experiences. According to both interview and survey data, what participants learned about the host institution during their eight weeks in an SROP was a major factor in many participants' decision to enroll at that institution for graduate or professional school. The surveys and interviews also showed that, even when students do not enroll at CIC institutions for advanced degrees, the SROPs do encourage and prepare participants for graduate or professional education at other institutions, which was the programs' primary goal. Most of the students we interviewed described their participation in the programs as a necessary and important step in allowing them to make an informed choice about attending graduate or professional school. For some students, the program was what "steered" them in the direction of research in the first place. And even students who entered the program with fairly strong interests in research expressed that the program strengthened these interests by giving them "hands-on" experience.

Second, SROP participants expressed a high degree of satisfaction with their research experiences and program activities. In both the interviews and surveys, students were asked about their satisfaction with their research situation and the program activities in which they participated. The vast majority of respondents were highly satisfied or sufficiently satisfied with both. Although there was quite a range in the setting in which students worked and how much contact they had with their faculty mentors, virtually all of the survey respondents were satisfied with their research situation and the relationships they had with their mentor. Most of the students we interviewed also had very positive things to say about their research situation and their mentors, but there were some notable exceptions. The exceptions tended to be students who felt they were given insufficient guidance from their mentors. The vast majority of both interviewees and survey respondents were also pleased with the program activities and seminars in which they participated, although many students said they wanted the program to be longer. According to most respondents, eight weeks is not enough time to get one's project completed and write it up for presentation, and many students said they felt rushed.

Third, in terms of giving participants a valuable and enjoyable experience, faculty mentors are the thing that "make or break" the SROPs. An open and congenial relationship with one's

mentor and a good experience in his or her lab were an important part of the programs and a key factor in encouraging students to consider going to graduate school. Although mentors were often too overloaded with other responsibilities to be the ones who provided SROP participants with day-to-day guidance (a task usually given to their graduate students), it is the faculty mentor who represents the department and is seen as exemplifying what professors in graduate school will be like. Furthermore, program participants often turn to their faculty mentors when they need recommendations or an “inside edge” to gain admission to the department’s graduate program. When asked about their own difficulties in participating in the program, every mentor interviewed said that time was the major obstacle. Nevertheless, the mentors expressed a high degree of satisfaction with their mentoring experience. Most of the mentors believed that their students had an educational and worthwhile experience in the program, and that even those students who weren’t turned on to research received something valuable from their participation. When asked if they planned on participating in the program again, most of the mentors were very enthusiastic about doing so.

Fourth, when SROP participants chose to enroll somewhere other than the host institution for their advanced degrees, it was generally for reasons unrelated to program experiences.

This was evident from both the interview and the survey data. In cases where students had a good experience in the summer program but decided to enroll elsewhere for graduate school, it was often because of the Midwest’s cold weather or the distance from their families. This was especially the case with Puerto Rican students or students from HBCUs in the South. In other cases, students did not enroll at the host institution because they could get better funding or a cheaper education elsewhere. The primary factors interviewees were taking into consideration in choosing a graduate school were the following: (1) a strong reputation in the student’s field of interest, (2) having a program in a special field, and (3) the availability of fellowships or other graduate funding. Other factors that came into play for some students once these primary ones had been taken into account were climate, community environment, and distance from home.

Conclusion

By all indications, the CIC’s SROPs are doing well at their immediate goal of providing students with the best research experience possible during their eight short weeks in the program. And as it turns out, the programs are also doing well at their post-program goal of attracting participants to graduate and professional programs at CIC institutions. Three-quarters of the already-graduated alumni from the program’s first eleven years have gone on to graduate schools (52%) or professional schools (23%), three times the national average for all college graduates across the U.S. and more than four times the average for minority college graduates.

Still, there is only so much summer undergraduate research programs can do on their own. These programs must be combined with other strategies if universities wish to attract a sufficiently high number of minority graduate students. For one thing, graduate schools and departments must work together on finding more reliable funding for minority graduate students—funding that not only pays for their education but that ties them to a research lab or faculty advisor. Also, academic departments need to do a better job at following-up on minority students who have participated in their universities’ summer research programs. Many departments have a poor record when it comes to tracking and actively recruiting the promising students who worked in

their labs over the summer, much less recruiting minority candidates on their own. For universities that invest in these other two strategies as well, summer undergraduate research programs like the SROPs described here should be even more effective at recruiting promising minority candidates into graduate school.

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