NATIONAL SCIENCE FOUNDATION
NATIONAL SCIENCE BOARD
WASHINGTON, D.C. 20550

May 12, 1977

MEMORANDUM TO MEMBERS OF THE NATIONAL SCIENCE BOARD

Subject: Peer Review Survey

Attached is the final report on the peer review survey, Perceptions of the National Science Foundation Peer Review Process: A Report on a Survey of NSF Reviewers and Applicants.

The report is being formally transmitted to the House Committee on Science and Technology and is being released jointly by that Committee and the Foundation.

Vernice Anderson
Executive Secretary

Attachment

Parramore

PERCEPTIONS OF THE NATIONAL SCIENCE FOUNDATION PEER REVIEW PROCESS: A REPORT ON A SURVEY OF NSF REVIEWERS AND APPLICANTS

PERCEPTIONS OF THE NATIONAL SCIENCE FOUNDATION PEER REVIEW PROCESS:

A REPORT ON A SURVEY OF NSF REVIEWERS AND APPLICANTS

Prepared for
The Committee on Peer Review,
National Science Board and
The Committee on Science and Technology
U. S. House of Representatives

by

Deborah R. Hensler

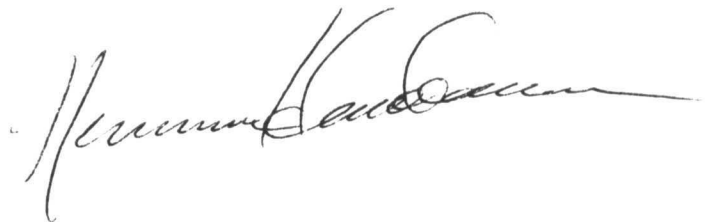December 1976

Prefatory Remarks of

Norman Hackerman
Chairman
National Science Board

April 25, 1977

A series of Congressional oversight hearings on the peer review process as used by the National Science Foundation (NSF) were held during the spring and summer of 1975. The National Science Board (NSB) and the Subcommittee on Science, Research, and Technology of the Committee on Science and Technology, U.S. House of Representatives, were both concerned over how the process was perceived by the scientists involved. Plans for a survey of opinions of recent applicants for NSF funds and a separate survey of scientists who reviewed NSF proposals were made jointly by the NSB and the House Subcommittee. The survey was carried out by Dr. Deborah R. Hensler, a consultant to the National Science Foundation.

We are happy to receive Dr. Hensler's report, <u>Perceptions of the National Science Foundation Peer Review Process: A Report on a Survey of NSF Reviewers and Principal Investigators.</u> This report gives a very careful and extensive examination of the responses to the survey questionnaires. Two closely related questionnaires were distributed to a sample of NSF reviewers and NSF potential principal investigators. The response to the questionnaires was unusually good. We believe this is an indication of the lively interest on the part of the scientific community in the United States, both in the National Science Foundation generally, and in its process of peer review.

The Board acknowledges with thanks Dr. Hensler's excellent work in the design and execution of the survey and preparation of this report. It also appreciates the assistance provided NSF by the staff of the House Committee on Science and Technology, particularly Dr. Thomas R. Kramer, as well as the excellent cooperation and assistance of the General Accounting Office in the conduct of the survey and validation of this report.

Prefatory Remarks of

James W. Symington
Former Chairman
Subcommittee on Science, Research and Technology
U.S. House of Representatives

April 25, 1977

The Subcomittee on Science, Research and Technology of the House
Committee on Science and Technology is responsible for legislation and
oversight concerning the National Science Foundation. As part of its
oversight activities the Subcommittee held six days of hearings into
National Science Foundation Peer Review during the Summer of 1975. The
Subcommittee's Report which followed the hearings called for the collec-
tion of further information concerning peer review. Even as the Report
was in preparation the peer review survey reported herein was undertaken
as a joint effort between the National Science Board and our House
Committee.

The survey and this analysis of its results are seen by the
Committttee as an important step in the study of peer review. The survey
is, of course, not the only step that should be taken, and other efforts
are underway in the Committee, the National Academy of Sciences, and
the Foundation itself. We are aware that the content of the survey
consists largely of the mercurial substance called opinion and, being
such, must be considered with care. We are also aware that the people
surveyed were from the Foundation's clientele and do not represent
a cross section of the scientific community, however defined.

