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Educational and Employment Outcomes of Ronald E. McNair Postbaccalaureate Achievement Program Alumni

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Executive Summary

This report presents findings from a study of the Ronald E. McNair Postbaccaulaureate Achievement (McNair) Program. The McNair Program was established in 1986 to increase the attainment of doctoral degrees by students from disadvantaged and underrepresented backgrounds. The McNair Program awards grants to institutions of higher education to provide participants with educationally enriching scholastic experiences that help prepare them to enter graduate school and to pursue and complete doctoral degrees. Students typically enter the program during their senior year in college, although they are able to participate in the McNair Program during any year of their undergraduate studies. Recipients of summer research internships must have completed their sophomore year in college. To qualify for the program, students must be enrolled in a degree-granting program at an accredited college or university and be low-income, first-generation college students or underrepresented minorities who are not low-income, first generation.

From its first grantee awards in 1989, the McNair Program has grown steadily in the number of grantee institutions, level of appropriation, and number of students participating in the program. By 2000, which included the period from which many of the participants in this study were drawn, the program was awarding close to $35 million in grants and serving more than 3,700 students annually. Females have always been a larger proportion—roughly two-thirds—of participants in the McNair Program. Blacks have consistently been the largest single ethnic category represented among McNair Program participants (from 40 to 45 percent of enrollees), followed by Latinos (approximately 25 percent) and whites (approximately 20 percent). As required by law, more individuals are eligible to participate in the program by virtue of being low-income and first-generation (roughly 70 percent) than by being underrepresented minorities who are not low-income and first-generation.

Methodology

This study is a descriptive analysis of participant outcomes and not an impact study. No attempt is made to compare the outcomes of McNair participation to any other program or condition. To address the study questions, Decision Information Resources, Inc. (DIR) conducted a telephone survey with a sample of participants identified as enrolled in the McNair Program, according to Annual Performance Report (APR) records, between the fall of 1989 and the spring of 2000. The final universe from which the sample was selected consisted of 11,116 cases. DIR conducted a telephone survey of the selected McNair alumni about their experiences as undergraduates and their educational and employment outcomes. Estimates presented throughout this report use weighted data to account for probability of selection, nonresponse, and post-stratification weighting to adjust for the respondent's actual strata compared to the initial sampling strata and to bring estimates in line with population totals contained in the APR.

Although we do not have survey data on the educational and employment outcomes for nonresponders, we used a method cited by the National Center for Education Statistics to estimate nonresponse bias by comparing the outcomes for early and late survey responders. We found no systematic differences between early and late respondents to this survey on key outcome variables, suggesting that outcomes for nonrespondents may not differ significantly

from those of respondents. Nonetheless, in view of the low response rates to the survey overall, findings should be interpreted cautiously.

Outcomes for McNair Program Participants

- To what extent do McNair Program participants earn doctoral degrees?

Overall, among former McNair participants who had sufficient time to earn a doctorate degree at the time of this study, 6.1 percent reportedly had earned their doctorates. As expected, the rate for earning a doctorate increased the more time that had elapsed since participating in the McNair Program. For students in the program between 1989 and 1993, 14.4 percent reportedly had earned doctorates, and 3.9 percent of participants in the program between 1994 and 1998 reported having earned a doctoral degree. None of the participants in the program between 1999 and 2003 indicated that they had earned a doctoral degree.

- To what extent are program participants still pursuing doctoral studies?

Of the 62 percent of former McNair participants who were enrolled in graduate school at the time of the study, approximately 22 percent indicated that they were in doctoral programs, and 15 percent reported that they were pursuing professional degrees.

The findings from this survey of former McNair participants suggest a high percentage (73 percent) of McNair participants with bachelor's degrees had enrolled in graduate school at some time within a five- to seven-year period after receiving their bachelor's degree. As a point of reference, 30 percent of typical B.A. recipients surveyed in NCES' Baccalaureate and Beyond Survey entered graduate schools within five years after college graduation.

- In what fields of study are McNair Program participants earning a doctoral degree?

The largest percentages of doctoral degrees reportedly were earned in the life sciences (26.0 percent), social sciences (24.1 percent), or physical sciences (14.6 percent). Those who earned professional degrees most often reportedly held doctorates of jurisprudence (55.3 percent), medicine (26.3 percent), or osteopathic medicine (8.7 percent).

- To what extent do McNair Program participants join faculties of higher education upon completion of the doctoral program?

Of McNair participants who completed doctoral degrees, about 65 percent indicated that they were employed in higher education. Seventy-two percent of that group reportedly were on the faculty of the institutions in which they worked. Only 4 percent of professional degree recipients indicated that they were employed in higher education. Of that group, about 40 percent were on the faculty. Overall, then, about 20 percent of McNair doctoral and professional degree recipients reported that they were faculty members in institutions of higher education.

Although the majority of Ph.D. and other doctoral degree recipients on faculties were in tenure-track positions, only six individuals indicated that they had obtained tenure. That is not surprising, in view of the time it takes to obtain tenure after joining the faculty of an institution. In contrast, the majority of professional degree recipients were not in tenure-track positions, and

none held tenured faculty positions. The largest proportion of doctoral and professional degree recipients who were not faculty at institutions of higher education were employed in industry or business (61.2 percent).

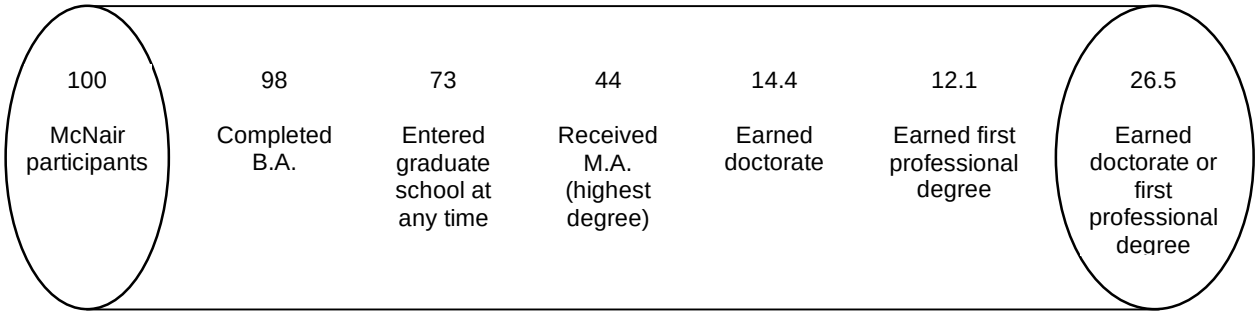
McNair participants with doctoral degrees other than the Ph.D. who did not work in higher education reportedly earned significantly more income than those employed in higher education. There was no statistically significant difference in the reported earnings of Ph.D. and professional degree recipients based on whether they worked in higher education or not. Similarly, McNair Program graduates who were not employed in higher education did not report significantly different education-related debt than their peers who were employed in higher education.

- What is the employment status of students who entered the program but for whom there is no evidence of an earned doctoral degree?

Overall, reported employment levels were higher among master's (93.6 percent) and bachelor's degree (83.8 percent) holders who were not enrolled in school compared with their peers who were enrolled in school (76.6 and 62.8 percent, respectively).

Figure 1 graphically presents the pipeline for producing low-income, first-generation and underrepresented minority doctorate or first professional degree recipients from an average of 100 McNair Program participants who had been in the program at least 10 years before the time of the study survey (the early cohort). This breakdown depicts survey findings converted from percentages to reflect a typical set of 100 McNair participants.

Figure 1. Pipeline of Doctoral or First Professional Degree Attainment of Early Cohort Participants (1989–93) by 2004—per Typical 100 McNair Program Participants at Least 10 Years After Program Participation



Source: Percentages derived from analysis of McNair survey, 2004–06.

Chapter 1. Introduction

This chapter describes the background of the Ronald E. McNair Postbaccalaureate Achievement (McNair) Program and sets forth the methodology for the study.

The McNair Program is one of the Federal TRIO Programs offered by the U.S. Department of Education (ED) to motivate and support students from economically disadvantaged backgrounds. The McNair Program was established in 1986 to increase the attainment of doctoral degrees by students from disadvantaged and underrepresented backgrounds. Recipients of summer research internships must have completed their sophomore year in college.

In 2002, ED's Policy and Program Studies Service awarded a contract to Decision Information Resources, Inc. (DIR), to undertake a study of McNair Program participants to assess the extent to which they complete doctoral studies and to determine the extent to which they obtained faculty or research positions at institutions of higher education.

Background of the Ronald E. McNair Postbaccalaureate Achievement Program

Authorized by Title IV, Part A, Subpart 2, Chapter 1, Section 402E of the *Higher Education Act of 1965*, as amended (P.L. 102-325), the McNair Program awards grants to institutions of higher education for grantees to provide participants with educationally enriching scholastic experiences that help prepare them to enter graduate school and complete doctoral degrees. Historically, low-income first-generation college students and minorities—particularly blacks, Hispanics, American Indians and Alaska Natives, and mixed or other races or ethnicities—have been underrepresented among doctoral degree recipients. The hope was that by increasing the pool of doctoral degree recipients among these groups, their representation on college faculties would also be increased. The program awards grants to institutions of higher education that give these students opportunities to engage in research and other scholarly activities to increase the likelihood of success in graduate school.

Students typically enter the program during their senior year, although they are able to participate in the McNair Program during any year of their undergraduate studies. To qualify for the program, students must be enrolled in a degree-granting program at an accredited college or university and be low-income, first-generation college students or underrepresented minorities who are not low-income, first generation. The program tracks and reports on participants in project Annual Performance Reports (APRs) through graduate school to degree completion.

The McNair Program offers a range of services and activities:

- academic counseling
- conferences and presentations
- seminars and workshops
- summer internships (research activities providing the legislated stipend of up to $2,800)
- test preparation
- tutorial assistance
- mentoring
- opportunities for research (other than research activities which include a stipend)
- assistance for obtaining student financial aid

From its first grantee awards in 1989, the McNair Program has grown steadily in the number of grantee institutions, level of appropriation, and number of students participating in the program. Table 1-1 presents a summary of McNair Program statistics through the year 2000.[1]

Table 1-1. Summary of McNair Program Statistics, 1989–2000 Grantees

Year	Appropriation	Number of McNair Grantees	Average Award Amount	Number of Students Served*	Average Award per Student
2000	$34,859,043	156	$223,455	3,744	$9,237
1999	$32,114,068	156	$205,859	3,641	$8,820
1998	$20,774,063	99	$209,839	2,469	$8,414
1997	$20,367,000	99	$205,727	2,480	$8,213
1996	$19,817,000	99	$200,172	2,480	$7,991
1995	$19,080,000	99	$192,727	2,460	$7,756
1994	$11,900,000	68	$175,000	1,800	$6,611
1993	$9,598,000	68	$141,147	1,730	$5,548
1992	$9,576,000	68	$140,824	1,700	$5,633
1991	$4,944,000	42	$117,714	1,000	$4,944
1990	$3,000,000	28	$107,143	730	$4,110
1989	$1,482,000	14	$105,857	415	$3,571

Source: Office of Federal TRIO Programs, http://www.ed.gov/programs/triomcnair/index.html, accessed 2006.
*Number of participants currently enrolled at that time; does not include former students in graduate programs.

The Annual Performance Reports provided by grantees to the U.S. Department of Education captures information about the characteristics of McNair Program participants, although before 1996, it was not required that individual-level data be reported.[2] Tables 1-2 through 1-4 show that selected characteristics of participants (gender, ethnicity, and eligibility classification) remain relatively consistent over the years. As required by law, two-thirds of program participants must be low-income, first-generation college students. The remaining participants may be members of groups who are underrepresented in graduate education (black, Hispanic, American Indian and mixed or other ethnicities) who are not low-income, first- generation.

[1] Data are presented through 2000 because that is the main period of focus for this study.
[2] When individual-level performance reports were begun in 1996, projects were required to include participants served since the program began in 1989.

Females have continued to be a larger proportion of McNair Program participants. This finding parallels those of other TRIO studies, such as the Upward Bound and Student Support Services studies, which also found that more women enrolled in TRIO programs than men.[3]

Table 1-2. McNair Participants Gender and Year Joined: 1989–2000

Year Participants Joined McNair	Gender						
	Overall	Female		Male		Missing	
	N	N	%	N	%	N	%
Total	12,171	8,077	66.4	4,071	33.4	23	0.2
2000	1,559	1,069	68.6	485	31.1	5	0.3
1999	1,752	1,180	67.4	561	32.0	11	0.6
1998	1,452	993	68.4	456	31.4	3	0.2
1997	1,465	946	64.5	518	35.4	1	0.1
1996	1,704	1,126	66.1	577	33.8	1	0.1
1995	1,289	838	65.0	450	34.9	1	0.1
1994	835	558	66.8	277	33.2	0	0.0
1993	867	548	63.2	319	36.8	0	0.0
1992	618	401	64.8	216	35.0	1	0.2
1991	307	195	63.5	112	36.5	0	0.0
1990	226	158	69.9	68	30.1	0	0.0
1989	97	65	67.0	32	33.0	0	0.0

Source: McNair Program Annual Performance Reports 1989–2000, not including updates provided by grantees.

Blacks have consistently been the largest single ethnic group represented among McNair Program participants. As required by law, the majority of program participants are eligible by virtue of being low-income, first-generation rather than by being underrepresented minorities who are not low-income, first generation.

[3] "The National Evaluation of Upward Bound. Summary of First-Year Impacts and Program Operations. Executive Summary." Washington, D.C.: Mathematica Policy Research, Inc., May 1997, Mary T. Moore and David Myers.

Table 1-3. McNair Participants Ethnicity and Year Joined, 1989–2000

Year Participants Joined McNair	Ethnicity															
	Overall		Asian		Black (not Hispanic)		Latino		White (not Hispanic)		Mixed		American Indian		Missing	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Total	12,171	100.0	692	5.7	5,344	43.8	3,075	25.3	2,319	19.1	84	0.7	631	5.2	26	0.2
2000	1,559	100.0	65	4.2	801	51.3	324	20.8	267	17.1	32	2.1	57	3.7	13	0.8
1999	1,752	100.0	109	6.2	799	45.6	457	26.1	287	16.4	20	1.2	76	4.3	4	0.2
1998	1,452	100.0	96	6.6	588	40.6	397	27.3	263	18.1	12	0.8	93	6.4	3	0.2
1997	1,465	100.0	84	5.7	582	39.7	439	30.0	237	16.2	4	0.3	119	8.1	0	0.0
1996	1,704	100.0	107	6.3	685	40.1	494	29.0	323	19.0	4	0.3	88	5.2	3	0.2
1995	1,289	100.0	80	6.2	527	40.9	315	24.4	283	22.0	5	0.2	79	6.1	0	0.0
1994	835	100.0	38	4.6	387	46.3	207	24.8	163	19.5	3	0.4	36	4.3	1	0.1
1993	867	100.0	58	6.7	377	43.5	199	23.0	186	21.5	3	0.3	42	4.8	2	0.2
1992	618	100.0	26	4.2	275	44.5	146	23.6	143	23.1	1	0.2	27	4.4	0	0.0
1991	307	100.0	12	3.9	151	49.2	67	21.8	70	22.8	0	0.0	7	2.3	0	0.0
1990	226	100.0	13	5.8	142	62.7	13	5.8	51	22.6	0	0.0	7	3.1	0	0.0
1989	97	100.0	4	4.1	30	30.9	17	17.6	46	47.4	0	0.0	0	0.0	0	0.0

Source: McNair Program Annual Performance Reports 1989–2000, not including updates provided by grantees.

