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Comparing the Productivity of BSR Training Grants

Introduction

The objective of this report is to compare the career outcomes of trainees across principal investigators funded by T32 grants of the Behavioral and Social Research Program of the National Institute on Aging.

Sample

The sample includes 968 individuals who began training between 1985 and 2003 from 29 different principal investigators. For each trainee in the sample, we attempted to obtain a CV so that we could ascertain the trainee's current institution and position along with a list of academic publications. In some cases, the principal investigators provided this information to us directly. We also collected information on citations and publications from the ISI Web of Science. Our publication measures include only those publications present in both the ISI database and a CV up through 2005. We collected data on NIH grants from the CRISP database. We only examine grants for which the trainee is the principal investigator as indicated by CRISP. Data collection was conducted in two phases. We first collected information on 529 trainees in 2003. Additional trainees were subsequently identified and we collected information on these new trainees in 2005.

After we completed our data collection, we contacted all of the principal investigators and requested that they examine our data and make any corrections. Principal investigators were generally very cooperative in providing updated information. Indeed, for 49 percent of trainees, principal investigators provided updated publication or job placement information. Individuals for whom we and the principal investigators were unable to provide information were assumed to have no publications, citations, or NIH grants. We also assumed that such trainees did not have an academic position (defined as a tenure track professorship at a university).

Table 1 provides summary statistics for individuals within our sample. Our sample is split evenly between predoctoral and postdoctoral trainees.[1] We see that about half of all trainees have academic appointments. Only about 11 percent, however, have academic appointments at research universities ranked in the top 25 by the University of Florida's postsecondary rating system. On average, trainees have 5.84 publications and 96 citations. The average H-factor for trainees is 2.7. This H-factor is the greatest number such that the researcher has at least that many publications with at least that many citations. It is a measure of the quality and quantity of a researcher's work. On average, trainees have received .34 NIH grants (excluding F grants) and .18 NIA grants.

Methodology

[1] Some individuals received both predoctoral and postdoctoral training. For a few individuals, we were not able to determine which type of training they had received.

Our objective is to evaluate individual principal investigators on the basis of the career outcomes of their trainees. We are *not* attempting to measure the value-added of the principal investigator on trainee outcomes. Thus the rankings we construct reflect both the selection of trainees to a particular grant along with the impact that grant has on career outcomes.

To rank grants, we examine several measures of career success. First, we examine whether an individual had an academic position at the time of data collection. We classify assistant, associate, and full professor at colleges and universities as having academic positions. Individuals who we were unable to locate are assumed not to have an academic position. The second outcome measure is academic position at a top 25 research university. To construct this measure of career success, we use rankings provided by the University of Florida. The third measure is whether the trainee has an H factor of greater than 5. Individuals for whom we were unable to locate a CV are assumed to have an H factor below 5. The fourth measure indicates whether the trainee received at least one NIH grant, excluding F-type grants, which fund postdoctoral training. We include only those grants that we were definitely able to link to the trainee in question by examining their CV, comparing institutions, or comparing the title of their grant to their publications. The fifth measure attempts to capture the very best researchers. These star researchers are defined as those who meet any one of the following three criteria: have an academic appointment at a top 25 institution, have an H of 5 or higher, or have been awarded at least two NIH grants (non F-type). The sixth measure includes only whether the trainee received at least one research grant (excluding F grants) funded by the NIA. The final measure examines whether the trainee received any non F-type grant, regardless of our ability to confirm the identity of the recipient.[2] This measure is robust to differences across grants in our ability to locate trainees.

To rank grants according to the career outcomes of each trainee, we estimate a linear probability model where the dependent variable is the binary career outcome measure in question. The covariates include variables indicating the first year of training, first year of training squared, whether the trainee received predoctoral or postdoctoral training, whether data collection for the trainee occurred primarily in 2003 or 2005, and whether the principal investigator provided updated information in the summer of 2006. We also include a fixed effect for each principal investigator. The coefficients on the principal investigator variables represent the regression adjusted productivity of each grant. We construct the rankings shown below from these coefficients. Principal investigators are only included in the rankings if they had 5 or more trainees.

In addition to Table 2, which displays the rankings based on the career outcomes of all trainees, we also examine predoctoral and postdoctoral trainees separately. Unfortunately, administrative records did not specify in all cases which type of training the trainee received. The tables reflect the experience of only the subset of trainees for which we had this information. Tables 3 and 4 show training grant rankings based on pre- and post-doctoral trainees respectively.

