Research Note

Indicators of Successful Submissions to the Law and Social Science Program of the National Science Foundation

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This article examines the overall success of 1,428 proposals submitted to the National Science Foundation's Law and Social Science Program between 1986 and 1997. On average, proposals were successful 30% of the time. The research examined a number of variables that might have influenced the success rate. The type of institution in which the Principal Investigator (PI) was employed and from which the proposal was submitted, the number of years since the PI had earned his or her Ph.D., and membership in the Law and Society Association at the time the proposal was submitted were significant factors. Variables that were not predictive of success included membership in the American Psychology-Law Society, the gender of the PI, and the type of institution from which the PI earned his or her terminal degree. Finally, persistence is a valuable strategy; proposals resubmitted for consideration after having been declined were more likely to be funded.

Earning extramural funding to support research and scholarship is a concern for the majority of scholars. It is of particular concern for social scientists when institutional budgets have many competing demands so that intramural support for research is decreasing. Yet, earning extramural grant support is an arduous task, and the factors that predict success in earning grants remain obscure. This Research Note examines the overall success of 1,428 proposals submitted to the National Science Foundation's Law and Social Science Program (LSSP) between 1986 and 1997. The results should be of interest to readers of the *Law & Society Review* because research funded by the program often appears in the pages of the *Review*.

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Although there is an extensive literature examining the factors determining the success of research funding as part of the reward system and scholarly consensus in science (Cole & Cole 1978; Cole 1981; see generally Cole 1991 and literature cited there), less empirical analysis has focused on the funding of social-scientific research. Some authors have explored the priorities federal funding agencies have given to research in health and social sciences (Adair 1980; Pincus & Fine 1992). Others focus on the gap between scientists' aspiration to do research and the low funding rates they must overcome (Kalucy 1983). In addition, some authors have given advice they believe will improve written applications for funding and thus enhance the likelihood of success (Rush, Gullion, & Prien 1996).

Of studies that have explored the factors predicting success in earning extramural funding, six specifically address success in various social science programs of the National Science Foundation (Intermaggio & Ing 1989; Mastriani & Plattner 1997; Plattner, Aronson, & Abellera, 1993; Plattner, Hamilton, & Madden 1987; Plattner & McIntyre 1991; Ploch 1978). Plattner et al. (1987, 1993) and Mastriani and Plattner (1997) found a 26–28.5% overall success rate for proposals submitted to the NSF Anthropology Program between 1980 and 1995, although the rate varied considerably, with a rate as low as 13% in some years and one as high as 42% in others. The authors were unable to identify predictors of success other than full professor status. Neither the elite status of the Ph.D.-granting institution of the investigator, the elite status of the employing institution, nor gender were generally predictive. In the Sociology Program, Ploch (1978) identified publication in the *American Journal of Sociology* and the *American Sociological Review* during the five years prior to the NSF submission and the prestige of the PI's current institution to be predictive of success in earning funding. These effects were small, accounting for only about 1% each of the variability in success. Intermaggio and Ing (1989) reported that 20% of the 593 proposals submitted to Social Psychology between 1982 and 1987 were funded. The rate varied between a high of 27% to a low of 14%. Like Plattner et al., Intermaggio and Ing were unable to identify statistically significant differences in funding rate based on gender or status of Ph.D.-granting institution; they did find significant differential success for proposals from scholars in more distinguished departments.

This Research Note focuses on the success rate for the Law and Social Sciences Program (LSSP), and the research on which it is based was designed to explore the factors that predict success in LSSP at NSF.

Law and Social Science Program

The LSSP has as its mandate to support social-scientific studies of law and law-like systems of rules. Research that advances our understanding of the impact of law on human behavior, the dynamics of legal decisionmaking, how changes in institutions or belief systems influence national legal systems, and those empirical investigations that promise to advance our understanding of sociolegal processes are supported. This very broad mandate provides the opportunity to support the research of sociolegal scholars from a variety of disciplines using a multitude of research methods.