Table 1-4. McNair Participants Eligibility Criteria and Year Joined, 1989–2000

Year Participants Joined McNair	Eligibility							
	Overall		Low Income & First-Generation		Under-represented Minority		Missing	
	N	(%)	N	(%)	N	(%)	N	(%)
Total	12,171	100.0	8,658	71.1	3,326	27.3	187	1.5
2000	1,559	100.0	1,087	69.7	464	29.8	8	0.5
1999	1,752	100.0	1,246	71.1	499	28.5	7	0.4
1998	1,452	100.0	1,065	73.4	382	26.3	5	0.3
1997	1,465	100.0	1,053	71.8	411	28.1	1	0.1
1996	1,704	100.0	1,198	70.3	494	29.0	12	0.7
1995	1,289	100.0	942	73.1	345	26.7	2	0.2
1994	835	100.0	603	72.3	215	25.7	17	2.0
1993	867	100.0	612	70.6	216	24.9	39	4.5
1992	618	100.0	387	62.6	138	22.4	93	15.0
1991	307	100.0	238	77.5	68	22.2	1	0.3
1990	226	100.0	154	68.2	71	31.4	1	0.4
1989	97	100.0	73	75.3	23	23.7	1	1.0

Source: McNair Program Annual Performance Reports 1989–2000, not including updates provided by grantees.

Previous Studies of the McNair Program

Studies and reports of the McNair Program have been limited. Perhaps the best-known reports on the McNair Program are those distributed by the U.S. Department of Education (ED). ED has produced several comprehensive national profiles of the McNair Program that highlight program activities and participant outcomes. *A Profile of the Ronald E. McNair Postbaccalaureate Achievement Program: 1997–1998 through 2001–2002* is the most recently produced publication available.[4] The data for these profile reports come from Annual Performance Reports (APRs) prepared or compiled by the McNair grantees for the U.S. Department of Education. The only participant self-reported information, to date, came from a mail survey conducted by the Pell Institute for the Study of Opportunity in Higher Education that focused on how participants financed their first year of postbaccalaureate studies.[5] Thus, no prior study of the McNair Program or its participants has obtained information directly from former program participants specifically about their educational and employment outcomes.

[4] *A Profile of the Ronald E. McNair Postbaccalaureate Achievement Program: 1997–1998 through 2001–2002*, U.S. Department of Education, Office of Postsecondary Education, Washington, D.C., 2005.

[5] Norfles, Nicole, and Mortenson, Thomas, "Financing the First Year of Graduate School: A Study of TRIO Ronald E. McNair Post-Baccalaureate Achievement Alumni," Pell Institute for the Study of Opportunity in Higher Education, March 2002.

Current Research Objectives and Study Questions

This study of educational and employment outcomes of McNair participants had two main objectives:

- To determine the extent to which McNair Program participants earn doctoral degrees
- To assess the extent to which McNair Program participants obtain faculty or research positions at institutions of higher education

To examine these objectives, the study addressed the following research questions:

- To what extent do McNair Program participants earn doctoral degrees?
- In what fields of study are McNair Program participants earning a doctoral degree?
- To what extent do McNair Program participants join faculties of higher education upon completion of the doctoral program?
- What is the employment status of students who entered the program but for whom there is no evidence of an earned doctorate?
- To what extent are program participants still pursuing doctoral studies?

Methodology

As evidenced by the study questions and the methodology employed, this study is a descriptive analysis of participant outcomes. As such, no attempt is made to compare the outcomes of McNair participation to any other program or condition. To address the study questions, DIR conducted a telephone survey with a sample of participants identified as enrolled in the McNair Program, according to APR records, between the fall of 1989 and the spring of 2000.[6] The survey was designed to query program participants on four major themes:

- Experiences as undergraduates
- Experiences as graduate students
- Employment-related experiences
- Sociodemographic characteristics

The design of the survey called for interviewing 100 percent of the McNair participants who reportedly had earned doctoral or professional degrees and a sample of McNair graduates who had completed master's or bachelor's degrees or who had not earned any degree.

[6] Updates from a subset of grantees added a small number of participants, who had enrolled in the program after 2000, to the survey sample.

Sampling Frame

The APRs provided by the grantee institutions were used as the base sample frame for identifying the universe of McNair Program participants and their degree status. These reports present profiles of grantees, program participants, program services, and the academic attainment of the participants. Before 1996, however, grantees were not required to collect data at the individual student level. As a result, only aggregate data on grantee activities and participants were consistently available from 1989–95. In 1996, ED required all McNair Program grantees to begin reporting data on all new, current, and prior-year participants.

To help identify participants in years before 1996 and to update APR-reported information on all students for this study, DIR asked current grantee program directors to provide any additional information available about former participants. However, the extent to which program directors were able to accurately capture retrospective data about individuals pursuing graduate study is unknown. Nevertheless, DIR used the additional information provided to update the base APR frame. Twenty-four grantees did not respond to requests for updates, so DIR used only information originally contained in their APRs for those programs.

The APR and grantee updates initially identified 12,640 individuals as participants in the McNair Program during the study time frame. However, the degree completion status of 1,524 of those cases could not be determined from either the APR or subsequent update information from the grantees. This prevented us from assigning those individuals to a sampling stratum. As a result, they were excluded from the sample frame for the study. Therefore, the final sampling universe consisted of 11,116 cases, reweighted in the analysis to reflect the population totals in the APR.

The universe was stratified according to the highest educational attainment reported in the APR records or in grantee's update of the APR information. A census for doctoral (and professional) degree recipients (n = 813) was conducted. Random samples were drawn from the three remaining subgroups of McNair participants—those who had earned master's degrees (n = 580), those who had earned bachelor's degrees (n = 615), and those who had earned no degree (n = 604), according to the APR and grantee reports. Weights were assigned to each record in the sample to appropriately represent their probability of selection and account for nonresponse. A more detailed explanation of the weights used is provided in Appendix A. Estimates presented throughout this report use weighted data. Unweighted data tables are provided in Appendix B.

Table 1-5. Number of McNair Participants in the Sampling Frame, Sampling Fraction, and Number of Selected Participants, by Sampling Stratum

Sampling Stratum	Sampling Frame	Sampling Fraction	Selected Participants
Bachelor's degree	6,537	.0941	615
Master's degree	1,363	.04255	580
Doctoral and professional degree	813	1.00	813
No bachelor's degree	2,403	.2514	604
Total	11,116	N/A	N/A

Source: McNair Program Annual Performance Reports, 1989–2000.

Survey Administration

DIR interviewers attempted to contact and interview McNair participants in each of the identified groups to complete the survey. A substantial amount of searching and tracing was conducted in an effort to locate potential respondents. In May 2004, the names and Social Security numbers of members of each respondent group were sent to Lexis-Nexis to obtain home addresses and telephone numbers. One week before we called sample members, we sent advance letters to all those for whom home addresses had been obtained. The letters informed potential respondents about the purpose of the survey, the hours of operation for the computer-assisted telephone interview (CATI) center, and the incentive of $25 that respondents would receive after they completed the survey.

In June 2004, DIR staff members began efforts to locate 1,277 individuals for whom they had received returned letters indicating a bad address and those for whom telephone numbers from Lexis-Nexis were wrong, disconnected, or missing. DIR staff members relied on several Internet-based resources, including www.555-1212.com, www.superpages.com, www.anywho.com, www.go.com, and www.google.com, to locate potential respondents. Staff members obtained new telephone numbers and addresses for 459 individuals of the 1,277 records traced and sent advance letters to these individuals.

In July 2004, DIR retained the services of National Change of Address (NCOA). A total of 1,674 records were sent to NCOA. New telephone numbers were obtained for 54 respondents, new addresses for 82 respondents, and new telephone numbers and new addresses for 201 respondents. No new information was received regarding the remaining 1,337 records.

In September 2004, DIR retained the services of TransUnion, a credit-reporting agency. A total of 1,385 records of potential survey respondents were sent to TransUnion. New addresses were received for 199 records and new telephone numbers and new addresses for 1,001 records from TransUnion. No new information was received regarding the remaining 185 records.

DIR's interviewers administered the survey in either English or Spanish through DIR's CATI system. Survey administration began in May 2004 and ended in December 2004. During this time, 1,003 surveys were completed with current or former McNair participants.

Response Rates and Weighting

The response rate for the survey was 39 percent, despite extensive tracing efforts to obtain correct addresses and telephone numbers for all potential respondents. DIR contacted 40.6 percent of the potential respondents. The remaining 59.4 percent of the groups resulted in noncontacts such as "wrong numbers," "nonworking numbers," faxes, modems, cell phones, pagers, refusals, ring with no answers, mechanical answering devices, etc.

The sample of 2,612 cases was partitioned into four groups based on the final survey disposition:

A = completers (1,003 cases)
B = nonrespondents (eligible sample), such as refusals, request do-not-call, etc. (33 cases)
C = ineligible samples, such as deceased, did not participate in McNair, or duplicate records (24 cases
D = unknown eligibility samples (due to no contact), such as busy number, no answer, fax, modem, answering machine, wrong number, not working number, etc. (1,552 cases)

The low response rate of 39 percent obtained in this survey was largely based on difficulties in locating respondents. A variety of searching and locating data bases and techniques were used in addition to tracking using contact information available through grantee and APR data. But, in view of the age of the data (in many cases 7 to 8 years old and without complete Social Security Numbers in many instances), this low response rate was not unexpected. We conducted several analyses to determine if and how respondents and nonrespondents likely differed in their characteristics or reported outcomes.[7] Using information available in the APR on the characteristics of the responding and nonresponding sample members, we found whites had significantly higher and Hispanics significantly lower rates of response compared to the overall rate. Persons with masters' and doctoral degrees responded at a higher rate compared to those with bachelors' degrees or no degree. This suggests that caution should be used in interpreting and generalizing from the results.

Although we do not have survey data on the educational and employment outcomes for nonresponders, we used a method cited by the National Center for Education Statistics to estimate nonresponse bias by comparing the outcomes for early and late survey responders (Bose, 2001). Using that methodology, we found no systematic differences between early and late respondents to this survey on key outcome variables, suggesting that outcomes for nonrespondents may likely not differ significantly from that of respondents. Nonetheless, in view of the low response rates to the survey overall, findings should be interpreted cautiously.

DIR made sample adjustments for eligibility and nonresponse in two steps. The first step adjusted for unknown eligibility in the sample due to non-contact. For the 1,552 cases of unknown eligibility (group D) who could not be contacted, their eligibility could not be confirmed. It was assumed that among the non-contacted cases in group D, some unknown number were ineligible like the ineligible cases in group C (that is, individuals that claimed they were not McNair participants, were deceased, or were duplicates). Thus, the first step in sample adjustments was to account for unknown eligibility. The second step adjusted for those eligible sample members who did not respond to the survey.

The final component of the weighting process was post-stratification weighting to adjust the final weights to the population totals identified in the APRs. To provide estimates that reflected the total McNair population, the data were weighted to account for the probability of selection into the survey, sample eligibility, and nonresponse. This resulted in an estimated total number of 12,558 McNair participants, based on the weighted results. Appendix A contains additional details on the weighting procedures and calculations of nonresponse.

[7] The results of these analyses are reported in Appendix A.

Study Design and Implementation Issues

Several issues regarding the study implementation, including availability and quality of data used for this report are noteworthy. We discussed problems related to the low response rate in the previous section. Two other important issues are reporting problems in the data available through the APR files and definitional differences in the use of the term "doctoral."

Data Availability

Before 1996, McNair Program grantees were not required to provide data to ED on individual participants in the program; only aggregate reports were required. Since that time, grantees have been expected to report on the academic attainment of individual participants until they earn a doctoral degree. For many grantees, their records of participants before 1996 were incomplete. Additionally, data in the initial years after moving to individual-level reporting were, not unexpectedly, subject to varying levels of completeness and accuracy.

This current (DIR) study focuses on McNair participants from 1989 to 2000, tracking their educational attainment through 2004, to ensure that sufficient time had elapsed to expect that some participants could have completed a doctoral degree. But, since many of those participants would have been in the program before mandatory reporting on individuals or in the early years of such reporting, we expect that some unknown, but potentially large, number of participants may not have been identified in this sample. As part of the study procedures, we asked grantees to update information that we provided them from APR data to identify prior participants who were not shown or for whom new information was available. This met with mixed results—85 percent of the grantees responded to requests for updated information; however, in many cases, they could not provide any useful information regarding missing prior participants or updated academic attainments. Therefore, the APR data file used for constructing the sample frame for this universe suffers from potentially substantial omissions of early participants from the 1989–2000 time period, thereby underestimating the number of doctoral degree recipients.

Terminology for Doctoral Degrees

Depending upon the source used—the authorizing legislation or the program's Web site—inconsistent terminology is used to discuss the doctoral-level degree that is the focus of the McNair Program. The authorizing legislation indicates that the McNair Program was created to awards grants to institutions of higher education for grantees to provide participants with educationally enriching scholastic experiences that help prepare them to enter graduate school and to pursue and complete doctoral degrees. On ED's TRIO Web site, the statement is made that the McNair Program is designed to prepare participants for "doctoral" studies. Later in that same reference, the goal of McNair is stated to increase the attainment of the "Ph.D. . . . " However, the Ph.D. is only one of many doctoral-level research degrees that could be potentially impacted by the services of the McNair Program. The National Science Foundation, which is responsible for conducting the Survey of Earned Doctorates (SED), identifies close to 50 other doctoral degrees (for example, Doctor of Social Work (D.S.W.), Doctor of Public Health (D.P.H.), Doctor of Engineering (D.Eng.) that they consider equivalent to the Ph.D. These research doctoral degrees are considered distinct from professional degrees—for example, doctorates in law, medicine, or pharmacy.

So, although we consider the Ph.D. and other research doctoral degrees equivalent for fulfilling the purposes and goals of the McNair Program, we have shown data for them separately in this report, to the extent feasible, as instructed by ED. We use the terms "doctoral degree" or "doctorate" to refer to the Ph.D. and all other research doctoral degrees. Professional degrees are presented separately whenever data permits. Professional degree recipients are not aggregated with Ph.D. and other doctoral degrees in any of the analyses, although those recipients were included in the strata with other doctoral degrees for the purposes of sampling.

Structure of the Remainder of the Report

This introductory chapter briefly described the McNair Program, the rationale and background for this current study, the methodology for the survey conducted, and several data issues. Chapter 2 describes the institutions attended by McNair Program participants and the program services they received, as determined from the survey. Chapter 3 presents findings regarding the educational and employment outcomes of McNair participants. In Chapter 4, we summarize the study's findings.

Chapter 2. McNair Participant Institutions and Services Received

This chapter provides brief information about the McNair grantee institutions and participants' perceptions of the helpfulness of the services and activities received during their McNair Program participation.

Institutions Attended by McNair Participants

As undergraduates, the majority of McNair participants reported that they were enrolled in research institutions that granted doctoral degrees. Table 2-1 presents the educational attainment of McNair participants by the type of undergraduate institution they attended as program participants. Over 70 percent of participants whose highest degrees were masters' or bachelors' or who had not completed bachelors' degrees reportedly attended research institutions that granted doctoral degrees. However, among doctoral and professional degree recipients, 57 percent said that they attended research institutions that granted doctoral degrees, and 42.5 percent reported attending colleges and universities that granted masters' degrees.