[2] We excluded from this analysis unconfirmed publications of individuals with very common names (e.g. John Smith), of which the vast majority must be false matches.

We also examine specifications in which we exclude trainees who have published half or more of their publications in the neurological or biological sciences. To take into account that we could not identify the nature of research and training of trainees with no confirmed publications, in our analysis we re-weighted the observations under the assumption that trainees without confirmed publications would have been classified as neurological or biological scientists at the same rate as other researchers funded by the same grant. Table 5 shows rankings that include pre- and post-doctoral trainees, but exclude those who have published at least half of their publications in the neurological or biological sciences. Tables 6 and 7 show comparable rankings, but focus exclusively on pre- and post-doctoral trainees respectively.

In Table 8, we show the regression estimates of the principal investigator dummy variables that are used to construct the rankings. A coefficient of .1 means that a trainee from the indicated grant is 10 percentage points more likely to achieve a particular career outcome than would be true for the average trainee in the sample. Robust standard errors are shown in parentheses.

Table 9 shows the relationship between trainee career outcomes and the rank of a principal investigator's university and department. Universities ranked outside of the top 51, were assigned a ranking of 52. Also included in the regression is a dummy variable indicating whether the principal investigator's department is ranked in the top 10 (as ranked by US News and World Report). We decided not to include a continuous measure for department rank since the range of rankings varied so greatly across disciplines. Standard errors (cluster corrected at the principal investigator level) are shown in parentheses. Covariates include first year of training, first year of training squared, whether the trainee received predoctoral or postdoctoral training, whether data collection for the trainee occurred primarily in 2003 or 2005, and whether the principal investigator provided updated information in the summer of 2006. To help clarify the interpretation of the rankings, moving from MIT (ranked 1) to Washington University in Saint Louis (ranked 11) is associated with a 2 percentage point decline that a trainee obtains an academic position at a top 25 research university. Holding constant university rank, being in a department ranked in the top 10 in its field is associated with a 7 percentage point increase in the probability of academic employment at a top 25 institution.

Discussion

By their nature, rankings imply that some training grants are superior to others in terms of trainee career outcomes. The rankings differ substantially in some cases depending on the particular career outcome under consideration. Because of this, administrators should consider carefully which outcomes are most important when making decisions based on the rankings. Readers should also bear in mind the rankings are also a function of the particular sample of trainees examined. In other words, the regression estimates used to construct the rankings have standard errors as shown in Table 8. Table 8 suggests that one can identify the most and least productive grants with some confidence but that the differences between grants in the middle of the rankings are generally not statistically

significant. Table 9 suggests that training grants associated with better ranked universities are associated with more successful trainees for five of seven outcomes examine. This suggests that principal investigators located at prestigious universities either attract better trainees or provide better training.

Table 1: Summary Statistics

Variable	Mean (Standard Deviation)
First Year of Training	1994.5 (4.53)
Predoctoral Trainee	0.59 (0.49)
Postdoctoral Trainee	0.42 (0.49)
Academic Appointment	0.40 (0.49)
Academic Appointment—Top 25 University	0.11 (0.31)
Publications	5.84 (10.24)
Citations	96.36 (278.41)
H-Factor	2.68 (4.09)
Confirmed NIH Grants	0.34 (0.94)
Confirmed NIA Grants	0.18 (0.61)

Table 2: Regression Adjusted Rankings of Principal Investigators Based on Trainee Career Outcomes.

			Ranking						
Principal Investigator	***Number of Trainees***	***Average***	***Academic Appointments***	***Academic Appointments—Top 25 Universities***	***H Factor Greater than 5***	***Star Researchers***	***Trainees with Confirmed NIH Grants***	***Trainees with Confirmed NIA Grants***	***Trainees with Confirmed or Unconfirmed Grants***
Principal Investigator 1	50	3.1	1	1	6	1	3	2	8
Principal Investigator 2	10	4.0	6	6	9	3	2	1	1
Principal Investigator 3	11	5.4	24	2	4	2	1	3	2
Principal Investigator 4	17	7.9	11	13	10	5	5	7	4
Principal Investigator 5	81	9.3	5	15	13	13	4	5	10
Principal Investigator 6	23	9.6	16	3	22	6	9	4	7
Principal Investigator 7	35	9.7	20	9	1	4	10	11	13
Principal Investigator 8	66	10.0	7	4	5	7	14	17	16
Principal Investigator 9	28	10.1	17	10	7	11	8	12	6
Principal Investigator 10	29	10.9	9	11	14	14	6	8	14
Principal Investigator 11	6	12.1	21	27	2	8	15	9	3
Principal Investigator 12	18	13.1	13	5	17	9	13	20	15
Principal Investigator 13	25	13.3	19	22	15	15	7	6	9
Principal Investigator 14	28	14.7	25	7	12	17	16	21	5
Principal Investigator 15	63	15.1	15	14	25	18	12	10	12
Principal Investigator 16	27	15.1	3	12	11	12	22	23	23
Principal Investigator 17	86	15.7	4	8	24	19	20	15	20
Principal Investigator 18	33	15.7	8	16	3	10	24	25	24
Principal Investigator 19	20	17.4	10	21	18	20	18	13	22
Principal Investigator 20	22	17.6	12	24	27	24	11	14	11
Principal Investigator 21	104	18.3	14	18	20	21	19	18	18
Principal Investigator 22	20	18.4	2	20	23	26	17	16	25
Principal Investigator 23	32	19.6	27	17	8	16	26	26	17

