

## A brief analysis of graduate student funding 1996-2003

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### *Introduction*

This report contains a brief summary of an analysis that looked at numbers of psychology graduate students funded in comparison to numbers of graduate students in the social sciences and the biological/physical sciences. The data were obtained from Table 38 of the *National Science Foundation Survey of Graduate Students and Postdoctorates in Science and Engineering, 2003*. A complete description of these data can be found at <http://www.nsf.gov/statistics/nsf06307/>; the data are gathered each year by distributing questionnaires to participating colleges and universities. The data in Table 38 were tabulated from the responses received from doctorate-granting institutions. The present analysis does not look at levels of funding in terms of dollar amounts; it only looks at numbers of graduate students funded in these various disciplines as compared to numbers of psychology graduate students. The analysis concentrates on numbers of graduate students funded by NIH and NSF and numbers of graduate students funded by all federal sources.

Tables 1 and 2 show the specific subfields included in the general categories of *Psychology, All, Social Sciences* and *Sciences*. Table 3 shows the specific types of support sources included in the general categories of *Other Federal Support, Other Support* and *Self-support*. Because the data used in this analysis were collected by NSF, all of the sub-field and area definitions are those of NSF.

### *Explanation of the Odds Ratio (OR) analysis*

The statistical analysis employed here borrowed a technique used in epidemiological research to assess whether or not individuals in a target group have greater or lesser odds of contracting a disease relative to a reference group. For example, one might ask the question do individuals who live close to a chemical-

producing factory have higher odds of contracting cancer than individuals who have not been exposed to this type of hazardous environment. This approach allows one to compute an odds ratio (OR) with the following formula:

$$\text{OR} = \frac{\text{N exposed with cancer/N exposed without cancer}}{\text{N unexposed with cancer/N unexposed without cancer}}$$

In the present analysis, it is assumed that the target group is psychology graduate students with and without various types of support while the reference group is graduate students in social sciences and sciences with and without support. An odds ratio can be computed in the following way, using NSF support as an example:

$$\text{OR} = \frac{\text{N } \Psi \text{ graduate students-NSF support/ N } \Psi \text{ graduate students-other support}}{\text{N other graduate students-NSF support /N other graduate students-other support}}$$

An OR of 1.0 is considered to be the null value where the odds for both groups are equal. An OR > 1.0 indicates that the odds are higher for the target group while an OR < 1.0 indicates the reverse, namely, that the odds are lower for the target group. For example, if one looks at psychology graduate students with NSF funding compared to psychology graduate students with other sources of funding as the target group (numerator of the OR formula) and one uses the same two categories for the reference group (denominator in the OR formula), one can compute an OR that provides a numerical estimate of whether the odds of NSF funding are higher or lower for psychology graduate students as compared to graduate students in the reference group. If this computation produces an OR of 1.5, for example, one can interpret this figure as indicating that psychology graduate students have a 50% greater chance of being funded by NSF than graduate students in the reference group. The odds can also be stated in another way, e.g. for every graduate student funded in the reference group, 1.5 psychology graduate students are funded. One can also compute a standard error for the OR and, thus, produce a 95% confidence interval (CI) in a manner similar to that used to compute a 95% CI around the mean. If the CI does not include the null value of

1.0, then the OR indicates a significant difference in odds between the target and reference groups.

*Tables 4 & 5: Psychology graduate students v. social science graduate students*

Table 4 shows the psychology/social science graduate student data for the years 1996, 2000 and 2003. The psychology student data is shown for the three general subcategories of *Psychology, Clinical, Psychology, Combined* and *Psychology, Except Clinical* as compared to all *Social Science* students combined. An overall category, *Psychology, All* combines the data from the three psychology subcategories. If one looks at the percentages of students receiving funding from different sources, one finds that psychology graduate students were receiving higher rates of support from all federal sources over these years but also had slightly higher rates of self-support when compared to social science graduate students.