Table 2-1. McNair Participants by Carnegie Classification of Undergraduate Institution and Educational Attainment

	Highest Degree Completed							
Classification of Institution	**No Bachelor's Degree (N = 305)**		**Bachelor's Degree (N = 5,936)**		**Master's Degree (N = 4,985)**		**Doctoral or Professional Degree (N = 1,331)**	
	N	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**
Doctoral or research universities	223	73.2	4,233	71.3	3,494	70.1	758	57.0
Master's colleges and universities	68	22.2	1,402	23.6	1,237	24.8	565	42.5
Baccalaureate colleges	14	4.6	329	3.9	137	2.7	5	0.4
Specialized institutions	0	0.0	72	1.2	117	2.4	3	0.2

Source: Weighted McNair survey data (fall 1989–spring 2000).

Note: "In 1970, the Carnegie Commission on Higher Education developed a classification of colleges and universities to support its program of research and policy analysis. Derived from empirical data on colleges and universities, the 'Carnegie Classification' was published for use by other researchers in 1973 and subsequently updated in 1976, 1987, 1994 and 2000. For over three decades, the Carnegie Classification has been the leading framework for describing institutional diversity in U.S. higher education. It has been widely used in the study of higher education, both as a way to represent and control for institutional differences and also in the design of research studies to ensure adequate representation of sampled institutions, students, or faculty." The Carnegie Foundation for the Advancement of Teaching, 2006.

Services and Activities Offered by McNair Grantees

A goal of the McNair Program is to provide participants with educationally enriching scholastic experiences that will prepare them for graduate studies. ED does not prescribe the types of services or activities that McNair grantees must provide for participating students; as a result, the offerings of these programs vary. Survey respondents were asked for their perceptions of the helpfulness of McNair Program services they received as undergraduates, once they were enrolled in graduate school. The results are presented in Table 2-2. On a scale of 1 to 4, with 4

being the most positive endorsement, the lowest average rating of any service received by a McNair participant as an undergraduate was 2.95. Their ratings indicate that McNair participants found the services they received during their enrollment in the McNair Program to be beneficial during their graduate studies.

Table 2-2. Perceived Helpfulness of Selected McNair Program Services by Participants' Level of Academic Attainment

Perceived Helpfulness of Services	Bachelor's Degree	Master's Degree	Doctoral Degree	Professional Degree	Doctoral and Professional Degree
Career counseling	3.44	3.47	3.48	3.38	3.73
Instruction: library resources	3.48	3.44	3.46	3.29	4.00
Seminars: developing research skills	3.45	3.53	3.60	3.26	3.73
Seminars: networking	3.63	3.40	3.44	3.49	NR
Seminars: scientific methods	3.44	3.47	3.48	3.38	3.73
Special for-credit courses	3.64	3.51	3.62	3.34	3.28
Workshops: improve study skills	3.51	3.46	3.30	3.40	3.00
Workshops: improve test-taking skills	3.39	3.37	3.34	2.95	3.00
Workshops: improve time management	3.53	3.30	3.35	3.24	3.00
Workshops: writing skills	3.53	3.57	3.43	3.49	3.62

Source: Weighted McNair survey data (fall 1989–spring 2000).
Notes:
1. Scores range from 1 to 4; 4 = very helpful, 3 = somewhat helpful, 2 = not very helpful, 1 = not at all helpful.
2. Bachelor's degree group includes participants whose highest degree is a bachelor's degree and who are currently enrolled in graduate school. Master's, doctoral, professional, and doctoral and professional degree groups include all participants whose highest degree is a master's doctoral, professional, and doctoral and professional degree respectively.
3. Ns vary, depending on the number of participants who responded "don't know."

NR = no responses.

Similarly, respondents perceived the research-related McNair Program activities they received as undergraduates to be helpful during their graduate studies. Table 2-3 presents the perceived helpfulness of selected program activities and opportunities. On a scale of 1 to 4, with 4 being the most positive endorsement, the lowest average rating of any activity was 3.45.

Table 2-3. Perceived Helpfulness of Selected McNair Research-Related Program Activities Received by Participants' Level of Academic Attainment

Perceived Helpfulness of Activities	Bachelor's Degree	Master's Degree	Doctoral Degree	Professional Degree	Doctoral and Professional Degree
Faculty mentor	3.47	3.67	3.63	3.67	3.45
Publish papers	3.68	3.69	3.84	3.49	4.00
Summer research activities	3.63	3.84	3.71	3.50	3.73
Work on faculty research	3.66	3.70	3.76	3.59	3.73

Source: Weighted McNair survey data (fall 1989–spring 2000).
Notes:
1. Scores range from 1 to 4; 4 = very helpful, 3 = somewhat helpful, 2 = not very helpful, 1 = not at all helpful.
2. Bachelor's degree group includes participants whose highest degree is a bachelor's degree and who are currently enrolled in graduate school. Master's, doctoral, professional, and doctoral and professional degree groups include all participants whose highest degree is a master's doctoral, professional, and doctoral and professional degree respectively.
3. Ns vary, depending on the number of participants who responded "don't know."

Chapter 3. Educational and Employment Outcomes

This chapter discusses findings related to the educational and employment outcomes reported by former McNair Program participants. As part of the educational outcomes assessment, we looked at both doctoral degree and professional degree recipients in terms of gender, race and ethnicity, eligibility criteria, disciplines in which the doctorate or professional degree was earned, and the status of McNair participants still pursuing degrees. In assessing employment outcomes of doctoral and professional degree recipients, we looked at the extent to which McNair alumni joined the staff and faculty of institutions of higher education, their employment earnings, and the employment status of nondoctoral degree participants. Recall that much of the outcome data is based on the self-reports of the survey respondents.

Educational Outcomes

A central goal of the McNair Program, as reflected in its authorizing legislation, is to increase the number of doctoral degrees completed by students from disadvantaged and underrepresented backgrounds. Therefore, answering the question, "To what extent do McNair Program participants earn doctoral degrees?" was a primary focus of this study. To answer this question, we used data from the ED Annual Performance Reports (APR) obtained from McNair grantees to provide the base sample for a survey of McNair Program participants.

McNair Program Doctoral Recipients

The survey population was initially identified on the basis of APR-reported McNair Program participants who were enrolled in the program between 1989 and 2000. Data reflecting the highest degree obtained were available from the APRs and from updates provided by grantees for the years 1989 to 2003. Fifteen grantees also provided data on participants who enrolled in the McNair Program between 2001 and 2003, and those individuals were included in the survey sample frame. From this population, three cohorts of participants were created—an early cohort of former participants in the McNair Program between 1989 and 1993, a middle cohort of former participants in the program between 1994 and 1998, and a late cohort of participants who joined the program after 1999.

We assumed that enough time had elapsed for some of the participants in the early and middle cohorts to have completed their doctoral studies at the time of our study in 2004. Therefore, those two cohorts are the focus of our analysis of doctoral completion rates. Table 3-1 presents estimates of the extent to which early and middle cohort McNair participants completed doctoral degrees (Ph.D.s and other doctorates) based on data from the McNair participant survey and from the APRs, without the survey. All of the following discussion in this chapter focuses on the results from the survey of participants, which reflects the most updated information available.

Survey results indicate that 14.4 percent of the early cohort of 1,807 former McNair participants reportedly had earned doctorates, and 3.9 percent of the middle cohort of 7,122 former participants indicated that they had earned doctorates. Combined, 6.1 percent of former McNair participants from the early and middle cohorts reported that they had obtained a doctoral degree by 2003. As expected, none of the participants in the late cohort indicated that they had obtained a doctoral degree.

Table 3-1. McNair Program Participants from 1989 to 1998 Who Earned a Doctorate by 2003

Data Source	Doctoral Degrees					
	Total		Ph.D.		Other Doctorate	
	N	%	N	%	N	%
APR—Nonsurvey (N = 8,860)	286	3.2	—	—	—	—
Early Cohort (1989 to 1993) (N = 2,115)	169	8.0	—	—	—	—
Middle Cohort (1994 to 1998) (N = 6,745)	117	1.7	—	—	—	—
McNair Participant Survey (N = 8,929)	541	6.1	319	3.6	222	2.5
Early Cohort (1989 to 1993) (N = 1,807)	261	14.4	138	7.6	123	6.8
Middle Cohort (1994 to 1998) (N = 7,122)	280	3.9	181	2.5	99	1.4

Source: Weighted McNair survey data for the participant survey (fall 1989–spring 2000) and APR-reported data for the nonsurvey data year.
Note: APR reports do not distinguish Ph.D. from other doctorates.

Characteristics of McNair Program Doctoral Recipients

In absolute numbers, women reportedly earned more doctoral degrees (Ph.D. and other doctorates combined) than male program participants. This finding, presented in Table 3-2, is not surprising, in view of the fact that more women participate in the McNair Program than men. However, it is important to note that, despite their lower absolute level of program participation, male McNair participants reportedly earned doctoral degrees at a higher rate than women. Although males represent 33 percent of McNair participants, as noted in Chapter 1, they reported earning 48 percent of the doctoral degrees (Ph.D. and other doctorates combined), based on the survey findings. Women, representing 67 percent of McNair participants, reportedly earned 52 percent of the combined Ph.D. and other doctoral degrees.

Table 3-2. Doctoral Degrees by Gender and Type of Doctorate

Characteristics	Doctoral Degree Recipients					
	Combined (N = 541)		Ph.D. (N = 319)		Other Doctorates (N = 222)	
	N	(%)	N	(%)	N	(%)
Gender						
Male	261	(48.2)	190	(59.5)	71	(31.9)
Female	280	(51.8)	129	(40.5)	151	(68.1)
Missing	---	---	---	---	---	

Source: Weighted McNair survey data (fall 1989–spring 2000).

In comparison to their representation in the McNair Program, whites and Asians, who are not considered underrepresented minorities, were overrepresented among those McNair survey respondents who reportedly obtained doctoral degrees while blacks and Hispanics were underrepresented (Table 3-3). Whites constitute about 19 percent of the McNair Program but indicated that they earned over 42 percent of the doctoral degrees (Ph.D. and other doctorates combined). Blacks, who represent 44 percent of program participants, reportedly earned about 26 percent of doctoral degrees. Hispanics, who make up about 25 percent of McNair Program participants, indicated that they earned about 16 percent of doctoral degrees.

Table 3-3. Doctoral Degrees by Race or Ethnicity and Type of Doctorate

Characteristics	Doctoral Degree Recipients					
	Combined (N = 541)		Ph.D. (N = 319)		Other Doctorates (N = 222)	
	N	(%)	N	(%)	N	(%)
Race or Ethnicity						
White	230	42.5	136	42.8	94	42.3
Black	140	25.9	80	25.0	60	27.0
Hispanic	85	15.7	60	18.8	25	11.5
Asian	36	6.7	20	6.4	16	7.0
American Indian*	26	4.8	8	2.5	18	7.9
Mixed/Other	18	3.3	9	2.9	9	4.2
Refused/Missing	6	1.1	6	1.8	0	0.0

Source: Weighted McNair survey data (fall 1989–spring 2000).
*Includes American Indian, Alaska Native, Native Hawaiian, and other Pacific Islanders.

Study findings indicated that more low-income and first-generation program alumni held doctoral degrees (Ph.D. and other doctorates combined) than underrepresented minorities who are not low-income and first-generation (see Table 3-4). But in relation to the proportion of their number in the program, low-income and first-generation participants were slightly less likely to report having earned a doctorate. Low-income and first-generation alumni reportedly earned about 63 percent of the doctoral degrees; however, they represent about 71 percent of all McNair Program participants.

Table 3-4. Doctoral Degrees by Eligibility Criteria and Type of Doctorate

Characteristics	Doctoral Degree Recipients					
	Combined (N = 541)		Ph.D. (N = 319)		Other Doctorates (N = 222)	
	N	(%)	N	(%)	N	(%)
Eligibility						
Low-income and first-generation	340	62.8	186	58.3	154	69.5
Underrepresented minorities, not low-income and first-generation	201	37.2	133	41.7	68	30.5
Missing	—	—	—	—	—	—

Source: Weighted McNair survey data (fall 1989–spring 2000).

McNair Program Professional Degree Recipients

The survey also provided information on McNair alumni who had earned professional degrees. Included in the category of professional degrees are degrees in law, medicine, pharmacy, chiropractic medicine, and osteopathic medicine. Because some professional degrees require fewer years to complete than doctoral degrees, we report data from all three cohorts for the professional degree recipients.

The study findings shown in Table 3-5 indicate that approximately 6.4 percent of former McNair Program participants reportedly earned professional degrees. The survey found that from the early cohort subpopulation of 1,807 former McNair participants, 12.5 percent indicated that they had earned a professional degree; from the middle cohort of 7,122 former participants, 6.7 percent said they had earned a professional degree; and from the late cohort of 3,631, 2.8 percent of McNair alumni reported having earned a professional degree. Of particular interest are the findings that a larger number of McNair participants completed professional degrees than doctoral degrees, and some were able to do so in a shorter period of time.

Table 3-5. 1989–2000 McNair Program Professional Degree Recipients

Data Source		Professional Degree Recipients	
		N	%
APR		505	4.0
	Early Cohort (1989 to 1993)	171	8.1
	Middle Cohort (1994 to 1998)	272	4.0
	Late Cohort (1999 to 2003)	62	1.7
McNair Survey		802	6.4
	Early Cohort (1989 to 1993)	225	12.5
	Middle Cohort (1994 to 1998)	477	6.7
	Late Cohort (1999 to 2003)	100	2.8

Source: Weighted McNair survey data year (fall 1989–spring 2000).

Study findings show that a higher percentage of male than female McNair alumni reported holding professional degrees. This is contrary to study findings for McNair alumni that hold doctorates. In terms of eligibility, most degree recipients were low-income, first-generation former participants. In terms of race and ethnicity, most degree recipients were underrepresented minorities who were not low-income and first generation. Table 3-6 presents the demographic characteristics of McNair professional degree recipients.

Table 3-6. Professional Degree Recipients by Sociodemographic Characteristics and Data Source

Characteristics	Professional Degree Recipients (N = 802)	
	N	(%)
Gender		
Male	448	55.9
Female	354	44.1
Missing	—	—
Race/Ethnicity		
White	112	14.0
Black	375	46.7
Hispanic	99	12.3
Asian	92	11.5
American Indian*	13	1.6
Mixed	107	13.4
Refused/Missing	4	0.5
Eligibility		
Low-income & first-generation	469	58.5
Underrepresented minorities	333	41.5
Missing	—	—

Source: Weighted McNair survey data year (fall 1989–spring 2000).
*Includes American Indian, Alaska Native, Native Hawaiian, and other Pacific Islanders.

Disciplines of Doctoral and Professional Degrees

Former McNair Program participants reported receiving their doctoral degrees in an array of disciplines. The largest percentage of doctoral degrees earned by former participants was reportedly in the life sciences—for example, biochemistry, microbiology, agronomy, etc.—(26.0 percent). McNair doctoral recipients were also concentrated in social sciences (24.1 percent) and physical sciences (14.6 percent). Those who earned professional degrees most often held doctorates of jurisprudence (55.3 percent), medicine (26.3 percent), and osteopathic medicine (8.7 percent). Tables 3-7 and 3-8 present the disciplines in which former McNair Program participants reported earning doctoral and professional degrees.