Principal Investigator 24	16	19.9	23	19	16	22	21	19	19
Principal Investigator 25	50	23.4	22	23	21	25	23	24	26
Principal Investigator 26	35	23.6	18	26	26	27	25	22	21
Principal Investigator 27	27	24.9	26	25	19	23	27	27	27

Notes: The sample includes all principal investigators with at least five trainees. We define an academic appointment as assistant, associate, or full professors at universities. We use the University of Florida rankings of research institutions to define top 25 institutions. H-factor is defined as the greatest number, H, such that an individual has at least H publications with H citations each. Star researchers have an academic appointment at a top 25 institution, have an H of 5 or higher, or have been awarded at least two NIH grants (non F-type). We assumed that individuals we were unable to locate did not have a current academic appointment and had an H less than 5. Confirmed NIH grants include non F-type grants that we were able to definitively attribute to the trainee in question. Unconfirmed NIH grants include all non F-type NIH grants we were able to match to trainees on the basis of first and last name. In performing our comparisons, we control for predoctoral and postdoctoral training, year of training, year of training squared, whether we originally collected data in 2003 or 2006, and whether our information was updated by the principal investigator.

Table 3: Regression Adjusted Rankings of Principal Investigators Based on Predoctoral Trainee Career Outcomes.

	Ranking								
Principal Investigator	***Number of Trainees***	***Average***	***Academic Appointments***	***Academic Appointments —Top 25 Universities***	***H Factor Greater than 5***	***Star Researchers***	***Trainees with Confirmed NIH Grants***	***Trainees with Confirmed NIA Grants***	***Trainees with Confirmed or Unconfirmed Grants***
Principal Investigator 7	14	4.4	13	9	1	2	1	2	3
Principal Investigator 1	39	5.9	1	1	14	1	10	5	9
Principal Investigator 15	28	6.0	7	5	10	7	4	4	5
Principal Investigator 6	21	6.1	14	2	18	4	2	1	2
Principal Investigator 5	78	6.6	4	11	8	9	3	3	8
Principal Investigator 9	15	7.0	20	7	3	5	7	6	1
Principal Investigator 14	19	10.1	18	4	5	8	17	13	6
Principal Investigator 18	22	10.4	5	15	4	6	15	15	13
Principal Investigator 12	8	10.7	15	13	12	17	5	9	4
Principal Investigator 10	18	10.9	10	8	17	15	6	8	12
Principal Investigator 19	9	11.3	3	12	11	16	12	7	18
Principal Investigator 16	12	11.6	11	6	6	10	16	18	14
Principal Investigator 21	66	12.0	6	10	15	13	13	10	17
Principal Investigator 23	9	12.1	8	19	2	3	21	21	11
Principal Investigator 25	12	12.9	12	18	13	18	11	11	7
Principal Investigator 17	43	13.4	9	3	20	11	18	14	19
Principal Investigator 22	13	13.9	2	14	16	19	14	17	15
Principal Investigator 2	5	15.0	21	21	7	12	9	19	16
Principal Investigator 20	15	15.0	16	17	21	21	8	12	10
Principal Investigator 27	13	16.3	19	16	9	14	19	16	21
Principal Investigator 26	26	19.4	17	20	19	20	20	20	20

Notes: The sample includes only principal investigators with at least five predoctoral trainees. We define an academic appointment as assistant, associate, or full professors at universities. We use the University of Florida rankings of research institutions to define top

25 institutions. H-factor is defined as the greatest number, H, such that an individual has at least H publications with H citations each. Star researchers have an academic appointment at a top 25 institution, have an H of 5 or higher, or have been awarded at least two NIH grants (non F-type). We assumed that individuals we were unable to locate did not have a current academic appointment and had an H less than 5. Confirmed NIH grants include non F-type grants that we were able to definitively attribute to the trainee in question. Unconfirmed NIH grants include all non F-type NIH grants we were able to match to trainees on the basis of first and last name. In performing our comparisons, we control for year of training, year of training squared, whether we originally collected data in 2003 or 2006, and whether our information was updated by the principal investigator.

