

NUMBERS OF SUPPORT MODES USED

MODES OF SUPPORT

The methods used to fund graduate education are diverse. In the 1995 SED survey, new Ph.D.s were asked to select, from among 32 separate support choices, those that they may have used during graduate school. In this study, those 32 possible options have been combined into 7 distinct modes of support;¹³ these are listed below and described in the text box:

- fellowships,¹⁴
- traineeships,
- research assistantships (RAs),
- teaching assistantships (TAs),
- own funds,
- loans, and
- other.

Respondents to the 1995 SED used all of the 127 possible combinations of these seven modes of support; respondents to the 1986 SED used 125. As would be expected, not all combinations are evenly distributed among the respondents. For example, in 1995 only one person used a combination of fellowship, traineeship, RA, loan, and other; 2,703 used a combination of RA and TA. (The combinations of support patterns are discussed in greater detail in chapter 3.) In 1995, 58 percent of all respondents reported a total of either one or two modes of support, compared to only 49 percent in 1986 (table 1).

Table 2 shows the incidence of funding modes for 1986 and 1995. Use of traineeships declined from 30 to 21 percent, use of own funds from 70 to 61 percent, and use of loans from 29 to 20 percent. The use of RAs, on the other hand, increased from 56 percent in 1986 to 66 percent in 1995. Changing demographics contribute to some of this shift in use of RAs. In 1986, 21 percent of S&E Ph.D. recipients were foreign students on temporary visas. By 1995, this amount rose to 26 percent. (NSF 1996c.) Because they often do not qualify for Federal loans in this country, they tend to rely more heavily on RAs. Interestingly, in either time period, there were only

¹³See question 17 of the questionnaire in Appendix A for the 32 support choices. See page A-2 of Appendix A for the grouping of these 32 choices into the 7 modes of support. The emphasis on modes rather than on sources was chosen because validation studies of the SED showed that students frequently misreport the source (e.g., Federal, nonfederal) of their financial support, but that they can accurately identify the modes. (NRC 1994)

¹⁴Note that fellowships are nationally competitive awards. University fellowships are included under traineeships.

Definitions and Terminology

- **Fellowships** are here described as nationally competitive awards granted directly by the sponsoring organization to a student, such as fellowships from the Ford Foundation; Mellon Foundation; Rockefeller Foundation; Alcohol, Drug Abuse and Mental Health Administration; NSF; U.S. Department of Agriculture (USDA); and Fulbright Foundation. Also included are other fellowships such as Woodrow Wilson, Danforth, Hertz, Earhard, and African Graduate Fellowship Program fellowships.
- **Traineeships** are here considered to be those awards that are not nationally competitive and that are awarded by individual academic departments or institutions rather than by a sponsoring organization. These include university or university-related fellowships; National Institutes of Health (NIH) fellowships; and other Federal support such as Patricia Roberts Harris, Title IV Foreign Language, and National Defense Education Act fellowships.
- **Research assistantships** include university-related research assistantships and Federal research assistantships such as those provided by NIH, NSF, USDA, and other agencies.
- **Teaching assistantships** include university-related teaching assistantships.
- **Own funds** include resources from a student's own earnings, spouse's earnings, and family contributions.
- **Loans** include student loans such as guaranteed student loans, Perkins loans, and other loans.
- **Other sources include** Federal support from the Departments of Health and Human Services, Education, and Veterans Affairs; the National Endowment for the Humanities; other government departments and agencies; university-related college work study and other university-related funding; business or employer funds; support from foreign governments, and support from state governments.

small differences reported in the use of particular support modes as either primary or secondary modes, except for the case of RAs, which more commonly provided primary than secondary support, and own funds and loans, which more commonly provided secondary support. However, because the number of graduate students has increased, more students are using any one specific mode.

Although some change is apparent between 1986 and 1995, it is small enough that this report will not address such variations. Also, since there is such a small percent of S&E Ph.D.s (less than 1 percent) using more than five modes, the report will consider only students using five or fewer modes in most tables reporting number of funding modes.