Table 3-7. Disciplines of Doctoral Degrees

	Total (N = 541)		Ph.D. (N = 319)		Other Doctorate (N = 222)	
Field of Study	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**
Life Sciences	140	26.0	77	24.3	63	28.5
Social Sciences	130	24.1	79	24.8	51	23.1
Professional/Other*	85	15.6	59	18.5	26	11.5
Physical Sciences	79	14.6	50	15.6	29	13.1
Humanities	51	9.4	48	15.1	3	1.2
Education	29	5.4	3	0.85	26	11.8
Engineering	27	4.9	3	0.85	24	10.8

Source: Weighted McNair survey data (fall 1989–spring 2000).
* The "Professional/Other" category represents doctoral degrees awarded in business management and administrative services, communications, and professional fields such as architecture, law, library science, and social work. These are not considered among professional degrees.

Table 3-8. Disciplines of Professional Degrees

Field of Study	Professional Degrees (N = 802)	
	N	**%**
Law (J.D.)	444	55.3
Medicine (M.D.)	211	26.3
Osteopathic Medicine (D.O.)	70	8.7
Other	36	4.5
Pharmacy (Pharm.D.)	27	3.4
Chiropractic (D.C. or D.C.M.)	14	1.8

Source: Weighted McNair survey data (fall 1989–spring 2000).

Factors Contributing to Degree Completion Among Doctoral Recipients

To look more closely at factors contributing to the completion of the doctoral degree among McNair Program participants, we conducted a multivariate logistic regression, using data from the McNair survey, to examine the relative contribution of individual, institutional, and McNair

Program services. The dependent variable in this model was the completion of a doctoral degree (either Ph.D. or other doctorate) or not. Although the unadjusted analysis suggested a number of possibly significant factors, the adjusted analysis indicated that only the following two factors significantly (that is, $p < 0.05$) increased the likelihood of completing a degree:

- Working 12 hours a week or less as an undergraduate compared to those who worked more than 12 hours per week

- Working with a faculty mentor who was perceived as helpful as opposed to a mentor who was not perceived as helpful

Appendix C contains the full results of the logistic regression.

Educational Attainment of McNair Participants Without Doctoral Degrees

Although this study focuses on the receipt of doctoral degrees by McNair Program participants, we also looked at their other educational attainments in order to examine the pipeline of potential doctoral students. For this portion of the analysis, we used the total sample of respondents from all three cohorts. For that reason, the percentages of doctoral and professional degree recipients discussed in this section are not comparable with those rates presented earlier in this chapter when we focused only on the early and middle cohorts.

Based on reports from the survey respondents, the highest degree attained by 47.3 percent of McNair participants was a bachelor's degree, the highest degree for 39.7 percent was a master's, and only 2.4 percent had attained no degree at the time of the study (see Table 3-9).

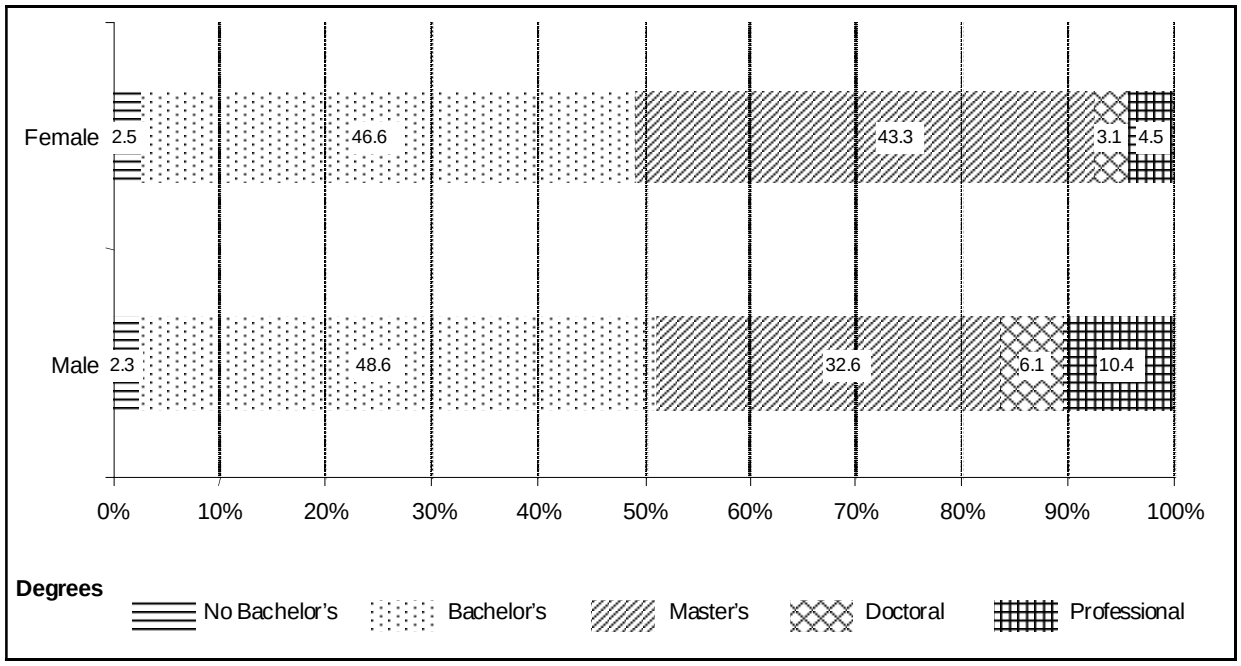
Table 3-9. Educational Attainment of the Total Pool of McNair Participants, 1989–2003

Highest Degree Attained	McNair Participant Total (N = 12,530)	
	N	%
No Bachelor's	298	2.4
Bachelor's	5,922	47.3
Master's	4,980	39.7
Doctoral or Professional	1,330	10.6

Source: Weighted McNair survey data (fall 1989–spring 2000).

We also looked at educational attainment of McNair Program participants by gender, race and ethnicity, and eligibility criteria. Figures 3-1 through 3-3 display these results. Similar percentages of men and women reported completing bachelor's degrees. However, as seen in Figure 3-1, a larger proportion of women (43.3 percent) than men (32.6 percent) reported completing master's degrees while a larger proportion of men (16.5 percent) than women (7.6 percent) indicated that they had completed doctoral and professional degrees, combined.

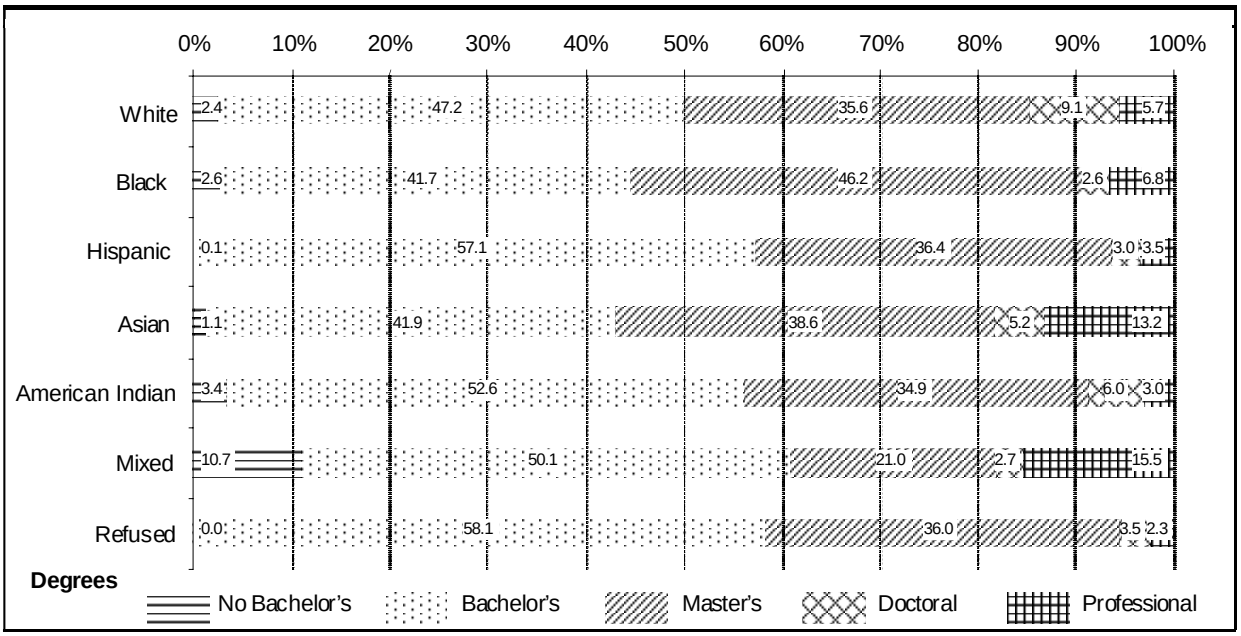
Figure 3-1. Educational Attainment of McNair Participants, by Gender



Source: Weighted McNair survey data (fall 1989–2000).

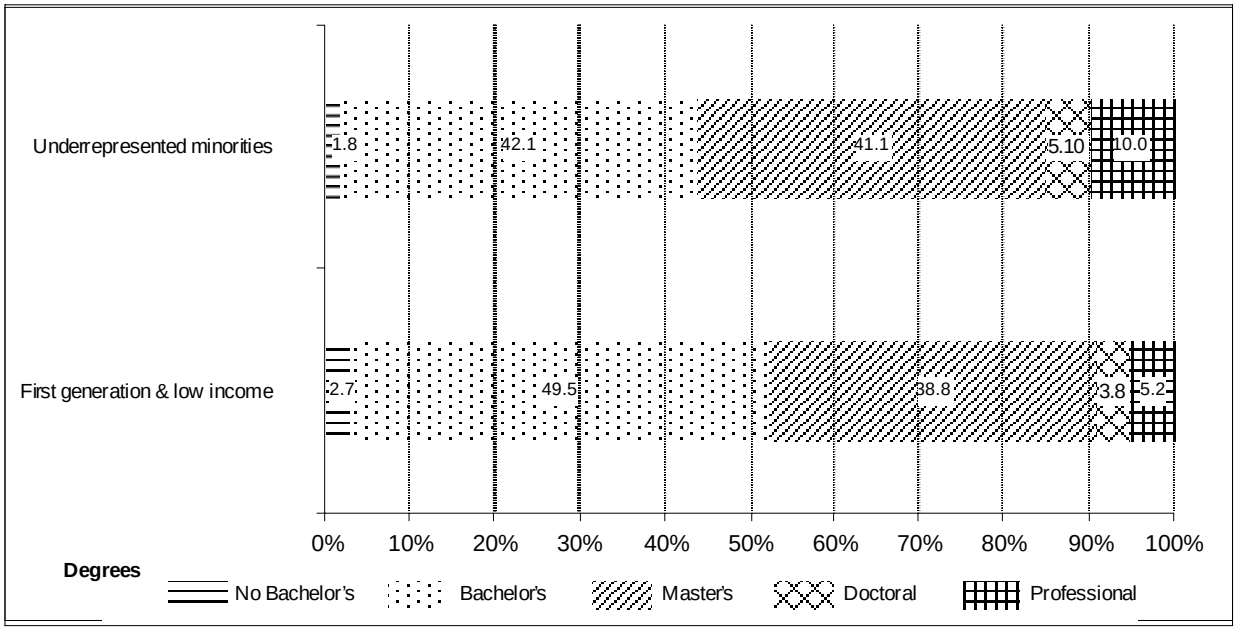
Similar to the results for gender, there were also differences reported in educational attainment by race and ethnicity (see Figure 3-2). Mixed race (15 percent) and Asian (13 percent) participants were more likely to report having a professional degree; blacks (46 percent) were more likely to report having a master's degree; and Hispanics (57 percent) were more likely than others to indicate that they had received a bachelor's degree as the highest degree obtained. Underrepresented minorities—blacks, Hispanics, American Indians, and mixed race participants—were more likely (56 percent) than low-income and first-generation respondents to report having an advanced degree, (48 percent) (see Figure 3-3).

Figure 3-2. Educational Attainment of McNair Participants, by Race and Ethnicity



Source: Weighted McNair survey data (fall 1989–2000**).**

Figure 3-3. Educational Attainment of McNair Participants, by Eligibility Criteria



Source: Weighted NcNair survey data (fall 1989–2000).

Continuing Graduate Studies of McNair Participants Without Doctoral Degrees

A recent report by Hoffer and Welch (2006) indicates that, on average, people who earned their doctoral degrees between 1989 and 2003 were registered as graduate students for 7.1 to

7.5 years. Therefore, it is not unreasonable to expect that many McNair participants would be still pursuing degrees during the timeline of our study. As a result, another major question for this study was, “To what extent are program participants still pursuing doctoral studies?”

Of the 47.3 percent of McNair alumni whose highest degree reportedly was a bachelor’s degree (see Table 3-9), 62.4 percent indicated that they were enrolled in graduate school, and of these, 62.9 percent said they were enrolled in master’s programs, 21.7 percent were reportedly enrolled in doctoral programs, and 9.8 percent said they were enrolled in professional degree programs (see Table 3-10).

Of the 39.7 percent of former McNair participants whose highest degree was a master’s (see Table 3-9), 28.4 percent were enrolled in graduate school. Of those, 73.8 percent were enrolled in doctoral programs, 19.2 percent were pursuing an additional master’s degree, and 7.1 percent were pursuing professional degrees (see Table 3-10).

Table 3-10. Degrees Being Pursued by McNair Participants with Bachelor's or Master's Degrees

Degrees Being Pursued	Degree Completed			
	Bachelor's N = 5,922		Master's N = 4,980	
	N	%	N	%
Total Currently in Graduate School	**3,698**	**62.4**	**1,414**	**28.4**
Masters	**2,327**	**62.9**	**271**	**19.2**
Business Administration (M.B.A.)	324	13.9	5	1.8
Science (M.S.)	324	13.9	0	0.0
Arts (M.A.)	59	2.5	41	1.5
Education (M.Ed.)	311	13.4	67	24.7
Public Administration (M.P.A.)	45	1.9	0	0.0
Public Health (M.P.H.)	14	<1.0	3	1.1
Applied Arts (M.A.A.)	0	0.0	8	2.9
Teaching (M.A.T.)	14	<1.0	0	0.0
Divinity (M.Div.)	14	<1.0	11	4.0
Social Work (M.S.W.)	128	5.5	0	0.0
Other Master's	1,094	47.0	136	50.0
Doctoral	**804**	**21.7**	**1,043**	**73.8**
Philosophy (Ph.D.)	61	7.6	78	7.5
Education (Ed.D.)	0	0.0	140	13.4
Business Administration (D.B.A).	0	0.0	8	<1.0
Engineering (D.Eng.)	0	0.0	48	4.6
Public Administration (D.P.A.)	27	3.4	6	<1.0
Science (D.Sc. or S.Cd.)	151	18.8	23	2.2
Psychology (Psy.D.)	33	4.1	76	7.3
Other	532	66.2	664	63.7
Professional Degree	**567**	**9.8**	**100**	**7.0**
Dentistry (D.D.S. or D.M.D.)	1	<1.0	0	0.0
Medicine (M.D.)	218	38.4	41	41.0
Osteopathic Medicine (D.O.)	0	0.0	9	9.0
Pharmacy (Pharm.D.)	18	3.2	0	0.0
Podiatry (D.P.M. or Pod.D.)	0	0.0	6	6.0
Law (J.D.)	162	28.6	36	36.0
Theology (D.D. [Divinity] or D.T.)	8	1.4	0	0.0
Other	160	28.2	8	8.0

Source: Weighted McNair survey data (fall 1989–2000).