Table 4: Regression Adjusted Rankings of Principal Investigators Based on Postdoctoral Trainee Career Outcomes.

	Ranking								
Principal Investigator	***Number of Trainees***	***Average***	***Academic Appointments***	***Academic Appointments —Top 25 Universities***	***H Factor Greater than 5***	***Star Researchers***	***Trainees with Confirmed NIH Grants***	***Trainees with Confirmed NIA Grants***	***Trainees with Confirmed or Unconfirmed Grants***
Principal Investigator 1	22	1.1	1	1	1	1	1	2	1
Principal Investigator 3	9	5.1	17	4	4	3	2	4	2
Principal Investigator 9	12	6.9	6	5	7	8	4	12	6
Principal Investigator 10	10	7.3	8	13	6	11	5	3	5
Principal Investigator 8	61	8.1	7	6	5	6	8	13	12
Principal Investigator 7	18	9.0	13	7	3	5	12	9	14
Principal Investigator 20	7	9.4	4	18	11	7	7	11	8
Principal Investigator 19	7	10.4	11	16	12	10	9	5	10
Principal Investigator 17	43	10.7	5	12	16	13	10	8	11
Principal Investigator 16	15	10.7	3	10	8	9	15	14	16
Principal Investigator 18	11	11.0	9	8	2	4	19	17	18
Principal Investigator 14	7	11.1	19	3	14	17	6	15	4
Principal Investigator 13	5	11.3	20	21	19	12	3	1	3
Principal Investigator 12	7	11.7	10	2	13	2	18	18	19
Principal Investigator 15	25	12.7	12	11	20	14	11	6	15
Principal Investigator 24	16	13.1	15	15	10	15	14	10	13
Principal Investigator 22	6	13.4	2	17	18	20	13	7	17
Principal Investigator 23	13	13.7	18	9	9	16	17	20	7
Principal Investigator 21	34	15.4	14	20	15	18	16	16	9
Principal Investigator 27	13	19.1	16	19	17	19	21	21	21
Principal Investigator 25	8	19.4	21	14	21	21	20	19	20

Notes: The sample includes all principal investigators with at least five postdoctoral trainees. We define an academic appointment as assistant, associate, or full professors at universities. We use the University of Florida rankings of research institutions to define top

25 institutions. H-factor is defined as the greatest number, H, such that an individual has at least H publications with H citations each. Star researchers have an academic appointment at a top 25 institution, have an H of 5 or higher, or have been awarded at least two NIH grants (non F-type). We assumed that individuals we were unable to locate did not have a current academic appointment and had an H less than 5. Confirmed NIH grants include non F-type grants that we were able to definitively attribute to the trainee in question. Unconfirmed NIH grants include all non F-type NIH grants we were able to match to trainees on the basis of first and last name In performing our comparisons, we control for year of training, year of training squared, whether we originally collected data in 2003 or 2006, and whether our information was updated by the principal investigator.

Table 5: Regression Adjusted Rankings of Principal Investigators Based on Trainee Career Outcomes—Excluding Trainees Identified as Neuro or Biological Science Trainees.