There is considerable variation in the number of modes of funding used in different S&E fields. Table 3 shows, for example, that more than one-quarter of those

in the agricultural sciences used only one support mode, and nearly three-quarters used one or two modes. In contrast, only 44 percent of those in psychology were covered by one or two modes. The average number of modes of support varies from 2.1 for the agricultural sciences to 2.9 for the social sciences, with an overall mean of 2.5 (table 4). The variation in number of support modes by field (as well as by sex, race/ethnicity, and citizenship) suggests that a “one size fits all” policy to influence graduate support patterns may not be appropriate. For instance, for groups characterized by a large number of funding modes, emphasis on one specific mode of support may have less effect than on a group characterized by one predominant mode of funding.

PRIMARY MODE OF SUPPORT

1995 S&E Ph.D.s reported use of RAs (38 percent) than any other primary support mode (table 5). This was the case in all fields except the health sciences, math-

Table 1. Percentages of 1986 and 1995 S&E Ph.D. recipients using various numbers of support modes

Year	Number of S&E Ph.D.s	Number of support modes						
		1	2	3	4	5	6	7
1986.....	20,207	13	36	27	16	6	1	< 1
1995.....	27,865	16	42	24	13	4	1	< 1

NOTE: Rows may not total 100 percent due to rounding. Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 2. Percentages of 1986 and 1995 S&E Ph.D. recipients reporting various support modes as any, primary or secondary support source

Support mode	1986			1995		
	Any ¹ support	Primary support	Secondary support	Any ¹ support	Primary support	Secondary support
Fellowship.....	7	3	2	7	3	2
Traineeship.....	30	11	9	21	8	8
Research assistantship.....	56	30	16	66	38	21
Teaching assistantship.....	52	19	21	51	18	22
Own funds.....	70	25	34	61	22	32
Loans.....	29	2	10	20	2	8
Other.....	26	9	8	24	9	7

¹ Students may report more than one mode of support. These columns present data on support reported from any of these modes.

NOTE: Primary and secondary columns may not total 100 percent due to rounding. Percentages are based on actual responses. The nonresponse rate was 4 percent for any support, 24 percent for primary support, and 37 percent for secondary support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 3. Percentages of 1995 S&E Ph.D. recipients using various numbers of support modes, by field

Field	Number of support modes					
	1	2	3	4	5	More than 5
Total S&E	16	42	24	13	4	1
Agricultural sciences.....	27	45	19	6	2	1
Biological sciences.....	19	42	24	12	3	0
Health sciences.....	18	38	25	14	4	1
Engineering.....	19	47	22	9	2	1
Computer & information sciences.....	13	46	27	11	2	1
Mathematics.....	17	45	24	11	2	1
Physical sciences.....	12	47	26	11	3	1
Earth, atmospheric, & ocean sciences.....	15	39	26	14	5	1
Psychology.....	12	32	28	19	8	1
Social sciences.....	12	34	24	18	8	4

NOTE: Rows may not total 100 percent due to rounding. 1,779 Ph.D.s did not report any mode of support. Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 4. Average number of modes of support used by 1995 S&E Ph.D. recipients, by field

Field	Average number of modes used
Total S&E	2.5
Agricultural sciences.....	2.1
Biological sciences.....	2.4
Health sciences.....	2.5
Engineering.....	2.3
Computer & information sciences.....	2.4
Mathematics.....	2.4
Physical sciences.....	2.5
Earth, atmospheric, & ocean sciences.....	2.6
Psychology.....	2.8
Social sciences.....	2.9

NOTE: 1,779 Ph.D.s did not report any mode of support. Averages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 5. Any, primary, and secondary modes of support for 1995 S&E Ph.D. recipients, by field (percentages)