As shown in Table 3-11, approximately 73 percent of McNair alumni reported having ever enrolled in graduate school at some time since receiving their bachelor's degree. As a point of reference, NCES' Baccalaureate and Beyond Longitudinal Study of bachelor's degree recipients found that five years after they received their degree, 39 percent had taken a graduate admissions exam, and 30 percent had enrolled in a graduate program (McCormick, et al, 1999). The findings

from this survey of former McNair participants indicate a higher rate of graduate school enrollment among this group than among other bachelor degree recipients.

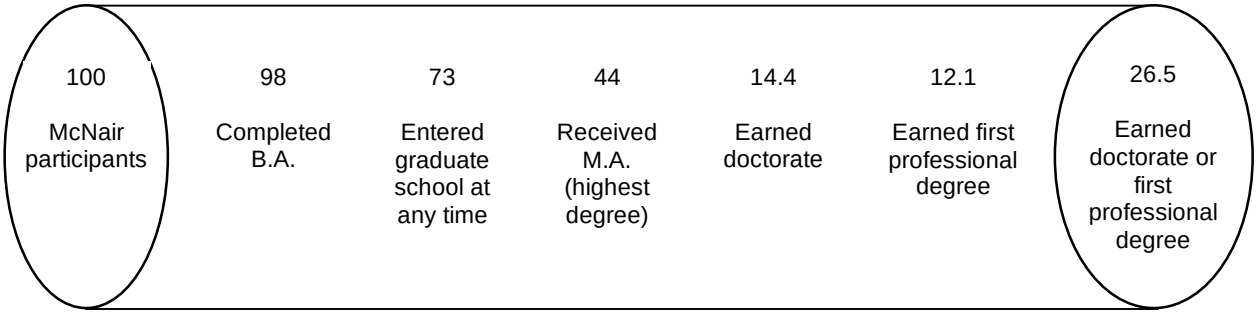
Table 3-11. Educational Attainment of McNair Alumni, by Cohort, by mid-2004

Cohort	Number in Cohort (N = 12,560)	% No Bachelor's Degree (N = 298)	% Bachelor's Degree (highest degree) (N = 5,937)	% Master's Degree (highest degree) (N = 4,980)	% Ph.D. or other doctoral degree at the time of study (N = 541)	% Ph.D., Other Doctorate, or Professional Degree (N = 1,341)[a]	% in Graduate School at Time of Survey (N = 3,798)	% Ever Enrolled in Graduate School (N = 9,184)
All Cohorts Combined	12,560	2.4%	47. 3%	39.6%	4.3%	10.7%	30.2%	73.1%
Early Cohort	1,807	1.8	27.4	44.3	14.4	26.5	16.0	75.1
Middle Cohort	7,122	2.2	43.4	43.7	3.9	10.7	26.0	74.0
Late Cohort	3,631	3.0	64.8	29.4	NA	NA	45.6	70.3

[a] Four individuals reported earning both a research doctorate (Ph.D. or other doctorate) and a professional degree.
NA—insufficient time elapsed since program entry.

Figure 3-4 graphically presents a pipeline for producing low-income, first-generation and underrepresented minority doctorate or first professional degree recipients from an average of 100 McNair Program participants who had been in the program at least 10 years before the time of the study survey (the early cohort). This breakdown depicts survey findings converted from percentages to reflect a typical set of 100 McNair participants.

Figure 3-4. Pipeline of Doctoral or First Professional Degree Attainment of Early Cohort Participants (1989–93) by 2004—per Typical 100 McNair Program Participants at Least 10 Years After Program Participation



Source: Percentages derived from analysis of McNair survey 2004–06.

Employment Outcomes

In assessing employment outcomes, we asked former McNair Program participants a series of questions about their employment experiences, focusing on positions in higher education, position responsibilities, and earnings. This section highlights study findings on those topics.

McNair Program Doctoral Recipients and Employment in Institutions of Higher Education

The survey queried McNair participants about employment within institutions of higher education. Specifically, we were interested in knowing the extent to which former McNair Program participants who were doctoral recipients joined institutions of higher education in either a faculty or research position.

As shown in Table 3-12, among all respondents, 29 percent said that they were employed in higher education. However, among those McNair participants with either a Ph.D. or other doctorate, 65 percent reportedly were employed in higher education (75 percent of the Ph.D. recipients and 50 percent of other doctoral degree holders). Only 4.4 percent of the professional degree recipients indicated that they were employed by institutions of higher education.

Table 3-12. Employment Status of McNair Doctoral and Professional Degree Recipients

Employer	Overall (N = 1,332)		Ph.D. (N =319)		Other Doctorates (N = 222)		Professional Degree (N = 791)	
	N	(%)	N	(%)	N	(%)	N	(%)
Higher Education	386	29.0	240	75.1	111	50.2	35	4.4
Outside of Higher Education	862	64.7	65	20.4	107	48.6	690	87.2
Not Working	84	6.3	14	4.5	4	1.2	66	8.5

Source: Weighted McNair survey data (fall 1989–spring 2000).
Note: Ns are slightly lower than in previous tables due to missing employment status data.

Table 3-13 presents the type of higher education institution in which McNair doctoral and professional degree recipients reportedly were employed, regardless of their faculty status. Most doctoral and professional degree recipients reported being employed in four-year colleges or universities; among professional degree recipients, a sizable proportion were also employed in medical schools.

Table 3-13. McNair Doctoral and Professional Degree Recipients Employed in Higher Education

	Overall		Ph.D.		Other Doctorates		Professional Degree	
	N	(%)	N	(%)	N	(%)	N	(%)
Total employed in higher education	386	100.0	240	62.9	111	25.1	35	12.0
Type of Institution								
Four-year college or university	362	93.8	233	97.0	107	95.3	23	73.5
Medical school	17	4.5	5	2.2	0	0.0	12	26.5
Junior or community college	7	1.7	2	0.8	5	4.7	0	0.0

Source: Weighted McNair survey data (fall 1989–spring 2000).

Table 3-14 focuses on the current academic rank and tenure status of doctoral and professional degree recipients who were employed in higher education as faculty members at the time of the survey. Of those doctoral and professional degree holders employed in institutions of higher education, approximately 69 percent reportedly were on the faculty (267 out of 386 higher education employees). Most of those not in faculty positions reported conducting research in university-based research centers. The remainder indicated that they provided clinical services or were employed in administration. 75 percent of Ph.D. holders and 65 percent of doctoral degree recipients employed in higher education were in faculty positions. Approximately 40 percent of professional degree holders employed in higher education said than they were on the faculty.

While the majority of Ph.D. and other doctoral degree recipients on faculties were reportedly in tenure-track positions, we estimate that only 2 percent had obtained tenure. Given that obtaining tenure takes, on average, at least five or six years, the percentage with tenure is not surprising. The majority of professional degree recipients indicated that they were not in tenure-track positions and none held tenured faculty positions.

Table 3-14. Rank and Tenure Status of McNair Doctoral and Professional Degree Recipients on the Faculty at Institutions of Higher Education

	Overall		Ph.D.		Other Doctorates		Professional Degree	
	N	(%)	N	(%)	N	(%)	N	(%)
Employed in Higher Education	386	100.0	240	100.0	111	100.0	35	100.0
In faculty position	267	69.2	181	75.4	72	64.9	14	40.0
Currently on faculty	267	100.0	181	100.0	72	100.0	14	100.0
Professor/Associate Prof	9	2.7	3	1.7	6	8.3	0	0.0
Assistant professor	250	93.6	178	98.3	64	88.9	8	57.1
Instructor/Lecturer	8	2.5	0	0.0	2	2.8	6	42.9
Tenure status of faculty	267	100.0	181	100.0	72	100.0	14	100.0
Tenured	6	2.2	3	1.6	3	4.3	0	0.0
Tenure-track	169	63.3	114	63.0	51	70.8	4	28.6
Not on tenure-track	54	20.2	28	15.5	16	22.2	10	71.4
Tenure status unknown	38	14.2	36	19.9	2	2.7	0	0.0

Source: Weighted McNair survey data (fall 1989–spring 2000).

McNair Doctoral and Professional Degree Recipients Not Employed as Faculty Members in Institutions of Higher Education

Table 3-15 presents the types of employers by whom Ph.D., other doctoral, and professional degree recipients are reportedly employed outside of academia. The largest concentration of Ph.D. (66.2 percent), other doctoral (65.4 percent), and professional degree recipients (60.0 percent) not employed in higher education at the time they completed the survey was in industry or business.

Table 3-15. Employment of McNair Doctoral Recipients Outside of Higher Education

Employer Type	Overall N = 862		Ph.D. N = 65		Other Doc N = 108		PD N = 689	
Elem. or secondary school	53	6.2	5	7.3	8	7.8	40	5.9
U.S. federal government	89	10.3	0	0.0	6	5.5	83	12.1
U.S state government	61	7.2	3	5.5	2	1.9	56	8.1
U.S. local government	9	1.0	4	5.9	2	1.9	3	0.4
Nonprofit	28	3.2	3	4.1	13	12.1	12	1.8
Industry or business	528	61.2	43	66.2	71	65.4	414	60.0
Self employed	94	10.9	7	11.0	6	5.4	81	11.7

Source: Weighted McNair survey data (fall 1989–spring 2000).

Earnings

Among McNair survey respondents who worked outside of higher education, all who had earned Ph.D.s or other doctorates and 97.3 percent of those who had earned professional degrees cited the level of debt incurred as students as one of the most important factors influencing their decisions to seek employment outside of higher education.

Table 3-16 highlights the amount of current earnings among Ph.D., other doctoral, and professional degree recipients by type of employer. McNair graduates who held other doctoral degrees and who did not work in higher education reported earning significantly more than those who were employed in higher education ($F_{OD} = 12.01$; $p > 0.01$). The other differences in earnings shown in Table 3-16 were not significantly different.

Table 3-16. Earnings for 2003 Among McNair Participants with Doctoral or Professional Degrees, by Employment Status

Degree	Employed in Higher Education	Not Employed in Higher Education	P-value*
Doctorate of Philosophy	$54,261	$60,875	0.26
Other Doctorate	$53,548	$76,071	<0.01
Professional Degree	$59,062	$69,854	0.22

Source: Weighted McNair survey data (fall 1989–spring 2000).
Note: The mean amount earned was calculated on the basis of the median value of the reported range. Participants who indicated that they earned less than $29,999 were assigned a value of $20,000, and those who indicated that they earned more than $100,000 were assigned a value of $110,000.
*Statistically not significant.

Table 3-17 highlights the amount of accumulated educational debt reported among Ph.D., other doctoral degree, and professional degree recipients by type of employer. With regard to reported levels of undergraduate and graduate debt, there were no statistically significant differences between McNair graduates employed in higher education and those not employed in higher education, although the difference for Ph.D. degree holders approached statistical significance at p =.06 and was quite substantial.

Table 3-17. Educational Debt Among McNair Participants with Doctoral or Professional Degrees, by Employment Status

Degree	Employed in Higher Education	Not Employed in Higher Education	P-value*
Doctorate of Philosophy	$27,877	$57,375	0.06
Other Doctorate	$21,015	$30,862	0.28
Professional Degree	$73,034	$81,631	0.61

Source: Weighted McNair survey data (fall 1989–spring 2000).
Note: Initial response options for the question probing "amount owed" were based on ranges; however, respondents who owed over $30,000 (roughly 60 percent) indicated the exact amount owed. The mean was calculated by using the exact amount reported for the 60 percent of respondents who owed $30,000 or more and the median value of the reported range for the other 40 percent of respondents who owed less than $30,000.
* Statistically not significant.

Employment of McNair Participants Without Doctoral Degrees

In looking at the employment patterns among McNair Program doctoral recipients, we gained useful information about the employment status of students who entered the McNair Program but for whom there is no evidence of an earned research doctorate or other doctoral or professional degree.

Not surprisingly, reported employment levels were higher among master's and bachelor's degree recipients who were not enrolled in school than employment levels of their peers who were enrolled in school. Among those not in school, 83.8 percent of bachelor's degree recipients and 93.6 percent of master's degree recipients reportedly were working. Of the master's and bachelor's degree recipients currently in school, the majority, 76.6 percent and 62.6 percent respectively, indicated that they were working. Table 3-17 presents the employment status of McNair participants who have not completed doctoral or professional degrees.

Regardless of whether they were in school or not, master's degree recipients reported the highest levels of employment. When compared to the employment levels of individuals with bachelor's degrees, employment levels among those with master's degrees were more than 10 percentage points higher (see Table 3-18).

Table 3-18. Employment Status of McNair Participants Without Doctoral Degrees

Degree Held	Employed (%)	Not Employed (%)
Master's degree recipients (N = 4,984)	89.2	10.8
Currently enrolled in school (N = 1,181)	76.6	23.4
Not currently enrolled (N = 3,605)	93.6	6.4
Missing (no response) (N = 99)	92.3	7.7
Bachelor's degree recipients (N = 5,937)	75.2	24.8
Currently enrolled in school (N = 2,456)	62.8	37.2
Not currently enrolled (N = 3,429)	83.8	16.2
Missing (no response) (N = 51)	100.0	0.0
No bachelor's degree (N = 305)	87.0	13.0

Source: Weighted McNair survey data (fall 1989–2000).

Chapter 4. Summary of Findings

This chapter summarizes the study findings about the educational and employment outcomes of individuals who participated in the McNair Program, focusing on the research questions.

To what extent do McNair Program participants earn doctoral degrees?

Overall, among former McNair participants who had sufficient time to earn a doctorate degree at the time of this study, 6.1 percent reportedly had earned their doctorates. As expected, the rate for earning a doctorate increased the more time that had elapsed since participating in the McNair Program. For students in the program between 1989 and 1993, 14.4 percent reportedly had earned doctorates, and 3.9 percent of participants in the program between 1994 and 1998 reported having earned a doctoral degree. None of the participants in the program between 1999 and 2003 indicated that they had earned a doctoral degree.

To what extent are program participants still pursuing doctoral studies?

Of the 62 percent of former McNair participants who were enrolled in graduate school at the time of the study, approximately 22 percent indicated that they were in doctoral programs, and 15 percent reported that they were pursuing professional degrees.

The findings from this survey of former McNair participants suggest a high percentage (73 percent) of McNair participants with bachelor's degrees had enrolled in graduate school at some time within a five- to seven-year period after receiving their bachelor's degree. As a point of reference, 30 percent of typical B.A. recipients surveyed in NCES' Baccalaureate and Beyond Survey entered graduate schools within five years after college graduation.

What are the characteristics of likely degree earners?

Based on the results of multivariate analyses of the likelihood of earning a doctorate, McNair Program participants who worked 12 or fewer hours per week as undergraduates and those who worked with faculty mentors whom they perceived as helpful were more likely to have earned a doctoral degree than their peers who worked more than 12 hours per week or who had faculty members whom they perceived as not helpful.

In which disciplines do McNair Program participants earn doctoral and professional degrees?