			Ranking						
Principal Investigator	***Number of Trainees***	***Average***	***Academic Appointments***	***Academic Appointments—Top 25 Universities***	***H Factor Greater than 5***	***Star Researchers***	***Trainees with Confirmed NIH Grants***	***Trainees with Confirmed NIA Grants***	***Trainees with Confirmed or Unconfirmed Grants***
Principal Investigator 1	50	2.9	1	1	6	1	3	6	2
Principal Investigator 2	9	5.3	8	14	7	3	2	2	1
Principal Investigator 3	11	5.4	25	2	4	2	1	1	3
Principal Investigator 4	17	7.6	12	13	9	5	4	4	6
Principal Investigator 7	29	8.7	20	6	1	4	10	11	9
Principal Investigator 6	23	8.7	16	3	20	6	7	5	4
Principal Investigator 10	29	10.4	7	10	12	14	8	14	8
Principal Investigator 9	28	10.7	18	9	8	11	9	8	12
Principal Investigator 11	6	12.1	22	27	2	7	14	3	10
Principal Investigator 5	67	12.6	10	19	16	21	5	10	7
Principal Investigator 13	25	12.9	17	23	15	15	6	9	5
Principal Investigator 8	50	13.4	5	5	14	12	20	24	14
Principal Investigator 12	18	13.9	14	4	18	9	13	16	23
Principal Investigator 15	63	14.9	15	12	25	17	12	12	11
Principal Investigator 16	27	15.0	3	11	10	13	22	22	24
Principal Investigator 14	28	15.0	27	7	11	16	17	7	20
Principal Investigator 18	31	15.7	6	15	5	10	26	26	22
Principal Investigator 17	86	16.3	4	8	24	19	21	19	19
Principal Investigator 23	18	17.0	23	18	3	8	24	17	26
Principal Investigator 19	20	17.0	11	21	17	18	19	20	13
Principal Investigator 24	15	17.0	24	16	13	20	15	15	16
Principal Investigator 21	87	17.3	9	17	22	22	18	18	15

Principal Investigator 22	19	18.3	2	20	23	26	16	23	18
Principal Investigator 20	22	18.3	13	24	27	23	11	13	17
Principal Investigator 25	46	22.7	21	22	19	24	23	25	25
Principal Investigator 26	35	23.6	19	26	26	27	25	21	21
Principal Investigator 27	25	25.4	26	25	21	25	27	27	27

Notes: The sample includes all principal investigators with at least five trainees. The sample excludes all trainees whose publications were primarily in the fields of neuro or biological sciences. In the analysis, however, we reweight the data assuming that trainees without confirmed publications would have been classified as neuro/medical scientists with the same probability as other trainees with the same PI. We define an academic appointment as assistant, associate, or full professors at universities. We use the University of Florida rankings of research institutions to define top 25 institutions. H-factor is defined as the greatest number, H, such that an individual has at least H publications with H citations each. Star researchers have an academic appointment at a top 25 institution, have an H of 5 or higher, or have been awarded at least two NIH grants (non F-type). We assumed that individuals we were unable to locate did not have a current academic appointment and had an H less than 5. Confirmed NIH grants include non F-type grants that we were able to definitively attribute to the trainee in question. Unconfirmed NIH grants include all non F-type NIH grants we were able to match to trainees on the basis of first and last name. In performing our comparisons, we control for predoctoral and postdoctoral training, year of training, year of training squared, whether we originally collected data in 2003 or 2006, and whether our information was updated by the principal investigator.

Table 6: Regression Adjusted Rankings of Principal Investigators Based on Predoctoral Trainee Career Outcomes—Excluding Trainees Identified as Neuro or Biological Science Trainees.

	Ranking								
Principal Investigator	***Number of Trainees***	***Average***	***Academic Appointments***	***Academic Appointments—Top 25 Universities***	***H Factor Greater than 5***	***Star Researchers***	***Trainees with Confirmed NIH Grants***	***Trainees with Confirmed NIA Grants***	***Trainees with Confirmed or Unconfirmed Grants***
Principal Investigator 7	10	4.3	12	4	2	3	1	7	1
Principal Investigator 15	28	6.0	8	6	9	6	4	6	3
Principal Investigator 1	39	6.1	1	1	13	2	11	10	5
Principal Investigator 6	21	6.4	14	2	19	4	2	2	2
Principal Investigator 9	15	7.4	20	7	3	5	8	3	6
Principal Investigator 5	65	9.0	9	13	10	13	5	9	4
Principal Investigator 23	7	9.7	2	21	1	1	21	1	21
Principal Investigator 14	19	10.6	18	5	5	8	16	8	14
Principal Investigator 10	18	10.7	11	9	16	14	6	12	7
Principal Investigator 12	8	10.9	15	12	14	16	3	5	11
Principal Investigator 18	20	11.1	6	15	4	7	18	15	13
Principal Investigator 19	9	11.3	4	11	11	15	12	18	8
Principal Investigator 25	12	11.4	7	20	12	19	9	4	9
Principal Investigator 16	12	11.9	13	8	7	9	15	13	18
Principal Investigator 21	58	12.9	5	10	18	17	13	17	10
Principal Investigator 17	43	13.6	10	3	20	11	17	19	15
Principal Investigator 22	12	13.6	3	14	15	18	14	14	17
Principal Investigator 2	5	14.3	21	18	6	10	10	16	19
Principal Investigator 20	15	15.0	16	17	21	21	7	11	12
Principal Investigator 27	12	15.9	19	16	8	12	19	21	16
Principal Investigator 26	26	19.0	17	19	17	20	20	20	20