The OR analyses in Table 5 shows separate comparisons for psychology graduate students in the three subcategories (*Psychology, Clinical, Psychology, Combined* and *Psychology, Except Clinical*) with *Social Science* graduate students. The concentration is on comparing *NSF, NIH* and *All Federal Support to Other Sources of Support* (non-federal) for the target group of psychology graduate students in the various subcategories as compared to the reference group of social science graduate students. Briefly, the OR analysis reveals that psychology graduate students were generally at an odds advantage for federal funding when compared to graduate students in other social science disciplines. The exception to this general finding was in regard to NSF funding. NSF has a specific policy against funding clinical psychology students and makes funding decisions for clinical students on a case-by-case basis. For this reason, it is not surprising that the odds ratios for the comparisons of clinical graduate students with other social science graduate students are significantly below 1.0. For example, in 2003, there was an 80% NSF funding advantage for social science graduate students

when compared to clinical psychology graduate students. The NSF comparisons for the subcategory of *Psychology, Combined* indicate no significant support differences between psychology and social science graduate students (odds ratios close to 1.0) while the comparisons between social science graduate students and psychology graduate students in the category *Psychology, Except Clinical* once again show a significant odds disadvantage of NSF support for the psychology graduate students. In summary, psychology graduate students in the various subcategories are either at an NSF funding disadvantage or they are at the same NSF funding numbers when compared to social science students.

The remaining OR comparisons indicate that psychology graduate students in all subcategories were at a funding advantage relative to social science graduate students. The largest advantage was in NIH funding where the odds ratios range from 8.09 to 12.35 depending on the year and psychology subcategory. One can interpret these OR figures to mean that, for every social science graduate student funded by NIH, eight to twelve psychology graduate students received NIH support.

*Tables 6 & 7: Psychology graduate students v. science graduate students*

Table 6 contains data from the same psychology subcategories shown in Table 4. In the case of Table 6, psychology graduate student support is compared to that of science graduate students. The patterns in Table 6 differ from those found in the psychology/social sciences comparisons of Tables 4 and 5. The percentage of psychology graduate students receiving support from federal sources was less than the rate for science graduate students and the percentage rates of self-support were much higher (in 2003, for example, the rate of self-support for psychology graduate students was 45% as compared to 11% among science graduate students).

The psychology/science OR analysis shown in Table 7 reveals a consistent picture. Psychology graduate students were at a significant funding disadvantage for all

subcategories of psychology graduate students and for the three years where data was analyzed. All the odds ratios in Table 7 are below 1.0. It is not surprising that the lowest odds ratios are found when the numbers of clinical psychology students supported by NSF are compared to science students with NSF support. Here the odds ratios are close to 0.0.

### *Summary*

Psychology graduate students were being funded at significantly higher rates than other social science graduate students in regard to NIH and all federal funding sources. Psychology graduate students were either at an odds disadvantage or there was no difference in support levels when psychology student NSF numbers are compared to the NSF numbers of students in the other social sciences.

Psychology graduate students were at a significant funding disadvantage when compared to students in the sciences. This is a consistent pattern regardless of psychology subcategory or year of comparison.

**Table 1: Listing of Specific Psychology & Social Sciences Sub-fields Included in the General Categories  
(Categories, Sub-fields & Areas Defined by NSF)**

<b>General Category</b>	<b>Sub-field</b>	<b>Areas Included in Sub-field</b>
Psychology, All	Clinical Psychology	
	Psychology, Combined	General Psychology
	Psychology, Except Clinical	Cognitive/Psycholinguistics
		Community
		Developmental
		Experimental
		Industrial/Organizational
		Physiological/Psychobiology
		Social
		School
		Psychology, Other
		Art Therapy
		Hypnotherapy
		Psychoanalysis
Social Sciences	Economics	Agricultural Economics
		Economics
		Business Economics
	Political Science/Public Admin.	Public Administration
		Public Policy Analysis
		International Relations
		Political Science/Government
	Sociology	Demography/Population Studies
		Sociology
	Anthropology	Anthropology
		Archeology
	Linguistics	
	History/Philosophy of Science	
	Geography	Geography
		Cartography
	Social Sciences, Other	Urban Planning
		Urban Design
		Ethnic/Cultural Studies
		Gerontology
		Community Organization
		Social Sciences, General
		Criminology
		Urban Affairs/Studies
		Social Sciences, Other

**Table 2: Listing of Specific Sciences Sub-fields Included in the General Categories (Categories, Sub-fields & Areas Defined by NSF)**