The largest percentages of doctoral degrees reportedly were earned in the life sciences (26.0 percent), social sciences (24.1 percent), or physical sciences (14.6 percent). Those who earned professional degrees most often reportedly held doctorates of jurisprudence (55.3 percent), medicine (26.3 percent), or osteopathic medicine (8.7 percent).

To what extent do McNair Program participants join faculties of higher education upon completion of the doctoral program?

Of McNair participants who completed doctoral degrees, about 65 percent indicated that they were employed in higher education. Seventy-two percent of that group reportedly were on the faculty of the institutions in which they worked. Only 4 percent of professional degree recipients indicated that they were employed in higher education. Of that group, about 40 percent were on the faculty. Overall, then, about 20 percent of McNair doctoral and professional degree recipients reported that they were faculty members in institutions of higher education.

Although the majority of Ph.D. and other doctoral degree recipients on faculties were in tenure-track positions, only six individuals indicated that they had obtained tenure. That is not surprising, considering the time it takes to obtain tenure after joining the faculty of an institution. In contrast, the majority of professional degree recipients were not in tenure-track positions, and none held tenured faculty positions. The largest proportion of doctoral and professional degree recipients who were not faculty at institutions of higher education were employed in industry or business (61.2 percent).

McNair participants with doctoral degrees other than the Ph.D. who did not work in higher education reportedly earned significantly more income than those employed in higher education. There was no statistically significant difference in the reported earnings of Ph.D. and professional degree recipients based on whether they worked in higher education or not. Similarly, McNair Program graduates who were not employed in higher education did not report significantly different education-related debt than their peers who were employed in higher education.

What is the employment status of students who entered the program but for whom there is no evidence of an earned Ph.D., other doctoral, or professional degree?

Overall, reported employment levels were higher among master's (93.6 percent) and bachelor's degree (83.8 percent) holders who were not enrolled in school compared with their peers who were enrolled in school (76.6 and 62.8 percent, respectively).

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Appendix A. Technical Notes for the Survey of 1989–2000 McNair Participants

Appendix A presents discussions of the following topics:

- Weighting adjustments
- Estimation and variance computation
- Response, cooperation, and refusal rates

Weighting Adjustments

The sampling weights properly quantify the representation of units in the frame by the units in the sample. These weights were calculated as the reciprocal of the selection probability. Weighted estimates that were computed by using these sampling weights and on the basis of a complete sample are expected to be unbiased. When nonresponse is part of the survey data, the survey estimates are calculated from only the respondents (that is, the persons who completed the survey) rather than from all sample cases. However, if the respondents and nonrespondents differ in the characteristics being surveyed, the estimates that were calculated only from the respondents may be biased.

The common method of accounting for this bias is to make nonresponse adjustments by using the weighting adjustment method. The objective of weighting adjustment is to avoid and reduce bias in the survey estimates. In this case, the sampling weights are adjusted to account for sample cases with unknown eligibility and nonrespondents.

Weighting adjustments were conducted for the McNair survey to reduce potential bias due to nonresponse. There are two types of nonresponse:

- Unit nonresponse—individuals in the sample did not complete the survey because of refusals, the inability to participate, or the interviewer's inability to locate and make contact.

- Item nonresponse—individuals in the sample did not answer individual survey items as a result of refusing to answer certain questions, responding "don't know" to certain questions, inadvertent omissions by interviewers, or unintentional data deletions during the editing process.

Unit nonresponse was addressed through weighting adjustment. Item nonresponse was not specially treated in the data analyses. Items not answered by respondents were either dropped from the analyses or presented in the tables as a category labeled "missing."

The sample was selected from the list of McNair participants (that is, sampling frame). Sampling weights that represented a specific number of units were assigned to each record in the sample. Table A-1 presents the calculations of the basic sampling weights.

Table A-1. Number of McNair Participants in the Sampling Frame and Number of Selected Participants, Sampling Fraction, and Sampling Weight by Sampling Stratum

Sampling Stratum	Sampling Frame	Selected Participants	Sampling Fraction	Sampling Weight
	N	N		
Bachelor's degree	6,537	615	0.0941	10.6293
Master's degree	1,363	580	0.4255	2.35
Doctoral and professional degree	813	813	1.0	1.0
No bachelor's degree	2,403	604	0.2514	3.9785
Total	11,116	2,612	—	—

Source: Sampling frame accessed from McNair Program Annual Performance Reports, 1989–2000.
Note: The APR and grantee updates initially identified 12,640 individuals as participants in the McNair Program during the study timeframe. However, the degree completion status of 1,524 of those cases could not be determined from either the APR or subsequent update information from the grantees. This prevented us from assigning those individuals to a sampling stratum. As a result, they were excluded from the sample frame for the study. Therefore, the final sampling universe consisted of 11,116 cases.

Some strata in the sample were over sampled; as a result, the sample was not self-weighting.

The sample adjustments were carried out in two steps. The first step adjusted for unknown eligibility in the sample due to non-contact. The second step adjusted for those eligible samples who did not respond to the survey.

The sample of 2,612 cases was partitioned into four groups based on the final survey disposition:

A = Completers (eligible sample)—1,003 cases
B = Nonrespondents, such as refusals, request do-not-call, etc.—33 cases
C = Ineligible samples, such as deceased, did not participate in McNair, or duplication records—24 cases
D = Unknown eligibility sample (due to no contact), such as busy number; no answer; fax, modem, or answering machine; wrong number; not working number; etc.—1,552 cases

Initial sample selection was based on the list of participants obtained from the McNair Annual Performance Reports (APR) data. This list, however, may not have accurately identified the target population of McNair participants. As the field data collection was conducted, some sample members were ineligible (group C) because they had not participated in McNair, were deceased, or were duplicate cases (24 out of 2,612 cases). These ineligible cases were excluded from the analyses.

In addition, there were 1,552 cases of unknown eligibility (group D). For these cases, contact could not be established; therefore, their eligibility was not confirmed. It was assumed that among the non-contacted cases in group D, there were ineligible cases as well (note that the frame still has some errors, such as the inclusion of cases that were not McNair participants, were deceased, or were duplicate cases), but unfortunately the number is unknown. The remaining eligible but non-contacted samples should be accounted for in the analysis. Hence, the first step of weighting adjustment is done to account for samples with unknown eligibility.

We made the adjustment for unknown-eligibility cases by inflating the weights of the cases with known eligibility to account for the cases with unknown eligibility. We did this by first modeling the propensity of being contacted (that is, propensity of known eligibility) by using a logistic regression in which the following variables were used as predictors:[8]

- sampling strata (educational attainment status recorded in the APR data)
- ethnicity or race
- program eligibility (low-income, first-generation college student, or underrepresented minority)

We then constructed weighting cells on the basis of estimates of propensity scores. Six weighting cells were constructed based on estimated propensity scores where the boundary between two cells was determined according to the equal-quantile method (Rosenbaum and Rubin, 1984).[9]

The sample was then partitioned into one of the six cells. For each cell, an adjustment factor was computed as a weighted ratio of all samples to the samples with known eligibility (groups A, B, and C). We produced the unknown-eligibility adjusted weights by multiplying the individual basic sampling weight with this adjustment factor. For cases in group D, we set the adjusted weight to be zero. The unknown-eligibility adjusted weights represent all eligible cases in the frame. We dropped cases in group D from the analysis.

We made the next adjustment to account for the nonrespondents (group B). The unknown-eligibility adjusted weight of cases in group A (completers or respondents) was inflated to account for cases in group B (nonrespondents). The response propensity model did not identify any variables that could be used to predict the response propensity, because among the eligible cases, only a small number did not respond to the survey (about 3.3 percent). As a result, we computed a single adjustment factor in this step as the weighted ratio of all eligible respondents (groups A and B) to the completers (group A only). We computed the nonrespondent adjusted weight as the unknown-eligibility adjusted weight, multiplied by this adjustment factor. We attached this weight to each respondent record, while the nonrespondents received a weight equal to zero. The analysis was based only on the respondents.

The last step in the weighting adjustment was controlling the weights (post-stratification) relative to known population totals based on updated APR data. We made this adjustment through the raking method, in which the sum of weights was controlled to meet population totals by gender, race or ethnicity, and program eligibility. This step produced the final survey weights that were used for the analyses.

Estimation and Variance Computation

We computed the weighted estimates of totals, percentages, and means by using the final analysis weights produced from the previous steps. The estimation method accounted for the

[8] A logistic regression model was used in which a binary variable that indicates whether or not a case is in group D was regressed with sampling strata, most recent educational attainment status based on survey, race or ethnicity, gender, and program eligibility as predictors.

[9] Rosenbaum, P. R. and Rubin, D. B. (1984), "Reducing Bias in Observational Studies Using Subclassification on Propensity Scores," *Journal of the American Statistical Association*, 79, 516–524.

stratified random sampling used in selecting the sampled cases. The sampling fraction was large in the master's degree strata. Therefore, computation of the variance incorporated the *finite population correction* (fpc) factor by defining the sample design as a *without-replacement* (WOR) sample.

In addition to estimates of totals and means presented in the body of the report, we also present the precision of the estimates computed as standard errors (that is, the square root of variances) of the estimates. For the McNair survey variance estimation, we used a design-based method that takes into account the sample design. We produced estimates of McNair survey parameters presented in the body of this report by using weighted estimation procedures that relied on the final analysis weights.

The estimate of a population total T_d of variable Y can be computed as a weighted sum of values of Y across respondents included for domain d as follows:

$$\hat{T}_d = \sum_{k \in d}^{n_d} w_k y_k$$

where

w_k = final analysis weight for respondent k,

y_k = value of variable Y for respondent k,

n_d = total number of respondents in domain d.

Examples of total estimates are:

- total number of McNair bachelor's degree holders
- total number of male McNair participants
- total number of years to complete bachelor's degrees

The estimate of the population mean or proportion (denoted by $\bar{y}$) can be computed as:

$$\bar{y}_d = \frac{\sum_{k \in d}^{n_d} w_k y_k}{\sum_{k \in d}^{n_d} w_k}$$

where the proportion variable y_k will have a value of either 0 or 1.

The following items are examples of this (ratio) type of estimate:

- percent of bachelor's degree holders
- percent of male McNair participants
- average number of years to complete bachelor's degrees

For each table presented in the body of the report, standard errors, which are the square root of variances, were computed. We computed variance estimation for the McNair survey sample by using a design-based method that took into account the sample design and sample selection probabilities—that is, a stratified random sampling without replacement (STRWOR). This variance represents the level of precision of the estimate.

When the statistic of interest is a nonlinear statistic such as the weighted mean or proportion, the variance is computed by using a Taylor Series expansion-linearization approach.[10] We used this method to compute the variance of the weighted estimates. We computed the estimates and their variances by using the statistical software SUDAAN (Research Triangle Institute, 2001).[11]

Response, Cooperation, and Refusal Rates

We computed unweighted and weighted response rates. We used the unweighted response rate to assess how successful the data collection effort was in getting responses from sample members. We used the weighted response rate to assess possible bias in the survey estimates when the nonrespondents have different characteristics than the respondents. The weighted response rate is computed by using the basic sampling weight so that a weighted response rate is an estimate of the proportion of the survey population with usable or available data.

The unweighted response rate was calculated by using the following formula:

$$\text{Unweighted Response Rate} = \frac{\text{count of completers}}{\text{count of "eligible" cases}}.$$

The weighted response rate was calculated in a similar way by using the sampling weights to get the counts:

$$\text{Weighted Response Rate} = \frac{\text{weighted count of completers}}{\text{weighted count of "eligible" cases}}.$$

Based on the survey response outcomes, the sample (2,612 cases) was partitioned into four groups:

A = Completers (eligible sample)—1,003 cases
B = Nonrespondents, such as refusals, request do-not-call, etc.—33 cases
C = Ineligible samples, such as deceased, did not participate in McNair, or duplication records—24 cases
D = Unknown eligibility sample (due to no-contact); such as busy number; no answer; fax, modem, or answering machine; wrong number; not working number; etc.—1,552 cases

[10] The variance of a nonlinear statistic cannot be computed by simply summing the within-stratum variances across strata. The Taylor Series approach will first linearize the nonlinear estimator and then use the first-order terms to get the variance components. See Wolter, K.M., *Introduction to Variance Estimation*, Springer-Verlag, New York, 1985, for such approximation methods.
[11] *SUDAAN User's Manual*, Release 8.0, Research Triangle Institute, Research Triangle Park, North Carolina, 2001.

According to the American Association for Public Opinion Research (AAPOR), the definition of response rate assumes that group D may contain some eligible cases that unfortunately could not be contacted. These cases should be taken into account when computing the response rate. Therefore, the number of eligible cases in group D must be estimated. We computed the eligibility rate by using the groups of cases with known eligibility status (that is, A, B, and C). Thus, we computed the unweighted response rate as follows:

$$\text{Unweighted Response Rate} = \frac{A}{A + B + \left(\frac{A + B}{A + B + C} \times D \right)} \times 100\%,$$

where the term (A + B) / (A + B + C) represented the eligibility rate among the contacted cases. Therefore, the unweighted response rate was computed as follows:

$$\text{Unweighted Response Rate} = \frac{1003}{1003 + 33 + \left(\frac{1003 + 33}{1003 + 33 + 24} \times 1552 \right)} \times 100\% = 39.3\%$$

The estimated number of eligible cases in the denominator of the formula is 1,003 + 33 + 1,586 = 2,552 cases. Therefore, using this formula, the unweighted overall response rate is 1,003 / 2,552 = 39.3 percent. A similar computation for a weighted response rate where the basic sampling weights were used as the weight for this computation resulted in a weighted overall response rate of 36.8 percent.

We used the formulas of the AAOPR[12] to calculate the cooperation and refusal rates.[13]

Cooperation Rate 2 (COOP2) was calculated by using the following formula:

COOP2 = (I+P) / (I+P) + R+O

$$\text{Unweighted Cooperation Rate 2} = \frac{1003}{1003 + 33 + 24} \times 100\% = 94.6\%$$

Refusal Rate 1 (REF1) was calculated by using the following formula:

REF1 = R / (I+P) + (R+NC+O) + (UH+OU)

$$\text{Unweighted Refusal Rate 1} = \frac{33}{1003 + 33 + 24 + 1{,}552} \times 100\% = 1.3\%$$

[12] *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*, The American Association for Public Opinion Research, Lenexa, Kansas, 2000.

[13] The final disposition codes used to calculate the outcome rates are defined as follows: I = complete interview; P = partial interview; R = refusal and break-off; NC = non-contact; O = other; UH = unknown if household occupied; and OU = unknown, other.

Nonresponse Bias Analyses

The overall response rate to the McNair survey was 39 percent and warranted a more detailed look at possible nonresponse bias. We used two approaches. First, we examined differences in the response rates of specific demographic subgroups for which we had consistent information from the APR data used to construct the sample. We then conducted an analysis of possible nonresponse bias in the outcome variables of interest. The results of those analyses are described in the following sections.

Analysis of differential response by demographic subgroups. Table A-2 displays differences in response rates of selected subgroups. We found significant differences in the response rates of racial and ethnic groups on the basis of degree status as indicated in the APR. Among racial and ethnic groups, Hispanics and Asians had much lower response rates, while whites and those in the mixed race or other category had higher response rates. Persons with no bachelor's degree and those with a bachelor's degree had substantially lower response rates than those with higher degrees. This suggests that caution be used in interpreting and generalizing these survey results.