So much being recognized at the outset, I believe Dr. Deborah R.
Hensler has done an excellent job and has responded well to the Committee's
interests in her construction of the questionnaire and analysis of the
responses. The questionnaire and analyses combine to provide answers
or partial answers to many questions in which the Committee had
previously expressed interest. There are other survey questions that
might have been desirable to ask and other data analyses that might have
been desirable to perform, but Dr. Hensler's questionnaire and report
represent a selection from among the most interesting questions and
analyses.

I particularly appreciate the willingness of those surveyed to reply
to the questionnaire. The Committee had indicated that a response rate of
over 75% was necessary to give the survey much credibility, and the goal
of exceeding that rate was achieved.

I appreciate also the efforts of the National Science Foundation staff and the General Accounting Office (GAO). At my request the GAO controlled receipt of the questionnaires to insure anonymity of the respondents, audited the keypunching of the data (excluding answers to questions soliciting a response in narrative form) to check that the data were accurately made machine readable, and tabulated the data independently. The GAO report indicates that all tabulations they have checked are quite accurate. The GAO report is bound with this volume.

Finally, the Committee believes that the narrative portions of Dr. Hensler's report reflect the data with fidelity to the extent that language is capable of reflecting numbers.

SUMMARY

In late 1975 the National Science Board and the House Subcommittee on Science, Research and Technology jointly commissioned a study to gather objective information about the scientific community's views of the peer review process. Two mail surveys were conducted: one directed to NSF reviewers and the other to recent applicants for NSF funds. Two questionnaires were designed to elicit information from these researchers about their experiences with the NSF review process, their evaluations of review procedures and their attitudes towards various modifications in the review process which were under discussion in the scientific community. Systematic random samples of reviewers and applicants were drawn from the Foundation's files of reviews and proposal actions. Data were collected from 1068 reviewers of NSF proposals and 2684 applicants for NSF funds in late 1975 and early 1976. Response rates for the two surveys were 82 percent and 85 percent respectively. The distribution of grantees and declinees in the respondent sample appears to be representative of the distribution in the total population (see Tables 1-3).

Response rates for both surveys indicate that the mail questionnaire survey is a viable technique for obtaining input from a cross-section of the scientific community served by the Foundation. The surveys do not measure the views of research investigators who have not applied for NSF funds or served as reviewers for NSF recently. Nor do they explore all aspects of NSF reviewers' and applicants' experiences with the NSF peer review process and attitudes towards this process. But they do present a general picture of how the Foundation's immediate audience views the process.

Analysis of responses focused on three major questions:

(1) What are the similarities and differences between NSF peer reviewers and applicants for NSF funds?

(2) What are reviewers' and applicants' attitudes towards the peer review process, based on their own most recent experiences with the process?

(3) What are reviewers' and applicants' perceptions of the outcomes of the peer review process as it is currently implemented, what changes would they like to see, and what are their reactions to modifications recently proposed by critics of the current system?

The main objective of the analysis was to describe reviewers' and applicants' perceptions and attitudes. Reviewers' and applicants' responses to survey items were cross-tabulated by selected background characteristics, such as academic generation, institutional affiliation and past experience regarding NSF. These data provide additional descriptive detail, but do not permit us to explain why differences in attitudes occur.

A comparison of professional background data on reviewers and applicants indicates that reviewers are quite similar to applicants. This finding was anticipated since there is a great deal of overlap between the two groups in the population. A majority of both reviewers and applicants have doctorate degrees which they received before 1970, and are currently affiliated with Ph.D.-granting institutions. Applicants are somewhat more likely than reviewers to belong to more recent academic generations and to be currently located at institutions with limited Ph.D.-granting programs or 4-year academic institutions. These differences are statistically significant at the 95 percent confidence level. Differences in background characteristics between reviewers and less frequent applicants, and reviewers and less successful applicants, are larger than differences between the total reviewer and applicant samples (see Table 4).

Although the Foundation's peer review process has recently been subjected to criticism from both the scientific community and Congress, the picture of the process that emerges from these surveys is generally positive, but respondents expressed concern about some aspects of the process.

Reviewers' assessments of the peer review process based on their own experience during the past two years are largely positive. Almost all indicate that, in their experience, the review process provided adequate time and information to conduct reviews. Almost all ad/hoc mail reviewers[1] thought the proposals they reviewed were appropriately matched with their background and expertise. A substantial majority of the panel reviewers felt that there was sufficient breadth of experience and expertise as well as enough specialized expertise among panel members to permit a competent review of proposals.

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[1]In the ad hoc mail review process one or more individuals are asked to review a proposal independently. The proposal is mailed to the reviewer for his review; he sends written comments back to the program officer. In contrast, in the panel review process, a group of reviewers meet to discuss a number of proposals and arrive at a recommendation to the program officer.