Proposals are accepted twice per year. Each proposal submitted to the Program is sent to several ad hoc reviewers who are experts in the content of the proposed research.[1] In addition, each proposal is reviewed by members of an advisory panel who typically convene at the NSF. The recommendations of the panel, in conjunction with the ad hoc reviews and the judgment of the Program Officer, are the basis for a recommendation to fund or decline a particular proposal. The review process focuses on the scientific merit of the proposed research, the societal impact of the research, the methods and procedures the investigator(s) proposes to use to address the questions at issue, the competence of the investigator(s), and the institutional support available to conduct the proposed research. The Program receives many more high-quality proposals than it can support given the limited resources available.

Results

1. Overall Success Rate

From 1986 through 1997, the Law and Social Science Program received 1,428 research proposals. Proposals for dissertation improvement grants or for conferences and the like were excluded from this total.[2] The overall success rate across the period was 30%. This is somewhat higher than the rate reported by the Anthropology, Social Psychology, and Sociology Programs and also higher than the current average success rate for the Division of Social, Behavioral, and Economic Research (SBER) as a whole. The current success rate for proposals within SBER, the administrative home of LSSP, is about 30%[3] overall and about

[1] See Cole (1991) for a discussion of experimental replication of NSF funding decisions in chemical dynamics, economics, and physics.

[2] For the methodology, see the Appendix.

[3] Overall funding rate includes proposals for conferences, training and other projects consistent with NSF's mission but that are not strictly research activities.

25% for research proposals (unpublished data from the National Science Foundation, 1997).

The funding rate varied across years. The proportion of awards ranged between a high of a 38.6% success rate to a low of 22.2%. The range spanned the reported rates for other programs. The relation between success ratio and year was statistically significant, χ^2 (11; N = 1,428) = 19.69, p <.05. In general, PIs have been more successful during the past six years than they were during the previous six. Variability in success is due, in part, to the variability across years in the number and quality of submissions, the total amount of money available, the amount of money requested by PIs, and the number of awards made.

2. Resubmissions

Many times investigators who are turned down revise and resubmit their proposals. It appears that for submissions to the LSSP, persistence is a sensible strategy. If investigators resubmitted (one or more times) a proposal that was declined initially, 48.6% were eventually funded. Of 154 proposals that were resubmitted once, 71 (or 46%) were successful. Of 22 that were resubmitted twice, 14 (64%) were eventually funded. One person resubmitted a third time and was never funded, and two PIs resubmitted four times, and each was finally funded. These findings suggest that it may be in the best interest of investigators to take advantage of the constructive feedback they get from reviewers.

3. Law and Society Association Membership

Membership in professional associations may be predictive of success in earning grants, although this was not examined in most previous studies. The LSS Program funds research that is judged likely to make a major contribution to theory and the empirical database in the field. It is important that proposers be able to communicate how their research will move the frontiers of the field. Obviously, one learns where the frontiers of thought are (Cole 1991) by reading journals and by attending professional meetings. Membership in a professional association can in this way be a proxy for being current in one's field.

The most prominent of the professional societies of which investigators might be members are the American Judicature Society, the American Psychology-Law Society, the American Society of Criminology, the Law and Society Association (LSA), and the general professional associations: the American Bar Association, American Political Science Association, American Psychological Association, and the American Sociological Association. Because of the prominence of the LSA in the field of sociolegal

scholarship, we chose to examine the relation between LSA membership and success in earning grants.

Membership in the LSA was positively related to success. Those investigators who had never been members of the LSA submitted 68% of the proposals but were successful 24.2% of the time. Those who had been LSA members at one time but were not at the time they submitted their proposal represented only 5% of the PIs. They were successful 30% of the time. Most important, those who were members at the time of their submission (27% of the PIs) had a success rate of 44.3%. These differences in success rates were statistically reliable, χ^2 (2; N = 1,428) = 53.36, $p < .0001$. It appears that those PIs who are active in the LSA are more likely to be in touch with the frontiers of research in law and social science and are more likely, therefore, to be successful.

Because the relation between LSA membership and success was so strong, we decided to compare this relation with membership in another professional association. We tested the success rate for PIs from psychology departments who were members of the American Psychology-Law Society (APLS). Coding for APLS membership was dichotomous: they were members at the time of submission or they were not. Success for APLS members was higher than that of psychologists who were not members of APLS, but the relation failed to reach the traditional level of statistical significance, χ^2 (1; N = 157) = 2.92, $p <.09$.