Table A-2. Response Rates by Selected Demographic Subgroup

Demographic Subgroup	% Responding	P-value
Gender		.155
Male (N = 854)	37.4	
Female (N = 1,738)	38.8	
Race/ethnicity		.000
Black (N = 1,111)	37.7	
Hispanic (N = 610)	32.5	
White (N = 559)	48.3	
Asian (N = 173)	27.2	
American Indian & Pacific Islander (N = 122)	41.9	
Mixed/Other (N = 22)	45.5	
Eligibility Status		.180
Low income & first generation (N = 1,841)	37.4	
Underrepresented minority; not low income & first generation (N = 744)	30.6	
APR degree status*		.000
Bachelor's (N = 735)	34.3	
Master's (N = 708)	44.9	
Doctorate (N = 236)	43.2	
Other terminal degree (N = 219)	42.0	
No bachelor's (N = 620)	33.5	

Sources: Unweighted McNair survey data for the participant survey (fall 1989–2000), and APR reported data for the nonsurvey data.

* APR reports do not distinguish Ph.D. from other doctorates.

Analysis of differences in outcome variables. Although we do not have survey data on the educational and employment outcomes for nonresponders, we used a method cited by the National Center for Education Statistics to estimate nonresponse bias by comparing the outcomes

for early and late survey responders (Bose, 2001). We did this to address obvious concerns regarding the generalizability of the survey's findings with such a low response rate. We used the extrapolation method to investigate the relationship between specific respondent characteristics and their propensity to respond to the survey. This method assumes that late survey respondents are similar to and approximate nonrespondents; any statistically significant differences between early and late survey respondents indicate bias that can be extrapolated to nonrespondents.

Of 1,003 surveys completed between May 2004 and December 2004, 500 were completed on or before July 17, 2004. Early respondents were defined as those who completed the survey on or before July 17, 2004; late respondents were those who completed the survey after July 17, 2004.

The analyses presented in Table A-3 indicate that early and late McNair survey respondents were not significantly different. We found no systematic differences between early and late respondents to this survey on key outcome variables, suggesting that outcomes for nonrespondents are likely not to differ significantly from that of respondents. Nonetheless, because of the low response rates to the survey overall, findings should be interpreted cautiously.

Table A-3. Response Bias Among Early and Late Survey Respondents

Characteristic	N	Mean	SD	t-value	df	p-value
APR Status						
Early respondents	497	2.55	1.46	–1.86	994	.063
Late respondents	499	2.72	1.53	–1.86	992	.063
Gender						
Early respondents	500	1.65	.485	–1.076	996	.282
Late respondents	498	1.69	.477	–1.076	996	.282
Eligibility						
Early respondents	499	1.32	.477	.754	.997	.451
Late respondents	500	1.30	.472	.754	.997	.451
Employment status						
Early respondents	500	.86	.349	–.065	1000	.948
Late respondents	502	.86	.347	–.065	1000	.948

Source: Sampling frame accessed from McNair Program Annual Performance Reports, 1989–2000.

Item Response Bias

Overall item response rates were very high; once McNair participants began the interview, they answered the majority of questions asked. Among the items that queried the undergraduate experience, the question "As a McNair participant, which services were you offered?" had the lowest response rate of 95.5 percent. Among the items that dealt with the graduate school experience, the question "How many programs did you apply to before entering your program?" had the lowest response rate (98.7 percent). In the sections that covered employment experiences, the lowest item response rate was obtained for the questions about income; 94.1 percent responded to "Please stop me when I reach the income category that best represents your 2003 earnings on this job." In the demographic section of the survey, 93 percent answered "Please stop me when I reach the income category that includes your best estimate of the combined yearly household income of your family when you were an undergraduate student."

Appendix B. Unweighted Estimate Tables

Table B-1. McNair Survey Respondents by Carnegie Classification of Undergraduate Institution and Educational Attainment

Classification of Institution*	No Bachelor's Degree		Bachelor's Degree		Master's Degree		Doctoral or Professional Degree	
	N	(%)	N	(%)	N	(%)	N	(%)
Doctoral or research universities	13	76.5	215	69.4	287	70.3	166	62.4
Master's colleges and universities	3	17.6	80	25.8	102	25.0	97	36.5
Baccalaureate colleges	1	5.9	11	3.5	10	2.5	2	.7
Specialized institutions	0	.0	4	1.3	9	2.2	1	.3

Source: Data derived from McNair survey, 2004–06).

* "In 1970, the Carnegie Commission on Higher Education developed a classification of colleges and universities to support its program of research and policy analysis. Derived from empirical data on colleges and universities, the 'Carnegie Classification' was published for use by other researchers in 1973, and subsequently updated in 1976, 1987, 1994 and 2000. For over three decades, the Carnegie Classification has been the leading framework for describing institutional diversity in U.S. higher education. It has been widely used in the study of higher education, both as a way to represent and control for institutional differences, and also in the design of research studies to ensure adequate representation of sampled institutions, students, or faculty." Source: *The Carnegie Foundation for the Advancement of Teaching*, 2006.

Table B-2a. McNair Program Services Received by Participants' Level of Academic Attainment

Services Received	No Bachelor's Degree		Bachelor's Degree		Master's Degree		Doctoral Degree		Professional Degree		Doctoral and Professional Degree	
	N	(%)	N	(%)	N	(0%)	N	(%)	N	(%)	N	(%)
Academic counseling	3	75.0	167	75.6	234	78.5	56	77.8	59	68.6	1	33.3
Advising: graduate school admissions	3	33.3	211	83.1	307	88.2	91	91.9	92	86.0	4	100.0
Assistance: applying for fellowships	3	60.0	108	63.2	154	70.3	40	78.4	31	50.0	1	100.0
Assistance: graduate school applications	2	25.0	164	69.5	254	80.4	73	84.9	60	62.5	2	66.7
Business cards	0	0.0	67	83.8	56	81.2	4	57.1	16	88.9	0	0.0
Career counseling	2	33.3	152	78.4	218	83.2	59	77.6	74	81.3	2	100.0
Financial assistance: tuition & fees	2	66.7	63	70.0	110	79.1	12	60.0	31	75.6	1	100.0
Funding: travel to research conferences	4	50.0	158	77.8	231	83.1	58	80.6	64	78.0	3	100.0
Graduate school application fee waiver	2	25.0	137	61.7	200	78.4	53	88.3	40	64.5	1	50.0
Help securing GRE waivers	3	37.5	163	73.1	209	79.8	49	76.6	35	59.3	0	0.0
Individual tutoring	1	14.3	104	58.4	139	61.2	35	58.3	38	50.7	0	0.0
Instruction: library resources	7	63.6	186	85.7	246	84.0	67	83.8	79	81.4	1	100.0
Laptop computer	5	50.0	41	70.7	23	60.5	9	60.0	12	85.7	0	0.0
Money for books	1	50.0	73	67.0	101	73.7	25	71.4	30	76.9	1	100.0
Seminars: developing research skills	8	66.7	213	76.1	281	79.4	94	81.7	89	12.9	4	100.0

Source: Data derived from McNair survey, 2004–06.

Table B-2b. McNair Program Services Received by Participants' Level of Academic Attainment

Services Received	No Bachelor's Degree		Bachelor's Degree		Master's Degree		Doctoral Degree		Professional Degree		Doctoral and Professional Degree	
	N	(%)	N	(%)	N	(0%)	N	(%)	N	(%)	N	(%)
Seminars: networking	9	69.2	138	83.1	140	78.2	37	86.0	51	83.6	0	0.0
Seminars: scientific methods	7	77.8	165	82.1	218	85.5	69	84.1	68	79.1	4	100.0
Special for-credit courses	0	0.0	113	82.5	151	82.1	31	73.8	37	80.4	3	75.0
Stipend	7	63.6	207	89.2	285	91.3	86	90.5	98	93.3	2	66.7
Summer research activities with stipend	6	66.7	231	89.5	294	87.8	104	91.2	93	84.5	4	100.0
Workshops: improve study skills	4	50.0	141	77.0	194	73.5	47	73.4	50	72.5	1	100.0
Workshops: improve test-taking skills	6	54.5	165	84.2	230	79.9	61	83.6	51	73.9	1	50.0
Workshops: improve time management	5	71.4	142	77.2	173	78.6	40	78.4	46	69.7	1	100.0
Workshops: writing skills	4	50.0	189	78.4	259	82.5	73	77.7	69	71.9	2	100.0

Source: Data derived from McNair survey, 2004–06.

Table B-3. Activities or Opportunities Received by McNair Participants Who Completed the DIR Survey by Level of Academic Attainment

Activities or Opportunities Received	No Bachelor's Degree		Bachelor's Degree		Master's Degree		Doctoral Degree		Professional Degree		Doctoral and Professional Degree	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Attend professional meetings	8	88.9	109	85.2	178	84.8	46	85.2	52	83.9	3	100.0
Faculty mentor	11	100.0	171	94.0	297	98.3	79	100.0	77	96.3	3	100.0
Present research findings (campus)	9	75.0	144	85.2	240	90.9	66	94.3	65	86.7	3	100.0
Present research findings (conference)	2	40.0	70	61.9	118	67.0	36	75.0	34	56.7	1	100.0
Publish papers	6	75.0	109	82.6	196	88.7	29	93.5	42	77.8	0	0.0
Summer research activities	10	100.0	156	89.1	249	90.9	71	100.0	70	86.4	3	100.0
Visit graduate programs	4	50.0	75	63.0	138	74.2	32	86.5	22	52.4	2	100.0
Work on faculty research	11	91.7	167	92.8	272	93.8	75	97.4	76	96.2	3	100.0

Source: Data derived from McNair survey, 2004–06.

Note: Bachelor's group includes participants whose highest degree is a bachelor's degree and who are currently enrolled in graduate school. Master's and doctoral or professional degree groups include all participants whose highest degree is a master's degree and doctoral or professional degree respectively.

Table B-4. Perceived Helpfulness of Selected McNair Program Services by Participants' Level of Academic Attainment

Perceived Helpfulness of Services	Bachelor's Degree[a,b]	Master's Degree[a,b]	Doctoral Degree	Professional Degree	Doctoral and Professional Degree
Career counseling	3.32	3.40	3.26	3.43	3.00
Instruction: library resources	3.55	3.49	3.50	3.51	4.00
Seminars: developing research skills	3.51	3.62	3.53	3.44	3.67
Seminars: networking	3.55	3.49	3.36	3.60	0.0
Seminars: scientific methods	3.47	3.50	3.46	3.51	3.67
Special for-credit courses	3.63	3.53	3.45	3.56	3.33
Workshops: improve study skills	3.52	3.46	3.23	3.55	3.00
Workshops: improve test-taking skills	3.40	3.34	3.20	3.30	3.00
Workshops: improve time management	3.52	3.42	3.24	3.37	3.00
Workshops: writing skills	3.61	3.57	3.49	3.52	3.50

Source: Data derived from McNair survey, 2004–06.
Notes: Scores range from 1 to 4; 4 = very helpful, 3 = somewhat helpful, 2 = not very helpful, 1 = not at all helpful.
[a] Bachelor's group includes participants whose highest degree is a bachelor's degree and who are currently enrolled in graduate school. Master's and doctoral or professional degree groups include all participants whose highest degree is a master's degree and doctoral or professional degree, respectively.
[b] Ns vary, depending on the number of participants who responded "don't know."

Table B-5. Perceived Helpfulness of Selected McNair Program Activities (Opportunities) Received by Participants' Level of Academic Attainment

Perceived Helpfulness of Activities	Bachelor's Degree[a,b]	Master's Degree[a,b]	Doctoral Degree[a,b]	Professional Degree[a,b]	Doctoral and Professional Degree[a,b]
Faculty mentor	3.51	3.65	3.65	3.56	3.33
Publish papers	3.67	3.72	3.85	3.60	4.00
Summer research activities	3.71	3.79	3.79	3.61	3.67
Work on faculty research	3.70	3.70	3.75	3.56	3.67

Source: Data derived from McNair survey, 2004–06.
Note: Scores range from 1 to 4; 4 = very helpful, 3 = somewhat helpful, 2 = not very helpful, 1 = not at all helpful.
[a] Bachelor's group includes participants whose highest degree is a bachelor's degree and who are currently enrolled in graduate school. Master's and doctoral or professional degree groups include all participants whose highest degree is a master's degree and doctoral or professional degree respectively.
[b] Ns vary, depending on the number of participants who responded "don't know.

Table B-6. McNair Program Participants from 1989 to 1998 Who Earned Doctorate by 2003

Data Source	Doctoral Degrees					
	Total		Ph.D.		Other Doctorate	
	N	%	N	%	N	%
APR—Nonsurvey	291	2.3	—	—	—	—
Early Cohort (1989 to 1993)	169	7.9	—	—	—	—
Middle Cohort (1994 to 1998)	117	1.7	—	—	—	—
McNair Participant Survey	130	13.1	62	3.7	68	4.2
Early Cohort (1989 to 1993)	79	30.2	37	14.2	42	16.1
Middle Cohort (1994 to 1998)	51	10.4	25	5.1	26	5.3

Source: Data derived from McNair survey, 2004–06.
Note: APR reports do not distinguish Ph.D. from other doctorates.

Table B-7. Doctoral Degrees by Gender and Data Source

Characteristics	McNair Survey Data			
	Ph.D. (N = 64)		Other Doctorates (N = 69)	
	N	(%)	N	(%)
Gender				
Male	38	(59.4)	48	(69.9)
Female	26	(40.6)	21	(30.4)
Missing	—	—	—	—

Source: Data derived from McNair survey, 2004–06.

Table B-8. Doctoral Degrees by Race or Ethnicity and Data Source

Characteristics	McNair Survey Data			
	Ph.D. (N = 64)		Other Doctorates (N = 69)	
	N	(%)	N	(%)
Race or Ethnicity				
White	26	40.6	32	46.4
Black	17	26.6	18	26.1
Hispanic	9	14.1	9	13.0
Asian	5	7.8	4	5.8
American Indian*	2	3.1	3	4.3
Mixed/Other	3	4.7	3	4.3
Refused/Missing	2	3.1	0	0

Source: Data derived from McNair survey, 2004–06.
*Includes American Indian, Alaska Native, Native Hawaiian, and other Pacific Islanders.

Table B-9. Doctoral Degrees by Eligibility Criteria and Data Source

Characteristics	McNair Survey Data			
	Ph.D. (N = 64)		Other Doctorates (N = 69)	
	N	(%)	N	(%)
Eligibility				
First generation & low-income	44	68.8	46	66.7
Underrepresented minorities	20	31.3	23	33.3
Missing	—	—	—	—

Source: Data derived from McNair survey, 2004–06.

Table B-10. 1989–2000 McNair Program Professional Degree Recipients

Data Source		Professional Degrees	
		N	%
APR		775	6.2
	Early Cohort (1989 to 1993)	171	9.0
	Middle Cohort (1994 to 1998)	272	5.0
	Late Cohort (1999 to 2003)	62	5.0
McNair Survey		131	13.1
	Early Cohort (1989 to 1993)	50	19.2
	Middle Cohort (1994 to 1998)	77	15.8
	Late Cohort (1999 to 2003)	4	1.6

Source: Data derived from McNair survey, 2004–06.