Field	Fellowship	Traineeship	Research assistant-ship	Teaching assistant-ship	Own funds	Loans	Other
Any mode							
Total S&E	7	21	66	51	61	20	24
Agricultural sciences.....	6	9	74	19	58	16	32
Biological sciences.....	8	34	67	41	53	19	19
Health sciences.....	5	28	47	33	82	22	34
Engineering.....	5	12	79	41	56	9	25
Computer & information sciences.....	7	14	71	56	62	9	26
Mathematics.....	6	20	47	85	49	11	20
Physical sciences.....	6	15	86	73	41	13	15
Earth, atmospheric, & ocean sciences.....	8	15	81	49	59	16	30
Psychology.....	3	20	46	50	86	51	26
Social sciences.....	13	30	45	63	75	28	32
Primary mode							
Total S&E	3	8	38	18	22	2	9
Agricultural sciences.....	4	3	52	4	17	1	19
Biological sciences.....	4	20	40	14	14	1	7
Health sciences.....	1	10	17	9	49	2	11
Engineering.....	3	3	56	10	15	0	13
Computer & information sciences.....	3	4	40	19	24	0	10
Mathematics.....	3	4	14	60	11	0	7
Physical sciences.....	3	4	57	22	8	0	6
Earth, atmospheric, & ocean sciences.....	2	4	52	13	18	0	11
Psychology.....	2	7	16	15	44	10	6
Social sciences.....	4	11	14	27	32	2	9
Secondary mode							
Total S&E	2	8	21	22	32	8	7
Agricultural sciences.....	2	5	20	10	47	8	9
Biological sciences.....	2	12	23	18	30	8	7
Health sciences.....	1	11	16	10	43	8	11
Engineering.....	2	6	23	23	34	4	9
Computer & information sciences.....	2	5	26	24	31	3	8
Mathematics.....	1	9	28	22	28	4	8
Physical sciences.....	1	5	28	40	18	3	5
Earth, atmospheric, & ocean sciences.....	2	7	26	25	26	5	10
Psychology.....	0	6	11	15	40	22	5
Social sciences.....	4	10	15	20	34	9	9

NOTE: Primary and secondary rows may not total 100 percent due to rounding. Percentages are based on actual responses. The nonresponse rate was 4 percent for any support, 24 percent for primary support, and 37 percent for secondary support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

ematics, psychology, and the social sciences. The use of own funds was the most frequently cited primary mode of support for those in the health sciences, psychology, and the social sciences. TAs were the most frequently cited primary mode in mathematics.

Fellowships, traineeships, and loans were the least frequently cited primary mode of support in S&E as a whole. Fellowships were the primary mode of support for only 3 percent of S&E Ph.D. recipients in 1995. Traineeships were cited as the primary mode of support more frequently in the biological sciences, health sciences, and social sciences. Loans were cited by few as a primary mode in every field except psychology. Table A1 in appendix A shows the number of doctorate recipients by primary mode of support and selected demographic and institutional characteristics.

SECONDARY MODE OF SUPPORT

The use of own funds was the most frequently reported secondary funding mode, cited by 32 percent of respondents citing a secondary mode (table 5). By major field of study, own funds was cited as secondary support by between 18 percent (physical sciences) and 47 percent (agricultural sciences) of 1995 Ph.D.s. Use of TAs was reported by 10 to 40 percent, and RAs by 11 to 28 percent.

The following sections examine how the number of modes used varies by the respondent's sex, race/ethnicity, and citizenship. The final section considers whether those who attended public institutions reported using different numbers of funding modes than those in private institutions and whether those attending Research I institutions differed from those in all other institutions.

NUMBER OF SUPPORT MODES BY SEX

Since differences between the sexes in the number of funding modes reported exist across almost all major fields of study, other characteristics besides field differences may need to be taken into account when formulating policies for graduate support (table 6). In every field except psychology, a larger percentage of women than men reported using more than three funding modes.

In mathematics, 19 percent of men reported using only one funding mode, while only 13 percent of women used a single mode of support. However, 88 percent of men in mathematics used one, two, or three modes of funding; so did 86 percent of women. The largest differences in men and women reporting one to three funding modes are in the earth, atmospheric, and ocean sciences (82 percent of men and 74 percent of women) and social sciences (74 percent of men and 65 percent of women).

Table 6. Percentages of 1995 S&E Ph.D. recipients citing 1, 2, 3, and more than 3 support modes, by sex and field

Field	1 mode		2 modes		3 modes		> 3 modes	
	F	M	F	M	F	M	F	M
Total S&E	14	17	38	44	25	24	23	15
Agricultural sciences.....	23	28	43	46	25	18	10	8
Biological sciences.....	19	19	40	43	24	24	18	15
Health sciences.....	17	21	38	37	25	26	20	16
Engineering.....	18	19	42	48	24	22	16	10
Computer & information sciences.....	11	13	45	47	27	27	18	13
Mathematics.....	13	19	47	45	26	24	14	13
Physical sciences.....	10	12	44	48	28	26	18	14
Earth, atmospheric, & ocean sciences	15	15	29	42	30	25	26	18
Psychology.....	12	11	33	32	28	28	27	29
Social sciences.....	10	14	32	35	23	25	35	27

NOTE: 1,779 Ph.D.s did not report any mode of support. Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

NUMBER OF SUPPORT MODES BY RACE/ETHNICITY AND CITIZENSHIP

Race/ethnicity and citizenship are aggregated into the following categories for this report:

- U.S. citizens and permanent residents, who are further subdivided as:
 - Asian (Asian or Pacific Islander);
 - underrepresented minority (black, non-Hispanic; Hispanic; and American Indian or Alaskan Native); or
 - white, non-Hispanic; and
- foreign students (persons on temporary visas).