4. Characteristics of PIs

Gender

A scientist's gender has been associated with success in publication, and those who earn extramural funding may be more successful than those who do not (de Meuse 1987). Whether gender is associated with success in LSSP funding is therefore of interest. A total of 401 proposals were submitted by women and 1,005 by men. The proportion of proposals submitted by each gender did not change over the 12 years that are the focus of this study, χ^2 (11; N = 1406) = 16.8, p = .11. Success rates for funding by women (28.7%) and by men (30.9%) did not differ, χ^2 (1; N = 1,406) = 0.69, p = .40, nor did the average award amounts differ for men (M = \$71,185) and women (M = \$72,940) PIs, F (1,403) = 0.18, p = .67.

Academic Experience

The data suggest that there was a linear relation between years since Ph.D. and probability of success. Those with more experience are more likely to be successful, F (1, N = 1,350) = 17.59, $p < .001$. This effect was qualified by an additional quad-

ratic effect. That is, there was a significant curvilinear relation between experience and success. The highest proportions of success were for faculty who had earned their Ph.D. 13–18 years earlier (37.9%) and 19–24 years earlier (38.0%). Those with Ph.D. degrees for 7 to 12 years were successful 27.7% of the time. Those with recent Ph.D.s (less than 7 years) and those who had held their terminal degrees for 25 years or more were less successful (20.0% and 30.7%, respectively). This curvilinear effect was statistically reliable, F (1, N = 1,350) = 12.43, $p < .001$.

5. Institutional Characteristics

Institution Type

Previous assessments of success rates at NSF have explored the impact of being trained at and working at "elite" schools on the probability of being funded (see Intermaggio & Ing 1989; Plattner et al. 1993). These investigators used the ratings of departments to define their criterion for "elite." Results have been mixed, and the issue has not been resolved.

Because the LSS Program spans so many disciplines, it was impossible to use department prestige ratings as a predictor. Rankings across departments and across years could not be presumed to be equivalent. In order to explore differences among institutions that could be comparable across disciplines and meaningfully related to institutional zeitgeist with respect to extramural funding, the Carnegie classification system was used (Carnegie Foundation for the Advancement of Teaching 1994). This system categorizes institutions by level and number of degrees offered. In addition, within the set of institutions offering the doctorate, those with high emphasis on research are divided from those with lower priority. The research institutions are also subdivided by the number of dollars in federal support they receive annually.

LSSP data revealed that most proposals come from Research I institutions[4] (N = 800; 56% of the total). This is not surprising because these institutions have a culture of pursuing extramural funding and of rewarding those who seek and secure such support. The second highest proportion of proposals emanated from research centers (11.0%; N = 157). Interestingly, small liberal arts colleges are also represented to some extent (2.9%, N = 41). Despite the pressures of large teaching loads and a reward system that does not put great emphasis on extramurally funded research, some faculty still choose to pursue sponsored research.

Both Research I and II institutions are above average in their success rates (31.6% and 34.4%, respectively). Interestingly, Doctoral II (21.7%) and Masters II (25%) institutions were more suc-

[4] See Appendix for classification scheme.

cessful than were Doctoral I and Masters I institutions (11.4% and 20.8%).

Finally, research centers are relatively successful in earning awards (38.2%). Indeed, PIs from these centers were more likely to receive funding than were faculty at research universities.

Department

The LSS Program is a broad-based, multidisciplinary program. It is not surprising, therefore, that proposals come from investigators from many theoretical and methodological backgrounds. The academic departments in which these investigators work serve as proxies for their disciplinary interests. Table 1 shows the frequency of proposal submission by academic department. The majority of proposals come from faculty members in political science, sociology, law schools, psychology, and criminal justice departments. Yet, as can be seen from the table, proposals come from a great number of disciplines such as history and statistics, and these investigators tend to be relatively successful in earning awards.