In response to the question: "Overall, would you say the (ad hoc mail review panel review) process as used for proposals you have reviewed during the past two years is : a sound review mechanism, an acceptable peer review mechanism with some weaknesses, (or) a questionable peer review mechanism with many weaknesses," few reviewers selected the most negative response. However about half of the ad hoc reviewers and one-third of the review panel members feel that each of these two systems while "acceptable," has some weaknesses (see Tables 5-6).

Views of the system generally do not differ significantly among reviewer sub-groups. There are weak but statistically significant relationships between reviewers' institutional affiliation and evaluation of the ad hoc process, and reviewers' funding source and their evaluation. Generally, reviewers from less heavily funded institutions and reviewers who are not themselves funded by NSF tend to evaluate the ad hoc review process *less* positively than other reviewers. (see Table 7).

Asked about strengths and weaknesses of the ad hoc/mail review system, reviewers give diverse responses. Broad participation of professionals and appropriate matching of reviewers to proposals are most frequently volunteered as strengths of the ad hoc system. Lack of opportunity for discussion among reviewers is the single most frequently mentioned weakness. About one-third of all responses regarding weaknesses of the ad hoc process relate to potential for bias in this system.

Improvements in reviewer selection procedures lead the list of suggestions for improving the ad hoc process. But there is little consensus on the improvements which should be made. (see Table 8).

Applicants' assessments of the peer review process based on their personal experiences with regard to the last proposal they submitted to the Foundation are also largely positive. Seventy-six percent of those who knew what type of review procedures were used thought they were "appropriate." Not surprisingly, evaluations of the appropriateness of the review procedures used are related to disposition of the proposal. But even among those whose proposals were declined, half feel the procedures were appropriate. A majority of unsuccessful applicants feel that the decision to decline was unfair but a substantial proportion—forty-three percent—feel that the decision was fair. About eighty-four percent of declinees who thought the decision was unfair, say they would have appealed the decision if a formal appeals process had existed.

Assessments of appropriateness of procedures and fairness of the funding decision do not appear to be related to academic generation,

institutional affiliation or region. However, those who have served
as NSF reviewers or who have received NSF grants in the past are more
likely to evaluate their most recent experience positively—even if
they were turned down—than those with less successful experience
dealing with NSF. Relationships between reviewer status and evaluation
and funding history and evaluation are statistically significant but
relatively weak (see Tables 12-13).

Applicants indicate varying degrees of knowledge about the review
procedures used for their most recent proposal. About twenty-nine per-
cent do not know what *type* of review—ad hoc or panel—was used. The
amount of acquaintanceship with reviewers and interaction with program
officers to receive feedback about reviews which is reported varies
with institutional affiliation, NSF reviewer experience, past experience
seeking NSF funds and disposition of current proposal. But these rela-
tionships, while generally statistically significant, are weak (see Tables 9-11).

About seventy-three percent of the applicants including both
grantees and declinees would favor NSF adopting a formal appeals system.
The reason for supporting such a system which is volunteered most frequen-
tly is that it would provide a remedy for mistakes and misjudgments. The
leading reason for opposing it is that it will further bureaucratize and
burden the review process.

Perhaps the most serious criticism of the NSF peer review process
which has been made is that it is "biased" against proposals from less
prestigious institutions, proposals by younger researchers, and proposals
which are "innovative" in character. Data from these surveys cannot
be used to confirm or refute this charge, since we collected no sub-
stantive or qualitative information about proposals. However, both
reviewer and applicant questionnaires included three questions to
measure respondents' general perceptions of bias in the system:

o   In general, if two equally good proposals are submitted to
    NSF in your area, one from a well-known institution and one
    from a lesser-known institution, do you think both proposals
    have an equal chance of being recommended for funding by the
    peer reviewers or one has a better chance than the other?

o   What if two equally good proposals are submitted, one with a young not-yet-established principal investigator and one with an older well-established principal investigator—do you think both proposals have an equal chance of being recommended for funding by the peer reviewers or one has a better chance than the other?

o   What about two equally good proposals, one for a project using approaches which are consistent with the mainstream of thought in your profession and one for a project which challenges the mainstream of thought—do you think both proposals have an equal chance of being recommended for funding by the peer reviewers or one has a better chance than the other?

A majority of reviewers and applicants believe that the NSF peer review process favors proposals from well-known institutions, proposals by older, well-established P.I.'s and proposals which are "in the mainstream." We do not know how respondents evaluate this perceived outcome (see Tables 14-14a).