<b>General Category</b>	<b>Sub-field</b>	<b>Areas Included in Sub-field</b>
Sciences	Astronomy	Astronomy Astrophysics
	Chemistry	Chemistry Polymer Chemistry
	Physics	Physics Optics/Acoustics
	Physical Sciences, Other	Physical Sciences, General Physical Sciences, Misc.
	Mathematics.	Mathematics Applied Mathematics Operations Research Mathematics, Other Mathematics/Computer Science Statistics Actuarial Science
	Anatomy	Anatomy Medical Anatomy
	Biochemistry	Biochemistry Medical Biochemistry
	Biology	
	Biometry/Epidemiology	Biometrics Biostatistics Medical Biomathematics Epidemiology
	Biophysics	
	Botany	Plant Pathology Plant Physiology
	Cell/Molecular Biology	Cell Biology Molecular Biology Medical Cell/Molecular Biology
	Ecology	
	Entomology/Parasitology	
	Genetics	Genetics, Plant & Animal Evolutionary Biology Medical Genetics
	Microbiology/Immunology/Virology	
	Nutrition	
	Pathology	Pathology, Human & Animal
	Pharmacology	Pharmacology, Human & Animal Toxicology
	Physiology	Physiology, Human & Animal
	Zoology	
	Biosciences, Other	Biotechnology Research Biological Sciences, Misc.

<b>Table 3: Specific Funding Sources &amp; Types Included in General Categories (NSF Category Definitions)</b>	
<b>General Category of Support Source</b>	<b>Specific Funding Source Included</b>
National Science Foundation (NSF)	
National Institutes of Health (NIH)	
Other Federal Support	Health & Human Services (not NIH)
	Department of Defense (DoD)
	Department of Agriculture (DoA)
	Department of Energy (DoE)
	NASA
	Other Federal Sources
Other Support	Institutional Support
	State/Local Government Support
	Foreign Sources
	Other USA Sources
Self-support	Loans
	Family Sources
<b>General Category “Support”</b>	<b>Specific Types of Support Included</b>
Support	Fellowships
	Traineeships
	Research Assistantships
	Teaching Assistantships
	Other

**Table 4 : Graduate Student Support Categories: Psychology v. Social Sciences**

	Year					
	1996	1996	2000	2000	2003	2003
		% Total		% Total		% Total
<b>Psychology</b>						
<b>Psychology, Clinical</b>						
NSF Support	5	0%	4	0%	19	0%
NIH Support	255	3%	311	3%	355	4%
Other Federal Support	348	4%	676	7%	607	7%
<b>Total Federal Support</b>	<b>608</b>		<b>991</b>		<b>981</b>	
<b>Other Support</b>	<b>3051</b>	<b>35%</b>	<b>2817</b>	<b>31%</b>	<b>2538</b>	<b>28%</b>
<b>Total Support</b>	<b>3659</b>		<b>3808</b>		<b>3519</b>	
<b>Self-support</b>	<b>5124</b>	<b>58%</b>	<b>5335</b>	<b>58%</b>	<b>5485</b>	<b>61%</b>
<b>Total Psychology, Clinical</b>	<b>8783</b>		<b>9143</b>		<b>9004</b>	
<b>Psychology, Combined</b>						
NSF Support	176	2%	166	2%	188	2%
NIH Support	590	6%	569	6%	732	8%
Other Federal Support	350	4%	455	5%	409	4%
<b>Total Federal Support</b>	<b>1116</b>		<b>1190</b>		<b>1329</b>	
<b>Other Support</b>	<b>5128</b>	<b>54%</b>	<b>4925</b>	<b>52%</b>	<b>5504</b>	<b>59%</b>
<b>Total Support</b>	<b>6244</b>		<b>6115</b>		<b>6833</b>	
<b>Self-support</b>	<b>3325</b>	<b>35%</b>	<b>3322</b>	<b>35%</b>	<b>2567</b>	<b>27%</b>
<b>Total Psychology, Combined</b>	<b>9569</b>		<b>9437</b>		<b>9400</b>	
<b>Psychology, Except Clinical</b>						
NSF Support	106	1%	103	1%	116	1%
NIH Support	366	3%	430	4%	513	4%
Other Federal Support	473	4%	482	4%	525	4%
<b>Total Federal Support</b>	<b>945</b>		<b>1015</b>		<b>1154</b>	
<b>Other Support</b>	<b>4771</b>	<b>41%</b>	<b>4929</b>	<b>45%</b>	<b>5175</b>	<b>44%</b>
<b>Total Support</b>	<b>5716</b>		<b>5944</b>		<b>6329</b>	
<b>Self-support</b>	<b>5888</b>	<b>51%</b>	<b>4912</b>	<b>45%</b>	<b>5543</b>	<b>47%</b>
<b>Total Psychology, Except Clinical</b>	<b>11604</b>		<b>10856</b>		<b>11872</b>	
<b>Psychology, All</b>						
NSF Support	287	1%	273	1%	323	1%
NIH Support	1211	4%	1310	4%	1600	5%
Other Federal Support	1171	4%	1613	5%	1541	5%
<b>Total Federal Support</b>						
<b>Other Support</b>	<b>12950</b>	<b>43%</b>	<b>12671</b>	<b>43%</b>	<b>13217</b>	<b>44%</b>
<b>Total Support</b>						
<b>Self-support</b>	<b>14337</b>	<b>48%</b>	<b>13569</b>	<b>46%</b>	<b>13595</b>	<b>45%</b>
<b>Total Psychology, All</b>	<b>29956</b>		<b>29436</b>		<b>30276</b>	
<b>Social Sciences</b>						
NSF Support	744	1%	716	1%	819	1%
NIH Support	263	0%	295	1%	370	1%
Other Federal Support	2136	4%	2314	5%	2396	4%
<b>Total Federal Support</b>	<b>3143</b>		<b>3325</b>		<b>3585</b>	
<b>Other Support</b>	<b>28254</b>	<b>52%</b>	<b>27723</b>	<b>56%</b>	<b>30709</b>	<b>54%</b>
<b>Total Support</b>	<b>31397</b>		<b>31048</b>		<b>34294</b>	
<b>Self-support</b>	<b>22455</b>	<b>42%</b>	<b>18459</b>	<b>37%</b>	<b>22607</b>	<b>40%</b>
<b>Total, Social Sciences</b>	<b>53852</b>		<b>49507</b>		<b>56901</b>	