Notes: The sample includes only principal investigators with at least five predoctoral trainees. The sample excludes all trainees whose publications were primarily in the fields of neuro or biological sciences. In the analysis, however, we reweight the data assuming that trainees without confirmed publications would have been classified as neuro/medical scientists with the same probability as other trainees with the same PI. We define an academic appointment as assistant, associate, or full professors at universities. We use the University of Florida rankings of research institutions to define top 25 institutions. H-factor is defined as the greatest number, H, such that an individual has at least H publications with H citations each. Star researchers have an academic appointment at a top 25 institution, have an H of 5 or higher, or have been awarded at least two NIH grants (non F-type). We assumed that individuals we were unable to locate did not have a current academic appointment and had an H less than 5. Confirmed NIH grants include non F-type grants that we were able to definitively attribute to the trainee in question. Unconfirmed NIH grants include all non F-type NIH grants we were able to match to trainees on the basis of first and last name. In performing our comparisons, we control for year of training, year of training squared, whether we originally collected data in 2003 or 2006, and whether our information was updated by the principal investigator.

Table 7: Regression Adjusted Rankings of Principal Investigators Based on Postdoctoral Trainee Career Outcomes—Excluding Trainees Identified as Neuro or Biological Science Trainees.

			Ranking						
Principal Investigator	***Number of Trainees***	***Average***	***Academic Appointments***	***Academic Appointments—Top 25 Universities***	***H Factor Greater than 5***	***Star Researchers***	***Trainees with Confirmed NIH Grants***	***Trainees with Confirmed NIA Grants***	***Trainees with Confirmed or Unconfirmed Grants***
Principal Investigator 1	22	1.1	1	1	1	1	1	2	1
Principal Investigator 3	9	5.1	17	4	4	3	2	4	2
Principal Investigator 9	12	6.9	6	5	7	8	4	12	6
Principal Investigator 10	10	7.3	8	13	6	11	5	3	5
Principal Investigator 8	61	8.1	7	6	5	6	8	13	12
Principal Investigator 7	18	9.0	13	7	3	5	12	9	14
Principal Investigator 20	7	9.4	4	18	11	7	7	11	8
Principal Investigator 19	7	10.4	11	16	12	10	9	5	10
Principal Investigator 17	43	10.7	5	12	16	13	10	8	11
Principal Investigator 16	15	10.7	3	10	8	9	15	14	16
Principal Investigator 18	11	11.0	9	8	2	4	19	17	18
Principal Investigator 14	7	11.1	19	3	14	17	6	15	4
Principal Investigator 13	5	11.3	20	21	19	12	3	1	3
Principal Investigator 12	7	11.7	10	2	13	2	18	18	19
Principal Investigator 15	25	12.7	12	11	20	14	11	6	15
Principal Investigator 24	16	13.1	15	15	10	15	14	10	13
Principal Investigator 22	6	13.4	2	17	18	20	13	7	17
Principal Investigator 23	13	13.7	18	9	9	16	17	20	7
Principal Investigator 21	34	15.4	14	20	15	18	16	16	9
Principal Investigator 27	13	19.1	16	19	17	19	21	21	21

Notes: The sample includes all principal investigators with at least five postdoctoral trainees. The sample excludes all trainees whose publications were primarily in the fields of neuro or biological sciences. In the analysis, however, we reweight the data assuming that

trainees without confirmed publications would have been classified as neuro/medical scientists with the same probability as other trainees with the same PI. We define an academic appointment as assistant, associate, or full professors at universities. We use the University of Florida rankings of research institutions to define top 25 institutions. H-factor is defined as the greatest number, H, such that an individual has at least H publications with H citations each. Star researchers have an academic appointment at a top 25 institution, have an H of 5 or higher, or have been awarded at least two NIH grants (non F-type). We assumed that individuals we were unable to locate did not have a current academic appointment and had an H less than 5. Confirmed NIH grants include non F-type grants that we were able to definitively attribute to the trainee in question. Unconfirmed NIH grants include all non F-type NIH grants we were able to match to trainees on the basis of first and last name. In performing our comparisons, we control for year of training, year of training squared, whether we originally collected data in 2003 or 2006, and whether our information was updated by the principal investigator.

Table 8: Regression Adjusted Measures of Trainee Career Outcomes by Principal Investigator.