The number of support modes reported varied with the race/ethnicity and citizenship status of respondents. Asians as well as foreign students reported considerably fewer modes of support, on average, than did other groups.¹⁵ The average number of support modes reported by Asians and foreign students, as well as the percentage of these groups reporting more than three support modes, was lower in S&E as a whole as well as in every major field except psychology. In psychology, Asian's support patterns were similar to those of whites and underrepresented minorities in terms of both mean number of support modes and percentage reporting more than three modes (table 7).¹⁶

NUMBER OF SUPPORT MODES BY CONTROL AND RESEARCH EMPHASIS OF INSTITUTIONS

This section examines differences in support patterns between 1995 S&E Ph.D.s who had graduated from public institutions and those from private ones, and between those from Carnegie Research I and other types of academic institutions.

Ph.D. recipients from public institutions on average used about as many support modes as those from private ones. For example, 57 percent of S&E Ph.D.s in public institutions and 58 percent of those in private institutions used one or two modes of support. There were some variations by academic discipline, most notably in psychology (table 8).

The number of funding modes varied for different types of institutions. Students who graduated from Research I institutions—the Nation's largest research performing universities—generally reported using more support modes than those attending other universities (table 9). Fifteen percent of new Ph.D.s in Research I institutions had used only one support mode. By field, proportions ranged from 9 percent in psychology to 26 percent in the agricultural sciences. In comparison, about 20 percent of Ph.D.s from the other institutions had used a single support mode, with a range from 13 percent in the earth, atmospheric, and ocean sciences to 31 percent in the agricultural sciences. In every field displayed in table 9, except the earth, atmospheric, and ocean sciences, the percentage of students using only one mode is smaller in Research I than other institutions. The percentage of students using one or two modes is also smaller in Research I universities for all fields, and the percentage using one, two or three modes is smaller for all except the earth, atmospheric, and ocean sciences and mathematics.

¹⁵See "Asian S&E Ph.D. Recipients—U.S. Citizens Compared to Permanent Residents" on page 23 for a cautionary note on how one should interpret the comparisons across race/ethnicity and citizenship classifications.

¹⁶This may be explained by the fact that a higher percentage of Asians earning psychology doctorates than of those earning doctorates in many other S&E fields were born in the United States.

Table 7. Mean number of support modes and percentages of 1995 S&E Ph.D. recipients citing various numbers of support modes, by field, race/ethnicity, and citizenship

Race/ethnicity, citizenship and number of modes	Total	Agricultural sciences	Biological sciences	Health sciences	Engineering	Computer & information sciences	Mathematics	Physical sciences	Earth, atmospheric, & ocean sciences	Psychology	Social sciences
Mean number of support modes ¹											
Total.....	2.5	2.1	2.4	2.5	2.3	2.4	2.4	2.5	2.6	2.8	2.9
Asian/Pacific Islander ³ ...	2.1	1.6	2.0	2.0	2.1	2.3	2.0	2.2	1.9	2.8	2.2
Underrepresented minority ^{3,4}	2.8	2.3	2.6	2.7	2.7	3.1	2.9	2.8	2.6	2.8	3.1
White ³	2.7	2.5	2.6	2.6	2.5	2.6	2.7	2.7	2.9	2.9	3.1
Foreign ²	2.1	1.8	2.0	2.2	2.1	2.3	2.1	2.1	2.2	2.4	2.3
Percentages citing number of modes											
Asian/Pacific Islander ³											
1.....	25	51	34	36	25	17	29	17	40	13	11
2.....	46	36	41	39	47	47	50	56	41	30	42
3.....	20	12	17	17	20	28	15	21	14	34	25
4.....	7	0	6	6	7	7	5	6	5	13	13
5.....	2	0	1	1	1	1	1	1	1	10	6
Underrepresented minority ^{3,4}											
1.....	10	16	10	13	11	6	13	4	6	11	8
2.....	38	46	42	41	38	24	35	40	50	37	33
3.....	26	30	26	19	30	41	22	32	25	25	22
4.....	17	5	17	19	16	18	13	17	13	16	19
5.....	7	3	3	6	6	6	13	7	6	9	11
White ³											
1.....	11	13	11	15	14	12	9	7	7	12	10
2.....	37	44	40	36	42	41	41	41	37	31	28
3.....	27	27	27	27	26	28	30	30	30	28	24
4.....	17	10	16	16	14	15	15	16	19	20	22
5.....	6	5	5	5	5	3	4	5	7	8	12
Foreign ²											
1.....	22	38	30	25	22	13	22	17	23	12	19
2.....	50	48	47	42	53	54	50	55	44	47	43
3.....	21	11	17	24	20	25	21	23	26	31	25
4.....	6	2	5	7	4	7	7	4	5	8	11
5.....	1	0	1	1	0	1	0	0	2	2	2