**Table 5 : Odds Ratios Comparing Psychology with Social Sciences  
(\*indicates statistical significance)**

		1996	Year 2000	2003
<b>Psychology, Clinical v. Soc. Sci.</b>				
NSF v. All Other Support				
	Odds Ratio	0.06	0.05	0.22
	95%CI	[0.02, 0.14]*	[0.02, 0.12]*	[0.14, 0.35]*
NIH v. All Other Support				
	Odds Ratio	8.87	9.27	10.29
	95% CI	[7.42, 10.55]*	[9.17, 9.43]*	[8.85, 11.94]*
All Federal v. All Other Support				
	Odds Ratio	1.79	2.93	3.31
	95% CI	[1.63, 1.97]*	[2.69, 3.16]*	[3.05, 3.59]*
<b>Psychology, Combined v. Soc. Sci.</b>				
NSF v. All Other Support				
	Odds Ratio	1.19	1.18	1.16
	95%CI	[0.99, 1.41]	[1.00,1.40]	[0.98,1.36]
NIH v. All Other Support				
	Odds Ratio	12.35	10.69	11.01
	95% CI	[10.65, 14.33]*	[9.27, 12.35]*	[9.68, 12.50]*
All Federal v. All Other Support				
	Odds Ratio	1.96	2.01	2.07
	95% CI	[1.82, 2.11]*	[1.87, 2.17]*	[1.93, 2.22]*
<b>Psychology, Except Clinical v. Soc. Sci.</b>				
NSF v. All Other Support				
	Odds Ratio	0.78	0.75	0.76
	95%CI	[0.63, 0.96]*	[0.61, 0.92]*	[0.63, 0.93]*
NIH v. All Other Support				
	Odds Ratio	8.11	8.13	8.09
	95% CI	[6.88, 9.49]*	[7.02, 9.49]*	[7.05, 9.27]*
All Federal v. All Other Support				
	Odds Ratio	1.78	1.72	1.91
	95% CI	[1.65, 1.93]*	[1.59, 1.85]*	[1.78, 2.06]*