Reviewers in general, and applicants who have also served as reviewers, are significantly more likely than non-reviewer applicants to think the system gives proposals from less-known institutions, proposals by younger applicants and innovative proposals an even chance. Perceptions of outcomes appear to be somewhat related to academic generation and institutional affiliation. Among both reviewers and applicants those who belong to the most recent academic generation and those at institutions with limited Ph.D.-granting programs and four year academic institutions are most likely to perceive institutional and generational bias in the review process. Among applicants the relationships between academic generation and perceptions, and institutional affiliation and perceptions, are statistically significant, but weak.

Applicants who have not been successful in obtaining NSF grants recently or in the past are most likely to think that the peer review process is biased. However, among reviewers, perceptions of outcomes generally do not differ significantly by experience obtaining NSF funds (see Tables 15a-15c).

A majority of reviewers and applicants are in favor of requiring peer review for all proposals, but would permit flexibility in determining the type of review used. A majority favors continuance of a strong role for the NSF staff in reviewer selection. But many would like to see reviewers selected from a "previously identified pool of experts," whether by the NSF staff, by a random sampling technique or by a combination of the two. Suggestions for constructing such a pool which were volunteered by respondents, include deriving names from citation indices, nomination by NSF staff and nomination by professional societies, among others. But suggestions were diverse, with no single proposal favored by a majority of respondents (see Tables 16-17).

A substantial minority of respondents--about one-third of reviewers and almost forty percent of applicants--is in favor of introducing some degree of randomization into the reviewer selection process.

Attitudes towards these aspects of review procedures vary somewhat by directorate.

A larger proportion of reviewers and applicants in the Biological, Behavioral and Social Science Directorate are in favor of requiring peer review compared to those in other directorates. Those in the Education Directorate and RANN are least likely to favor such a requirement. Reviewers and applicants in BBSS and the Astronomical, Atmospheric, Earth and Ocean Science Directorate are more likely to favor requiring both ad hoc and panel review for all proposals than those in other directorates. Among applicants, those in Education and BBSS are more likely to favor introducing randomization into the reviewer selection process than those in other directorates. Among reviewers, views on this issue are more similar across directorates (see Tables 18a-18b).

Reviewers' and applicants' attitudes towards requiring peer review, requiring specific types of peer review and introducing randomization into the reviewer selection process vary somewhat with academic generation and institutional affiliation but the patterns are not entirely consistent (see Tables 19a-19c).

A substantial majority of reviewers and applicants approve of NSF's new policy of providing verbatim review comments to applicants. About two-thirds of the applicants surveyed indicate they personally would have found verbatim review comments useful the last time they submitted

a proposal to NSF. Respondents who favor a policy of providing verbatim reviews to applicants say the reviews help applicants to understand the reasons for reviewers' reactions, permit applicants to judge reviewers' competence and provide a possible basis for rebutting reviews.

A minority of reviewers—nineteen percent—would approve of a policy of identifying reviewers to applicants and thirty-five percent say they would refuse to continue as reviewers if such a policy were adopted. But close to one-third of the applicants would approve of such a policy. Among the applicants who have *not* also served as reviewers recently more than forty percent would approve of identifying reviewers. Applicants from more recent academic generations and those affiliated with academic institutions which are *not* among the top twenty in federal research funding are more likely than other applicants to approve of identifying reviewers to applicants. Applicants with recent or previously unsuccessful experience obtaining NSF funds are most likely to approve of identifying reviewers.

Those who disapprove of identifying reviewers feel that this would lead to lower quality reviews and more difficulty securing participation of reviewers, and that it would cause bad feelings among colleagues in the scientific community, among other results.

A policy of treating reviews as public information is opposed by substantial majorities of reviewers and applicants. Among non-reviewer and unsuccessful NSF applicants about thirty percent would support such a policy. Those who oppose this policy indicate that it would lead to lower quality reviews and difficulty securing cooperation of reviewers and that it would infringe on the proprietary right of applicants (see Tables 20a-24).