Table 1. Success Rate Overall and within Discipline by Department[a] of Principal Investigator

Department	No. of Proposals	% of Total	Proportion Successful
Anthropology	33	2.3	30.3
Biological sciences	10	0.7	10.0
Business	52	3.6	11.5
Criminal justice	114	8.0	20.2
Economics	81	5.7	30.9
Education	6	0.4	0.0
History	29	2.0	34.5
Law	168	11.8	19.0
Political science	165	18.6	44.5
Sociology	208	14.6	26.0
Psychology	157	11.0	32.5
Sociology/anthropology	15	1.1	33.3
Statistics	13	0.9	46.2
Technology	12	0.8	16.7
Urban studies	9	0.6	22.2
Other	76	5.3	22.4
Research organizations	137	9.6	40.9
Missing	43	3.0	
Total	1,428	100.0	30.2

[a] Department is taken as a proxy for the discipline of the principal investigator.

6. Multiple Predictor Analysis

To examine the simultaneous effects of several predictor variables on the probability of success, logistic regression analysis was employed. Predictors were PI gender, PI experience, PI academic department (dummy coded), and PI's institution type (dummy coded). In addition, whether the PI was a member of

LSA at some time during the years spanned by this study was included. The dependent variable was the log odds of earning an award.

Overall, the set of predictor variables was reliably predictive of success rate, χ^2 (13; N = 1,428) = 125.16, $p < .0001$. While the overall model was statistically significant, the most reliable and important individual predictors, uniquely contributing to our understanding of success rate were (1) being in a political science or in a psychology department, (2) being a senior investigator (having more years since Ph.D.), and (3) being a member of the LSA. Of these, LSA membership was the most important, Wald statistic = 34.11, $p < .0001$. Membership in the LSA was positively associated with the odds of being funded over and above the information provided by the other variables.

Discussion

The results of this research reveal interesting patterns that may be instructive for those considering submitting proposals to the Law and Social Science Program of the National Science Foundation. Overall, the data suggest that the chances of being successful in earning funding are low. Although the absolute rate of success varies from year to year, it generally varies around an average of about 30%. Because the success rate was based on more than 1,400 submissions across more than a decade, the result is robust.

Women are underrepresented in science and engineering, and we found that twice as many men submit proposals to the LSS Program as do women. PI gender is a predictor of who submits proposals. Given that a proposal was submitted, funding success (proportion awarded) was equal for female and male PIs. Success is gender neutral. Further, when awards were made, the average award size was equal across genders. There appears to be real gender equity in earning awards.

The type of institution from which PIs earned their Ph.D.s was not associated with success, either. In part, this is due to the very high proportion of faculty who earn their degrees from research universities. Likewise, the largest number of investigators who are funded earned their degrees from research universities. It is also true, however, that the largest number of investigators who are declined earned their degrees from research universities. Having earned a degree at an institution that emphasizes research does not increase success when these persons are on the job.

The type of institution from which the proposal originated did predict success. Investigators employed at research centers and research universities were most successful. This suggests that institutional climate facilitates success. Where institutions focus

on research as a primary activity in which faculty are to engage, resources are more likely to be allocated to supporting the research enterprise. For example, Sponsored Projects Offices' staff are experienced and sophisticated. University administrators are more likely to make decisions that foster the research enterprise (e.g., provide travel funds so faculty can attend professional meetings, return indirect cost money to those units that produce the awards that recover it, provide smaller teaching loads and more released time for faculty). Faculty see empirical research as a major portion of their jobs. They expect to do it and are more likely to pursue extramural funding support. In addition, persons with the personal characteristics that should predict success in grant getting (e.g., high energy level, persistence, moderate risk-taking) are more likely to be attracted to such institutions. A synergy is more likely to exist between institutional climate and individual style at these institutions.

Not only does an investigator's geolocation relate to funding success, where they are in their careers seems to matter as well. Recall that there was a curvilinear relation between years since a PI earned his or her Ph.D. and the probability of success.

Being persistent is a strategy that frequently pays off for LSSP investigators. Proposals that were turned down but were revised and resubmitted were, on average, more likely to be successful than were first-time submissions. Persistence is a sensible strategy *if* investigators use the feedback they got on the previous submission to revise the proposal. Differences across NSF programs or within programs over time are numerous, so these results may not generalize to other NSF programs. For example, program directors may differ in the number or proportion of reviews they solicit from scientists who also reviewed the previously submitted version of a proposal. Advisory panelists differ over time within programs and are mutually exclusive across programs. Funding pressures (the ratio of proposals to dollars) differ over time and across programs.