	Dependent Variable						
Principal Investigator	***Academic Appointments***	***Academic Appointments—Top 25 Universities***	***H Factor Greater than 5***	***Star Researchers***	***Trainees with Confirmed NIH Grants***	***Trainees with Confirmed NIA Grants***	***Trainees with Confirmed or Unconfirmed Grants***
Principal Investigator 21	-0.02	-0.07**	-0.06*	-0.10**	-0.04	-0.04	-0.04
	(0.05)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)
Principal Investigator 15	-0.04	-0.02	-0.09**	-0.06	0.03	0.04	0.04
	(0.06)	(0.04)	(0.03)	(0.05)	(0.05)	(0.05)	(0.06)
Principal Investigator 23	-0.23**	-0.06	0.05	-0.03	-0.13**	-0.11**	-0.02
	(0.08)	(0.05)	(0.07)	(0.07)	(0.05)	(0.04)	(0.08)
Principal Investigator 11	-0.10	-0.16**	0.15	0.07	-0.02	0.05	0.2
	(0.21)	(0.03)	(0.19)	(0.19)	(0.15)	(0.15)	(0.2)
Principal Investigator 8	0.04	0.08	0.09	0.08	0.01	-0.04	-0.02
	(0.07)	(0.05)	(0.06)	(0.06)	(0.06)	(0.05)	(0.06)
Principal Investigator 17	0.07	0.03	-0.09**	-0.06	-0.05	-0.04	-0.07
	(0.05)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)	(0.05)
Principal Investigator 16	0.10	-0.01	0.03	-0.01	-0.07	-0.07	-0.10
	(0.08)	(0.06)	(0.07)	(0.07)	(0.06)	(0.05)	(0.08)
Principal Investigator 2	0.06	0.08	0.04	0.27	0.22	0.19	0.33**
	(0.16)	(0.13)	(0.12)	(0.17)	(0.16)	(0.15)	(0.16)
Principal Investigator 12	-0.02	0.08	-0.03	0.06	0.01	-0.05**	-0.02
	(0.12)	(0.09)	(0.03)	(0.09)	(0.09)	(0.03)	(0.10)
Principal Investigator 9	-0.06	0.02	0.07	0.04	0.08	0.01	0.13
	(0.08)	(0.06)	(0.08)	(0.08)	(0.08)	(0.06)	(0.09)
Principal Investigator 26	-0.07	-0.12**	-0.09**	-0.17**	-0.12**	-0.06**	-0.08
	(0.08)	(0.02)	(0.04)	(0.04)	(0.03)	(0.03)	(0.06)
Principal Investigator 25	-0.14	-0.10**	-0.06	-0.15**	-0.09*	-0.07**	-0.14**
	(0.07)	(0.04)	(0.05)	(0.05)	(0.05)	(0.03)	(0.06)
Principal Investigator 7	-0.08	0.03	0.24**	0.18**	0.07	0.04	0.03

	(0.07)	(0.06)	(0.08)	(0.08)	(0.08)	(0.06)	(0.08)
Principal Investigator 22	0.35**	-0.08**	-0.08**	-0.15**	-0.04	-0.04	-0.11
	(0.10)	(0.02)	(0.02)	(0.03)	(0.07)	(0.05)	(0.07)
Principal Investigator 13	-0.07	-0.09**	-0.02	-0.03	0.08	0.09	0.09
	(0.10)	(0.04)	(0.07)	(0.08)	(0.09)	(0.09)	(0.10)
Principal Investigator 6	-0.05	0.12	-0.06**	0.09	0.08	0.12	0.13
	(0.09)	(0.08)	(0.03)	(0.09)	(0.08)	(0.08)	(0.10)
Principal Investigator 19	0.01	-0.08**	-0.04	-0.07	-0.04	0.00	-0.08
	(0.11)	(0.02)	(0.02)	(0.05)	(0.05)	(0.05)	(0.07)
Principal Investigator 27	-0.20**	-0.11**	-0.05	-0.12**	-0.20	-0.12**	-0.29**
	(0.08)	(0.02)	(0.06)	(0.06)	(0.03)	(0.02)	(0.03)
Principal Investigator 24	-0.15	-0.07	-0.02	-0.12	-0.07	-0.05	-0.06
	(0.13)	(0.06)	(0.10)	(0.10)	(0.10)	(0.09)	(0.12)
Principal Investigator 3	-0.17	0.14	0.10	0.28*	0.33**	0.13	0.31**
	(0.15)	(0.14)	(0.13)	(0.16)	(0.16)	(0.15)	(0.15)
Principal Investigator 18	0.04	-0.05	0.12	0.05	-0.10**	-0.07*	-0.11*
	(0.09)	(0.04)	(0.08)	(0.07)	(0.05)	(0.04)	(0.06)
Principal Investigator 14	-0.18**	0.03	0.03	-0.04	-0.03	-0.06	0.13
	(0.09)	(0.07)	(0.08)	(0.08)	(0.08)	(0.05)	(0.10)
Principal Investigator 10	0.04	0.01	0.02	-0.02	0.08	0.08	0.03
	(0.09)	(0.06)	(0.06)	(0.07)	(0.08)	(0.07)	(0.08)
Principal Investigator 4	-0.01	-0.01	0.04	0.12	0.09	0.09	0.14
	(0.12)	(0.09)	(0.08)	(0.12)	(0.10)	(0.10)	(0.12)
Principal Investigator 20	-0.02	-0.1	-0.10**	-0.13**	0.04	-0.02	0.05
	(0.10)	(0.01)	(0.05)	(0.06)	(0.09)	(0.07)	(0.1)
Principal Investigator 1	0.38**	0.43**	0.08*	0.45**	0.12**	0.14**	0.12
	(0.07)	(0.08)	(0.05)	(0.08)	(0.06)	(0.06)	(0.07)
Principal Investigator 5	0.06	-0.05	0.02	-0.01	0.10*	0.10**	0.08
	(0.06)	(0.03)	(0.04)	(0.05)	(0.05)	(0.05)	(0.06)