CONTENTS

LIST OF TABLES

I. INTRODUCTION

Recently there has been considerable discussion in the scientific community and in Congress about the National Science Foundation peer review process. During the spring and summer of 1975 a series of Congressional oversight hearings on the peer review process were held by the subcommittee on Science, Research and Technology, of the U.S. House Committee on Science and Technology. A special task committee was established by the National Science Board to study the process. In late 1975 the National Science Board and the House Subcommittee on Science, Research and Technology jointly commissioned a study to gather objective information about the scientific community's views of the peer review process. The National Science Board and the U.S. House Subcommittee were interested in the opinions of three groups within the scientific community: NSF peer reviewers, recent applicants for NSF funds and scientific researchers who were neither reviewers nor recent applicants. After some consideration, the committees decided that it was not feasible to survey the latter group. But by drawing from the Foundation's files of reviews and proposal actions, it was possible to select two independent samples of recent NSF reviewers and applicants.

Two questionnaires were designed to elicit information from these researchers about their experiences with the NSF review process, their evaluationsof review procedures and their attitudes towards various modifications in the review process which were under discussion in the scientific community. The committees developed the specifications for the information to be collected, and reviewed the final sampling plans and final questionnaires.

Utilizing a mail survey technique, data were collected from 1068 reviewers of NSF proposals and 2684 applicants for NSF funds in late 1975 and early 1976. The data were coded, processed, and tabulated in spring 1976 under the direction of the National Science Foundation. Coding, processing and

II. METHODOLOGY

The sample of reviewers of NSF proposals was selected from the Foundation's file of all individuals who completed one or more reviews of proposals that were acted upon during fiscal year 1974 (the most recent file available for processing). This file includes members of peer review panels and individuals who completed independent ad hoc or mail reviews, for a total of about 31,000 peer reviewers in fiscal 1974. A systematic random sample of 1552 reviewers was selected to be surveyed.

The sample of applicants for NSF research funding was selected from the Foundation's file of all proposals that were awarded, declined or withdrawn during fiscal year 1975. Proposals from foreign institutions, pro- posals for travel grants, fellowships and miscellaneous grants to institutions were excluded from the sample. The total eligible population consisted of about 20,000 proposal actions, from which a systematic random sample of 3390 actions was selected for the survey.

Most of the proposals sampled had one prospective principal investi- gator, but 381 proposals had two or more co-investigators. The investi- gator whose name appeared first on the proposal—in most cases the senior investigator—was designated as the survey respondent for these proposals. Among the applicants who were selected as a result of the systematic sampling of actions there were 134 applicants who had two or more proposals acted upon in fiscal 1975. Since each applicant was sent only one questionnaire to complete, the total number of *individual applicants* selected to be surveyed was 3256.

A questionnaire was mailed to each individual in the reviewer and applicant samples accompanied by a cover letter explaining the purpose of the study.[1] The cover letter was co-signed by the Chairman of the National Science Board and the Chairman of the U.S. House Subcommittee on Science,

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[1] Since about sixty percent of NSF applicants are also asked to serve as reviewers at one time or other some individuals could have been selected for both surveys. We estimate the probability of this occurring was .008 or a total of about 100 cases out of the estimated 12,500 which comprise the population of reviewer-applicants. We made no attempt to identify these respondents prior to sending out questionnaires. Thus some individuals received both questionnaires. We do not know the proportion of cases where both were completed.

Research and Technology. Questionnaires were mailed in early November, 1975. A follow-up "reminder" letter was mailed to non-respondents approximately one month later. A final request for cooperation was mailed to remaining non-respondents in early January 1976.

Return envelopes for the completed questionnaires were identified with the respondent's name and institution so that the follow-up procedures for non-respondents could be implemented appropriately. Return envelopes were received by the NSF unit of the General Accounting Office, which recorded the receipt, removed the questionnaire, and then destroyed the envelope with its identifying information. The questionnaires them-selves did not contain respondents' names. They were identified only by a sequence number which bore no relationship to the original file of records from which the sample was drawn. In order to protect the anonymity of respondents, the NSB Task Force Committee decided not to assign identifying numbers which could be linked back to the master file. The questionnaire did ask for certain background information which could have been used to identify some respondents. A number of respondents, noting this, preferred not to complete those items although they did respond to questions about their experiences and attitudes.

Table 1 presents the response data for both surveys. As expected these well-educated and interested populations had a higher response rate than is usually experienced for mail surveys of the general public. More than eighty percent of those contacted returned completed question-naires. Because of the Task Force Committee's decision not to identify non-respondents for any purpose other than follow-up mailings, we do not know the characteristics of non-respondents. Therefore, we were not able to systematically investigate evidence of non-response bias.