Table B-11. Professional Degree Recipients by Sociodemographic Characteristics and Data Source

Characteristics	McNair Survey Data	
	Professional Degree (N = 133)	
	N	(%)
Gender		
Male	67	50.4
Female	66	49.6
Missing	—	—
Race/Ethnicity		
White	45	33.8
Black	51	38.3
Hispanic	17	12.8
Asian	6	4.5
American Indian*	4	3.0
Mixed	8	6.0
Refused/Missing	2	1.5
Eligibility		
First generation & low-income	91	68.4
Underrepresented minorities	42	31.6
Missing	—	—

Source: Data derived from McNair survey, 2004–06.
*Includes American Indian, Alaska Native, Native Hawaiian, and other Pacific Islanders.

Table B-12. Disciplines of Doctoral Degrees

Field of Study	Total (N = 134)		Ph.D. (N = 66)		Other Doctorate (N = 68)	
	N	(%)	N	(%)	N	(%)
Life Sciences	39	29.1	19	28.8	20	29.4
Social Sciences	30	22.4	14	21.2	16	23.5
Professional/Other*	20	14.9	13	19.7	7	10.3
Physical Sciences	16	11.9	8	12.1	8	11.8
Humanities	10	7.5	2	3.0	8	11.8
Education	10	7.5	8	12.1	2	2.9
Engineering	9	6.7	2	3.0	7	10.3

Source: Data derived from McNair survey, 2004–06.

* The "Professional/Other" category represents doctoral degrees awarded in business management and administrative services, communications, and professional fields such as architecture, law, library science, and social work. These are not considered among professional degrees.

Table B-13. Disciplines of Professional Degrees

Field of Study	Professional Degrees (N = 141)	
	N	%
Law (J.D.)	64	45.4
Medicine (M.D.)	42	29.8
Osteopathic Medicine (D.O.)	14	9.9
Other	9	6.4
Pharmacy (Pharm.D.)	7	5.0
Chiropractic (D.C. or D.C.M.)	5	3.5

Source: Data derived from McNair survey, 2004–06.

Table B-14. Educational Attainment of the Total Pool of McNair Participants, 1989–2000

Highest Degree Attained	McNair Survey Data (N = 1,003)	
	N	%
No Bachelor's	18	1.8
Bachelor's	310	30.9
Master's	408	40.7
Doctoral or Professional	267	26.6

Source: Data derived from McNair survey, 2004–06.

Table B-15. Gender of McNair Participants

Gender	N	(%)
Female	677	67.5
Male	326	32.5

Source: Data derived from McNair survey, 2004–06.

Table B-16. Race/Ethnicity of McNair Participants

Race/Ethnicity	N	(%)
White	268	26.7
Black	403	40.2
Hispanic	181	18.0
Asian	53	5.3
American Indian and Alaska Native	30	3.0
Mixed	52	5.2
Refused	16	1.6

Source: Data derived from McNair survey, 2004–06.

Table B-17. Eligibility Criteria of McNair Participants

Eligibility Criteria	N	(%)
First-generation low income	695	69.3
Underrepresented minority	305	30.4
Missing	3	.3

Source: Data derived from McNair survey, 2004–06.

Table B-18. Degrees Being Pursued by McNair Participants with Bachelor's or Master's Degrees

Degrees Being Pursued	Degree Completed	
	Bachelor's N = 310	Master's N = 408
	N	N
Masters	125	20
Business Administration (M.B.A.)	13	2
Science (M.S.)	18	0
Arts (M.A.)	4	2
Education (M.Ed.)	19	3
Public Administration (M.P.A.)	2	0
Public Health (M.P.H.)	1	1
Applied Arts (M.A.A.)	0	1
Teaching (M.A.T.)	1	0
Divinity (M.Div.)	1	2
Social Work (M.S.W.)	6	0
Other Master's	60	9
Doctoral	51	73
Philosophy (Ph.D.)	4	6
Education (Ed.D.)	0	12
Business Administration (D.B.A.)	0	1
Engineering (D.Eng.)	0	3
Public Administration (D.P.A.)	2	1
Science (D.Sc. or Sc.D.)	8	4
Psychology (Psy.D.)	3	7
Other	34	39
Professional	32	5
Chiropractic (D.C. or D.C.M.)	0	0
Dentistry (D.D.S. or D.M.D.)	1	0
Medicine (M.D.)	13	2
Optometry (O.D.)	0	0
Osteopathic Medicine (D.O.)	0	1
Pharmacy (Pharm.D.)	2	0
Podiatry (D.P.M. or Pod.D.)	0	1
Veterinary Medicine (D.V.M.)	0	0
Law (J.D.)	8	1
Theology (Th.D. or D.Min.)	1	0
Other	7	0

Source: Data derived from McNair survey, 2004–06.

Table B-19. Percent of McNair Participant Doctoral and Professional Degree Recipients by Category of Employer

Employer	Overall (N = 270)		Ph.D. (N = 67)		Other Doctorates (N = 69)		Professional Degree (N = 141)	
	N	(%)	N	(%)	N	(%)	N	(%)
Higher Education	93	34.4	45	67.2	35	50.7	14	7.1
Other Locations	168	62.2	19	28.4	33	47.8	116	82.3
Not Working	9	3.3	3	4.5	1	1.4	5	3.5

Source: Data derived from McNair survey, 2004–06.
Note: Ns are slightly lower than in previous tables due to missing employment status data.

Table B-20. Percent of McNair Participant Doctoral and Professional Degree Recipients by Type of Higher Education Employer

	Overall		Ph.D.		Other Doctorates		Professional Degree	
	N	(%)	N	(%)	N	(%)	N	(%)
Total employed in higher education	93	100.0	45	48.4	35	37.6	14	15.1
Type of Institution								
Four-year college or university	84	90.3	41	91.1	33	94.3	10	71.4
Medical school	6	6.5	2	4.4	0	0.0	4	28.6
Junior or community college	3	3.2	1	2.2	2	5.7	0	0.0

Source: Data derived from McNair survey, 2004–06.

Table B-21. Rank and Tenure Status of McNair Participant Doctoral and Professional Degree Recipients on the Faculty at Institutions of Higher Education

	Overall		Ph.D.		Other Doctorates		Professional Degree	
	N	(%)	N	(%)	N	(%)	N	(%)
Current rank	68	100.0	33	48.5	28	41.2	7	10.3
Professor/associate prof	5	7.4	2	6.1	3	10.7	0	0.0
Assistant professor	44	64.7	22	66.7	18	64.3	4	57.1
Instructor/lecturer	19	27.9	9	27.2	7	25.0	3	42.9
Tenure status								
Tenured	2	2.9	1	3.0	1	3.6	0	0.0
Tenure-track	39	57.4	20	60.6	17	60.7	2	28.6
Not on tenure-track	27	39.7	12	36.4	10	35.7	5	71.4

Source: Data derived from McNair survey, 2004–06.

Table B-22. Doctoral Recipient Employment Outside of Higher Education

Employer Type	Overall		Ph.D.		Other Doctoral Degrees		Professional Degrees	
	N	(%)	N	(%)	N	(%)	N	(%)
	168	100.0	19	11.3	33	19.6	116	69.0
Elementary or secondary school	9	5.4	2	10.5	3	9.0	4	3.4
U.S. federal government	7	4.2	0	0.0	3	9.0	4	3.4
U.S state government	9	5.4	1	5.3	1	3.0	7	6.0
U.S. local government	3	1.8	1	5.3	1	3.0	1	0.9
Nonprofit	12	7.1	1	5.3	6	18.2	5	4.3
Industry or business	104	61.9	11	57.9	16	48.5	77	66.4
Self employed	24	14.3	3	15.8	3	9.0	18	15.5

Source: Data derived from McNair survey, 2004–06.

Table B-23. Earnings for 2003 Among McNair Participants With Doctoral or Professional Degrees, by Employment Status

Degree	Employed In Higher Education	Not Employed in Higher Education
Doctorate of philosophy	$54,261	$60,875
Other doctoral degree	$53,548	$76,071
Professional degree	$59,062	$69,854

Source: Data derived from McNair survey, 2004–06.

Note: The mean amount earned was calculated on the basis of the median value of the reported range. Participants who indicated that they earned less than $29,999 were assigned a value of $20,000, and those who indicated that they earned more than $100,000 were assigned a value of $110,000.

Table B-24. Educational Debt Among McNair Participants With Doctoral or Professional Degrees, by Employment Status

Degree	Employed in Higher Education	Not Employed in Higher Education
Doctorate of Philosophy	$27,877	$57,375
Other Doctorate	$21,015	$30,862
Professional Degree	$73,034	$81,631

Source: Data derived from McNair survey, 2004–06.

Note: Initial response options for the question probing "amount owed" were based on ranges; however, respondents who owed over $30,000 (roughly 60 percent) indicated the exact amount owed. The mean was calculated by using the exact amount reported for the 60 percent of respondents who owed $30,000 or more and the median value of the reported range for the other 40 percent of respondents who owed less than $30,000.

Table B-25. Employment Status of McNair Participants Without Doctoral Degrees

Degree Held	Employed		Not Working	
	N	(%)	N	(%)
Master's degree	354	86.76	54	13.24
Currently enrolled in school	68	71.58	27	28.42
Not currently enrolled	282	91.56	26	8.44
Missing (no response)	4	80.00	1	20.00
Bachelor's degree	236	76.13	74	23.87
Currently enrolled in school	92	64.79	50	35.21
Not currently enrolled	142	85.54	24	14.46
Missing (no response)	2	100.00	0	0.00
No bachelor's degree	14	77.78	4	22.22

Source: Data derived from McNair survey, 2004–06.

Appendix C. Logistic Regression Models—Multivariate Logistic Regression Analyses

Logistic regression analysis is a robust statistical technique that can be used to predict a binary outcome variable from one or more predictor variables. In Chapter 3, the results from a multivariate analysis designed to establish the relative influence of the individual characteristics, type of undergraduate institution attended, and McNair Program characteristics on completing doctoral degrees were presented. This appendix presents an explanation of the analytic techniques used and the detailed data tables of the results.

About Logistic Regression Analysis

Logistic regression analysis is the appropriate analytic technique to use when the outcome of interest is binary (that is, having completed a doctoral degree as opposed to a master's degree or less). The odds ratios obtained from logistic regression analyses represent the likelihood or risk that a person with a specific characteristic will experience a specific outcome compared to a person who does not share the characteristic. To determine if an odds ratio is statistically significant we review the 95 percent confidence interval associated with the odds ratio. If the confidence interval does *not* encompass the value 1, we can assume the odds ratio is statistically significant. In this report we are interested in determining which characteristics are associated with successfully completing a doctoral degree. Thus, when we obtain an unadjusted odds ratios of 2.16 for the predictor variable gender (with a confidence interval of 1.81 to 2.58), it means that the probability of a man obtaining a doctoral degree is double that for a woman. Of equal importance are the variables that are not statistically significant, as they inform us about those attributes that are unrelated to obtaining a doctoral degree.

Statistical Adjustment

When a logistic regression analysis includes only one predictor variable the resulting odds ratio is referred to as unadjusted. However, when a logistic regression analysis includes two or more predictor variables, the resulting odds ratios are referred to as adjusted. Statistical adjustment essentially simultaneously controls for the influence of all the predictor variables included in the model for estimation on the outcome variable. After adjusting, the resulting odds ratio provides a "cleaner" indication of the relationship between the each predictor variable and the outcome variable of interest.

Research Question

Which characteristics (individual, institutional, or McNair Program Services) are associated with successfully completing a doctoral degree?

Unadjusted Individual Characteristics. The unadjusted results (Table C-1) indicated that men were just over two times more likely than women to complete doctoral degrees and that those participants with higher GPAs were just over four times more likely to finish doctoral degrees than their peers with lower undergraduate GPAs. McNair participants who worked for 12 hours a week or less were two and a quarter times more likely than their peers who worked for more than

12 hours a week to complete doctoral degrees. McNair eligibility criteria and where participants were born were unrelated to successfully completing doctoral degrees. In other words, whether McNair participants were first generation, low-income college students or underrepresented minorities was unrelated to successfully completing doctoral degree. Similarly whether they were born in the United States or not was unrelated to successfully completing doctoral degree.

Unadjusted Institutional Characteristics. Compared to McNair participants who attended a research university, those who attended master's, bachelor's, or specialized institutions were two times more likely to complete doctoral degrees.

Unadjusted McNair Program Services. If McNair participants worked with a faculty mentor and perceived that mentor as helpful, they were just over six times more likely to earn a doctoral degree than their peers who did not perceive the faculty mentor as helpful. Those who worked on research with a faculty mentor or during the summer were over eight times more likely to earn a doctoral degree than those who did not engage in research and those who published were almost three and a half times more likely to earn a doctoral degree. Receiving a stipend was unrelated to earning a doctoral degree.

Adjusted Results. Only two predictors maintained significance in the multivariate model: working less than 12 hours a week and perceiving a faculty mentor as helpful.

Table C-1. Unadjusted and Adjusted Odds Ratios (OR) and Confidence Intervals (CI) for Individual, Institutional, and Program Characteristics Among Doctoral Degree Holders

	Unadjusted		Adjusted[a]	
	OR	95% CI	OR	95% CI
			N = 3,660	
Individual Characteristics				
Gender				
Male	2.16*	(1.19, 3.92)	2.34	(0.86, 6.35)
Undergraduate G.P.A.	4.17*	(1.71, 10.18)	2.74	(0.70, 10.78)
Country of origin				
USA	1.37	(0.57, 3.33)	2.51	(0.74, 8.49)
No. hours worked as undergraduate				
≤ 12 hours/week	2.25*	(1.11, 4.54)	5.01*	(1.76, 14.27)
McNair Eligibility				
Underrepresented minority	1.40	(0.73, 2.70)	1.16	(0.37, 2.04)
Institutional Characteristics				
Type of undergraduate institution				
Master's, bachelor's, or specialized	2.19*	(1.20, 3.99)	2.06	(0.86, 4.95)
McNair Program Services				
Undergrad faculty mentor helpful				
Yes	6.41*	(2.37, 17.36)	13.80*	(1.55, 122.83)
Undergrad faculty research helpful				
Yes	8.40*	(2.72, 25.92)	[b]	[b]
Undergrad summer research helpful				
Yes	8.73*	(2.88, 26.45)	1.61	(0.28, 9.36)
Undergrad publication(s) helpful				
Yes	3.41*	(1.17, 9.92)	1.16	(0.35, 3.84)
Undergrad stipend helpful				
Yes	1.82	(0.97, 3.43)	1.85	(0.70, 4.90)

Source: Data derived from McNair survey, 2004–06.
[a] Adjusted for all the other variables in the analysis.
[b] Parameter not estimated in the fully adjusted model due to high inter-correlation between faculty mentor and working on faculty research.
* = significant at $p < .05$.

Notes

Because the survey sample was stratified and weighted with unequal probabilities of selection and differential nonresponse by strata, STATA analysis software was used. A robust variance estimation technique is automatically used to adjust for the design characteristics so that variances, standard errors and confidence intervals are correct.

In the multivariate analyses described above, we were unable to evaluate the role that ethnicity might play on successfully completing doctoral or professional degrees, because ethnicity is confounded with the program's eligibility criteria. We were also unable to estimate influence of working on faculty research on obtaining a doctoral degree because the correlation between having a faculty mentor and working on faculty research was very high ($r = 0.81$, $p < 0.01$).

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