Notes: The sample includes all principal investigators with at least five trainees. We define an academic appointment as assistant, associate, or full professors at universities. We use the University of Florida rankings of research institutions to define top 25 institutions. H-factor is defined as the greatest number, H, such that an individual has at least H publications with H citations each. Star researchers have an academic appointment at a top 25 institution, have an H of 5 or higher, or have been awarded at least two NIH grants (non F-type). We assumed that individuals we were unable to locate did not have a current academic appointment and had an H less than 5. Confirmed NIH grants include non F-type grants that we were able to definitively attribute to the trainee in question. Unconfirmed NIH grants include all non F-type NIH grants we were able to match to trainees on the basis of first and last name. In performing our comparisons, we control for predoctoral and postdoctoral training, year of training, year of training squared, whether we originally collected data in 2003 or 2006, and whether our information was updated by the principal investigator. The coefficients show the regression adjusted productivity of the principal investigator's trainees relative to the average principal investigator. Robust standard errors are in parentheses. * indicates significance at the 10 percent level. ** indicates significance at the 5 percent level.

Table 9: Regression Adjusted Measures of Trainee Career Outcomes by Institution and Department Rank

	Dependent Variable						
Independent Variable	***Academic Appointments***	***Academic Appointments—Top 25 Universities***	***H Factor Greater than 5***	***Star Researchers***	***Trainees with Confirmed NIH Grants***	***Trainees with Confirmed NIA Grants***	***Trainees with Confirmed or Unconfirmed Grants***
Institution Rank/10	0.00	-0.02**	-0.00	-0.03*	-0.02**	-0.02**	-0.03**
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Top 10 Department	0.03	0.07**	-0.01	0.03	-0.03	-0.03	-0.03
	(0.04)	(0.03)	(0.05)	(0.06)	(0.04)	(0.03)	(0.04)

Notes: We define an academic appointment as assistant, associate, or full professors at universities. We use the University of Florida rankings of research institutions. H-factor is defined as the greatest number, H, such that an individual has at least H publications with H citations each. Star researchers have an academic appointment at a top 25 institution, have an H of 5 or higher, or have been awarded at least two NIH grants (non F-type). We assumed that individuals we were unable to locate did not have a current academic appointment and had an H less than 5. Confirmed NIH grants include non F-type grants that we were able to definitively attribute to the trainee in question. Unconfirmed NIH grants include all non F-type NIH grants we were able to match to trainees on the basis of first and last name. In performing our comparisons, we control for predoctoral and postdoctoral training, year of training, year of training squared, whether we originally collected data in 2003 or 2006, and whether our information was updated by the principal investigator. The coefficients show the regression adjusted productivity of the principal investigator's trainees relative to the average principal investigator. Standard errors cluster corrected at the principal investigator level are in parentheses. * indicates significance at the 10 percent level. ** indicates significance at the 5 percent level. Note that the top university has a rank of 1, so a negative coefficient on university rank indicates better ranked universities are associated with better trainee outcomes.