But we can make some comparisons between respondents to the surveys and the populations from which they were drawn, utilizing aggregate statistics reported by the Foundation. For reviewers the only comparable background datum available was the percentage distribution of reviews by region of

Table 1

RESPONSE RATES FOR REVIEWER AND APPLICANT SURVEYS

	REVIEWER SURVEY	APPLICANT SURVEY
TOTAL SAMPLE	1552	3256
NOT LOCATED[a]	256	108
NET SAMPLE	1296	3148
COMPLETED QUESTIONNAIRES RETURNED	1068	2684
COMPLETION RATE (TOTAL NO. OF RESPONDENTS/TOTAL SAMPLE)	68.8	82.4
RESPONSE RATE (TOTAL NO. OF RESPONDENTS/TOTAL SAMPLE - UNLOCATABLE RESPONDENTS)	82.4	85.3

[a]Cases for which the mail questionnaire was returned "undeliverable"; among reviewers, also includes some cases for which NSF files did not include an adequate mailing address.

reviewers' institution.[1] Table 2 indicates that reviewers from the
South are underrepresented among the respondent sample, while reviewers
from the mid-west are somewhat overrepresented. These differences are
slightly greater than would be expected on the basis of sampling error
alone.

For applicants we were able to obtain population data showing the
distribution of actions by directorate and disposition, and by region.
We can compare these to respondents' indication of the directorate to
which their last proposal was submitted, action on that proposal and
the region of their current institution. Table 3 shows that the respon-
dent distribution by NSF Directorate quite accurately represents the
percentage distribution of the population of all actions by directorate, with
the exception of applicants to the Science Education Directorate. Appli-
cants to the Mathematics and Physical Sciences Directorate are somewhat
overrepresented, while applicants to the AAEOS Directorate are slightly
underrepresented. These differences are slightly larger than would be
expected on the basis of sampling error alone. The substantially larger
difference between the percent of total actions taken by the Science
Education Directorate and the percent of respondents reporting submission
of a proposal to that Directorate may reflect a response bias. But
another interpretation of these data is that respondents who submitted
proposals in the education area may have mistakenly recorded the *substantive
area* which the proposals related to rather than the actual directorate to
which they were submitted.

During the design of the survey, concern was expressed that there would
be some relationship between proposal disposition and respondent interest
in participating in the survey. We were therefore particularly concerned
about how the respondent distribution by disposition of proposal would
compare with the population distribution. Table 3 shows the proportion
of self-reported "successful" and "unsuccessful" applicants compared to
the percent of "awards" and "declines" in the action file. Overall, the

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[1]NSF reports statistics regarding *reviews* and *actions* rather than
reviewers and applicants. The geographical distribution of reviews and
reviewers should be the same, unless there is a regional bias in number
of reviews per reviewer.

Table 2

DISTRIBUTION OF RESPONDENTS TO REVIEWER SURVEY,
AND SAMPLE UNIVERSE BY REGION

	FISCAL 1974[a] REVIEW FILE	RESPONDENTS TO REVIEWER SURVEY
	% of Reviews	% of Respondents
REGION		
NORTHEAST	28.5	29.9
SOUTH	28.1	21.6
MIDWEST	19.8	23.7
WEST	23.5	24.9
TOTAL NUMBER OF CASES	114,353	1010[b]

[a]Source: *Analysis of Fiscal 1974 Reviewer file.*

[b]Excludes non-responses and uncodeable responses.

Table 3

DISTRIBUTION OF RESPONDENTS TO APPLICANT SURVEY, AND SAMPLE UNIVERSE, BY DIRECTORATE, REGION, AND DISPOSITION OF PROPOSAL

	FISCAL 1975 ACTION FILE[a]	RESPONDENTS TO APPLICANT SURVEY
	% of Actions	% of Respondents
DIRECTORATE		
BIOLOGICAL, BEHAVIORAL & SOCIAL SCIENCES	25.5	26.2
MATHEMATICS, PHYSICAL SCIENCE & ENGINEERING	31.6	36.8
ASTRONOMY, ATMOSPHERIC, EARTH & OCEAN SCIENCES	12.3	9.7
EDUCATION	21.1	10.5
RANN	8.8	7.6
OFFICE OF THE DIRECTOR	0.7	Not included in questionnaire response category
OTHER AND DON'T KNOW	Not applicable	9.1
TOTAL NUMBER OF CASES	20,101	2684
DISPOSITION OF PROPOSAL		
AWARD	51.1	54.4
DECLINE	43.6	40.1
WITHDRAWAL	6.3	2.7
DON'T KNOW, NO REPORT	--	2.8
TOTAL NUMBER OF CASES	20,101	2684

[a]Source: Analysis of Fiscal 1975 Action File

Table 3, cont.