¹ Means calculated on the basis of all funding modes, not just 5.

² Foreign students who were on temporary visas at the time of Ph.D. conferral.

³ U.S. citizens and permanent residents only.

⁴ Underrepresented minorities include blacks, Hispanics, and American Indians/Alaskan Natives.

NOTE: Columns may not total 100 percent due to rounding and/or to the exclusion of more than five funding modes. 1,779 Ph.D.s did not report any mode of support. Means and percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 8. Percentages of 1995 S&E Ph.D. recipients using various numbers of support modes, by institutional control and field

Institutional control and field	Number of support modes				
	1	2	3	4	5
Public institutions					
Total S&E	16	41	24	13	4
Agricultural sciences.....	27	45	19	6	3
Biological sciences.....	18	41	24	13	4
Health sciences.....	18	36	26	15	4
Engineering.....	19	47	22	9	2
Computer & information sciences.....	12	46	27	12	2
Mathematics.....	18	45	23	11	3
Physical sciences.....	11	46	26	12	3
Earth, atmospheric, & ocean sciences.....	16	38	27	13	5
Psychology.....	9	31	29	21	9
Social sciences.....	14	35	23	18	8
Private institutions					
Total S&E	16	42	24	12	4
Agricultural sciences.....	25	45	20	9	0
Biological sciences.....	22	43	22	11	2
Health sciences.....	20	42	21	10	5
Engineering.....	19	48	22	9	2
Computer & information sciences.....	14	47	28	10	2
Mathematics.....	14	47	28	9	2
Physical sciences.....	12	50	26	9	2
Earth, atmospheric, & ocean sciences.....	13	43	24	15	3
Psychology.....	17	35	26	15	6
Social sciences.....	10	32	26	19	10

NOTE: Rows may not total 100 percent due to rounding and/or to the exclusion of more than five funding modes. 1,779 Ph.D.s did not report any mode of support. Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 9. Percentages of 1995 S&E Ph.D. recipients using various numbers of support modes, by Carnegie classification

Field	Number of support modes				
	1	2	3	4	5
Research I					
Total S&E	15	42	25	13	4
Agricultural sciences.....	26	45	20	6	3
Biological sciences.....	17	41	25	13	4
Health sciences.....	16	38	25	15	5
Engineering.....	18	47	23	9	2
Computer & information sciences.....	10	45	29	13	3
Mathematics.....	16	47	24	10	2
Physical sciences.....	11	48	27	11	3
Earth, atmospheric, & ocean sciences.....	16	38	27	13	5
Psychology.....	9	33	27	21	9
Social sciences.....	11	33	24	19	9
Other than Research I					
Total S&E	20	41	24	11	4
Agricultural sciences.....	31	44	18	6	1
Biological sciences.....	24	42	21	10	2
Health sciences.....	26	38	25	9	2
Engineering.....	22	48	21	6	2
Computer & information sciences.....	20	47	23	8	2
Mathematics.....	22	42	23	11	2
Physical sciences.....	15	46	26	10	3
Earth, atmospheric, & ocean sciences.....	13	42	25	16	4
Psychology.....	15	32	28	17	7
Social sciences.....	18	37	24	13	6

NOTE: Rows may not total 100 percent due to rounding and/or to the exclusion of more than five funding modes.

A total of 1,779 Ph.D.s did not report any mode of support. Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.