Table 6: Graduate Student Support Categories: Psychology v. Sciences

	Year					
	1996	1996 % Total	2000	2000 % Total	2003	2003 % Total
<b>Psychology</b>						
<b>Psychology, Clinical</b>						
NSF Support	5	0%	4	0%	19	0%
NIH Support	255	3%	311	3%	355	4%
Other Federal Support	348	4%	676	7%	607	7%
<b>Total Federal Support</b>	608		991		981	
<b>Other Support</b>	3051	35%	2817	31%	2538	28%
<b>Total Support</b>	3659		3808		3519	
<b>Self-support</b>	5124	58%	5335	58%	5485	61%
<b>Total Psychology, Clinical</b>	8783		9143		9004	
<b>Psychology, Combined</b>						
NSF Support	176	2%	166	2%	188	2%
NIH Support	590	6%	569	6%	732	8%
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<b>Total Federal Support</b>	1116		1190		1329	
<b>Other Support</b>	5128	54%	4925	52%	5504	59%
<b>Total Support</b>	6244		6115		6833	
<b>Self-support</b>	3325	35%	3322	35%	2567	27%
<b>Total Psychology, Combined</b>	9569		9437		9400	
<b>Psychology, Except Clinical</b>						
NSF Support	106	1%	103	1%	116	1%
NIH Support	366	3%	430	4%	513	4%
Other Federal Support	473	4%	482	4%	525	2%
<b>Total Federal Support</b>	945		1015		1154	
<b>Other Support</b>	4771	41%	4929	45%	5175	44%
<b>Total Support</b>	5716		5944		6329	
<b>Self-support</b>	5888	51%	4912	45%	5543	47%
<b>Total Psychology, Except Clinical</b>	11604		10856		11872	
<b>Psychology, All</b>						
NSF Support	287	1%	273	1%	323	1%
NIH Support	1211	4%	1310	4%	1600	5%
Other Federal Support	1171	4%	1613	5%	1541	5%
<b>Total Federal Support</b>						
<b>Other Support</b>	12950	43%	12671	43%	13217	44%
<b>Total Support</b>						
<b>Self-support</b>	14337	48%	13569	46%	13595	45%
<b>Total, Psychology, All</b>	<b>29956</b>		<b>29436</b>		<b>30276</b>	
<b>Sciences</b>						
NSF Support	5228	6%	5411	7%	6821	7%
NIH Support	13049	16%	13454	17%	16295	17%
Other Federal Support	8961	11%	8001	10%	8884	10%
<b>Total Federal Support</b>	27238		26866		32000	
<b>Other Support</b>	46898	56%	45111	56%	51280	55%
<b>Total Support</b>	74136		71977		83280	
<b>Self-support</b>	9403	11%	8544	11%	10169	11%
<b>Total, Sciences</b>	<b>83539</b>		<b>80521</b>		<b>93449</b>	

**Table 7 : Odds Ratios Comparing Psychology with Sciences  
(\*indicates statistical significance)**

		1996	Year 2000	2003
<b>Psychology, Clinical v. Sciences</b>				
NSF v. All Other Support	Odds Ratio	0.02	0.01	0.06
	95%CI	[0.01, 0.04]*	[0.01, 0.03]*	[0.04, 0.09]*
NIH v. All Other Support	Odds Ratio	0.35	0.39	0.46
	95% CI	[0.31, 0.39]*	[0.34, 0.43]*	[0.41, 0.52]*
All Federal v. All Other Support	Odds Ratio	0.34	0.59	0.62
	95% CI	[0.32, 0.37]*	[0.55, 0.64]*	[0.57, 0.67]*
<b>Psychology, Combined v. Sciences</b>				
NSF v. All Other Support	Odds Ratio	0.38	0.56	0.32
	95%CI	[0.33, 0.45]*	[0.48, 0.66]*	[0.27, 0.37]*
NIH v. All Other Support	Odds Ratio	0.49	0.45	0.49
	95% CI	[0.45, 0.53]*	[0.41, 0.49]*	[0.46, 0.53]*
All Federal v. All Other Support	Odds Ratio	0.38	0.41	0.62
	95% CI	[0.35, 0.41]*	[0.38, 0.43]*	[0.57, 0.67]*
<b>Psychology, Except Clinical v. Sciences</b>				
NSF v. All Other Support	Odds Ratio	0.25	0.22	0.21
	95%CI	[0.21, 0.31]*	[0.18, 0.26]*	[0.17, 0.25]*
NIH v. All Other Support	Odds Ratio	0.32	0.34	0.36
	95% CI	[0.29, 0.36]*	[0.31, 0.38]*	[0.33, 0.39]*
All Federal v. All Other Support	Odds Ratio	0.34	0.35	0.36
	95% CI	[0.32, 0.36]*	[0.32, 0.37]*	[0.33, 0.38]*