DISPOSITION OF AWARD, BY DIRECTORATE	FISCAL 1975 ACTION FILE[a] % of Actions	RESPONDENTS TO APPLICANT SURVEY % of Respondents
BIOLOGICAL, BEHAVIORAL & SOCIAL SCIENCES		
AWARD	45.8	49.6
DECLINE	45.5	45.0
WITHDRAWAL	8.7	5.3
TOTAL NUMBER OF CASES	5130	693[b]
MATHEMATICS, PHYSICAL SCIENCE & ENGINEERING		
AWARD	56.4	59.2
DECLINE	39.6	39.4
WITHDRAWAL	4.0	1.5
TOTAL NUMBER OF CASES	6353	963[b]
ASTRONOMY, ATMOSPHERIC, EARTH & OCEAN SCIENCES		
AWARD	61.6	71.8
DECLINE	32.0	27.1
WITHDRAWAL	6.3	1.2
TOTAL NUMBER OF CASES	2472	255[b]
EDUCATION		
AWARD	42.6	54.2
DECLINE	55.5	45.5
WITHDRAWAL	1.9	0.4
TOTAL NUMBER OF CASES	4232	275[b]
RANN		
AWARD	38.3	53.5
DECLINE	43.2	39.4
WITHDRAWAL	18.4	7.1
TOTAL NUMBER OF CASES	1766	198[b]

[a]Source: Analysis of Fiscal 1975 action file.

[b]Excludes non-responses and uncodeable responses.

Table 3, cont.

REGION OF CURRENT INSTITUTION	FISCAL 1974 ACTION FILE[a] % of Actions	RESPONDENTS TO APPLICANT SURVEY % of Respondents
NORTHEAST	28.4	28.6
SOUTH	24.5	24.1
MIDWEST	24.6	23.3
WEST	22.4	23.8
TOTAL NUMBER OF CASES	19,521	2591[b]

[a]Source: *NSF Program Officers Workload Status Report*, Fiscal Year 1974.

[b]Excludes non-responses and uncodeable responses

respondent distribution appears quite representative with differences within the range of sampling error. However, the respondent-reported distribution of disposition appears less representative for some directorates than others. Applicants whose proposals were withdrawn are consistently under-represented. This may reflect response bias or a confounding of response bias with misreporting of directorate and disposition by respondents.

The questionnaires sent to survey respondents asked reviewers and applicants about their respective experiences with the peer review process, attitudes toward various aspects of the process, perceptions of the outcomes of the process, and reactions to specific modifications of the process which had been recently adopted by the National Science Board or proposed by Board members or others. Respondents were also asked to provide background data on their training, current research and institutional affiliation and past experience seeking research funds from NSF and other federal agencies.

The questionnaires were comprised predominantly of "closed-ended" or fixed-alternative items. The reviewer and applicant questionnaires each contained a special set of questions regarding the respondent's experience with the peer review process which was appropriate to that particular perspective. Identical questions about general attitudes towards the process and possible modifications to it appeared in both questionnaires. A small number of questions asked respondents to write in the reasons for their choice of a particular response. Responses to these "open-ended" or "free response" questions were then categorized by trained survey questionnaire coders.

Although the questionnaires had not been subjected to rigorous pre-testing, the distribution of responses, small percent of non-responses on most items and marginal comments appearing on many questionnaires, suggest that most respondents understood and were comfortable answering the questions. Item non-response was less than five percent for most of the closed-ended questions. Non-response was higher for questions about the respondent's background which some respondents felt posed a potential for breach of anonymity. On most of these items non-response was less than ten percent.

The main objective of the analysis was to *describe* reviewers' and applicants' perceptions and attitudes. Reviewers' and applicants' responses to survey items were cross-tabulated by selected background characteristics, such as academic generation, institutional affiliation and past experience regarding NSF. These data provide additional descriptive detail, but do not permit us to explain why differences in attitudes occur.[1]

The analysis described in this report focused on three major questions:

(1) What are the similarities and differences between NSF peer reviewers and applicants for NSF funds?

(2) What are reviewers' and applicants' attitudes towards the peer review process, based on their own most recent experiences with the process?

(3) What are reviewers' and applicants' perceptions of the outcomes of the peer review process as it is currently implemented, what changes would they like to see, and what are their reactions to modifications recently proposed by critics of the current system?

Below we discuss the results of our analysis of survey response data pertaining to each of these questions.