Finally, let us comment on the interesting finding that of all variables analyzed, LSA membership was the most important predictor of success. It strikes us as ironic that when people misstate the name of the LSS Program, they typically call it the Law and Society Program. The data reveal that there is a nontrivial relation between LSA and LSSP. LSA membership provides a professional identity and ties to other sociolegal scholars. It provides an annual occasion at which scholars interested in similar research areas can meet and share ideas. The same positive effects of association with scholars can be seen under the rubric of other professional societies (e.g., American Psychology-Law Society), although the relation in the APLS case was not nearly as strong.

An alternative argument for why success is associated with membership in a professional association is that reviewers' judg-

mental bias occurs in favor of society members. This explanation is colloquially known as the "Old Boys" effect. There was no way to test for this effect empirically, given the data available to us. Such a test would require, at a minimum, knowledge about the membership status of reviewers as well as of PIs and the ratings given by member reviewers to PIs who were and to those who were not also members. Evidence for an Old Boys effect would require that members rated other members' proposals higher than they rated those of nonmembers. Such a difference would be a necessary, but not a sufficient, condition to conclude that a bias existed. It is not clear exactly what additional data would be sufficient to draw such a conclusion. In any case, given the archival nature of this study, the reviewer information was not available. The question is addressable empirically, however, and could be the focus of future, prospective research.

The LSS Program attracts proposals from a very diverse set of disciplines. It is clear that the Program is not the exclusive province of any single group of investigators but supports research from across the spectrum. It is likely that even greater diversity among grantees can be expected in the future. Emerging areas relating to the recent advances in technology are just beginning to be explored by sociolegal scholars. For example, research on issues such as intellectual property rights and the Internet, sociolegal implications of biotechnology, DNA testing, and gene patenting are within the funding mandate of the LSS Program. The emergence of these broad, high-technology areas are likely to lead to changes in PI characteristics in the future. Further research should explore the impact of the changing sociolegal environment on success of proposals.

Appendix: Methodology

The sample was composed of all proposals submitted to the LSS Program during the fiscal years from 1986 through 1997. Data were drawn from the archival records on the NSF computer and from the hard copies of proposals where those were still available. Two variables used in the analyses had missing data: degree-granting institution and year of Ph.D. Instances of missing data occur because these variables were not in the computerized database, and the hard copy of the proposal could not be accessed.

Data were coded according to predetermined category codes. In instances where categorization was ambiguous, both authors discussed the code and decided by consensus. Variables coded included whether the proposal was funded, requested award amount, total award amount (if funded), the PI's current institutional affiliation, the PI's Ph.D.-granting institution, years since Ph.D., gender, whether the proposal was a resubmission, and whether the PI was a member of the Law and Society Association (LSA) at the time the proposal was submitted. Insti-

tutions were coded according to the Carnegie Foundation (1994) report on higher education under the following scheme:

Research I (50 or more doctoral degrees per year, high priority on research, and $40M or more per year in federal support)

Research II (50 or more doctoral degrees per year, high priority on research, and $15.5 to $40M or more per year in federal support)

Doctoral I (40 or more doctoral degrees per year across five disciplines)

Doctoral II (10 or more doctoral degrees per year across three disciplines or 20 in one)

Masters I (40 or more masters degrees per year across three or more disciplines)

Masters II (20 or more masters degrees per year in one or more disciplines)

Baccalaureate I (primarily undergraduate, 40% or more liberal arts degrees, restrictive in admissions)

Baccalaureate II (less than 40% liberal arts degrees or less restrictive admissions).

In addition, codes for Research Center (e.g., RAND Corporation, American Bar Foundation), Specialty School (e.g., independent Medical School), and individual awards were included.

Academic rank is typically not reported in proposals, so academic experience, coded as years since Ph.D., was used. Categories included those who had fewer than 7 years experience, those with 7 to 12 years experience, 13 to 18 years, 19 to 24 years, and those with 25 years' experience or more.

PIs were categorized into three groups depending on their LSA membership status. The coding distinguished among those who had never been members, those who had been members at some time but were not at the time of submission, and those who were members at the time the proposal was submitted.

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