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[1] Differences between sub-groups are reported to be "statistically significant" when a standard difference-of-proportions test indicated that, if the "true" population values were the *same* the observed difference would occur in only five out of one hundred instances. "Statistically significant" *relationships* between two variables are reported when the value of Chi-square is large enough that we can infer, at the 95 percent confidence level, that the two variables are *not* statistically independent. Because the value of Chi-square is greatly influenced by sample size and table size (number of cells) we should be careful of inferring too much from "statistically significant" values. Chi-square does not indicate how *strongly* two variables are related. In this analysis the Phi statistic and Cramer's V (a modification of Phi for large tables), Lambda and the uncertainty coefficient were used to measure the strength of relationships between two variables.

III. RESULTS

CHARACTERISTICS OF REVIEWERS AND APPLICANTS

Survey respondents were not asked for personal data such as age or sex, since it seemed that inclusion of such items might increase their concern about breach of confidentiality. However, the questionnaires did include items about professional background. A tabulation of these professional background data shows that reviewers and applicants are quite similar to each other. These data are presented in Table 4.

Not surprisingly, most respondents have doctorate degrees. About half of each group received their degrees at Ph.D.-granting universities which are *currently* among the top twenty in amount of federal research funds received annually.[1] Another third (among reviewers) to forty percent (among applicants) received degrees at other Ph.D.-granting institutions. The remainder received degrees at institutions with limited Ph.D.-granting programs or four-year academic institutions. Collectively, reviewers represent 138 different alma maters while applicants represent 242.

About seventy percent of each group is currently employed at a Ph.D.-granting institution. About one-quarter of the reviewers and one-fifth of applicants are at universities which were among the top twenty in federal research funding in fiscal 1974. Eighteen percent of applicants, as compared to seven percent of reviewers are at institutions with limited Ph.D.-granting programs or four-year academic institutions. Collectively, reviewers currently represent 207 different academic institutions while applicants represent 531 different academic institutions.

Differences between reviewers and applicants with regard to degree institution and current institutional affiliation are statistically significant at the 95 percent confidence level.

Reviewers as a group belong to a somewhat older academic generation than applicants. This difference is also statistically significant at the 95 percent confidence level.

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[1]Institutional affiliations were coded using the AAUP categorization system which differentiates doctorate-granting institutions which confer 15 or more doctorates in at least three disciplines in the prior three year period, other institutions awarding degrees above the baccalaureate, other four-year academic institutions and other academic institutions. The category of Ph.D.-granting institutions was further divided into two categories; the twenty academic institutions which received the greatest amount of federal research funds in 1974, and others.

Table 4

CHARACTERISTICS OF SURVEY RESPONDENTS

| | REVIEWERS | APPLICANTS | | |
	% OF ALL RESPONDENTS	% OF ALL RESPONDENTS	% OF RESPONDENTS WITH NO PREVIOUS APPLICATIONS, PAST 5 YEARS[a]	% OF RESPONDENTS WITH ONLY UNSUCCESSFUL PREVIOUS APPLICATIONS, PAST 5 YEARS[a]
DEGREE				
Ph.D.	88.3	91.1	82.6	91.6
TOTAL	1030[b]	2631[b]	557[b]	596[b]
DESCRIPTION OF DEGREE-GRANTING INSTITUTION				
AMONG TOP 20 IN FEDERAL RESEARCH FUNDING	51.8	45.3	39.3	40.7
OTHER Ph.D.-GRANTING INSTITUTIONS	33.7	40.7	45.8	47.4
OTHER ACADEMIC INSTITUTIONS[c]	2.0	3.2	6.2	3.1
OTHER, INCLUDING NOT CLASSIFIED	12.5	10.9	8.7	8.8
TOTAL	1068	2684	565[a]	604[a]
ACADEMIC GENERATION (Date Highest Degree Received)				
PRE-1960	49.0	33.8	27.6	24.5
1960-1969	44.0	46.1	35.6	51.0
1970-ON	7.0	19.8	36.9	24.5
TOTAL	1037	2619[b]	548[b]	592[b]

[a] Does not include most recent proposal action.

[b] Excludes non-responses and uncodeable responses.

[c] Institutions with limited Ph.D-granting programs and 4-year academic institutions.

	REVIEWERS	APPLICANTS		
	% OF ALL RESPONDENTS	% OF ALL RESPONDENTS	% OF RESPONDENTS WITH NO PREVIOUS APPLICATIONS PAST 5 YEARS[a]	% OF RESPONDENTS WITH ONLY UNSUCCESSFUL PREVIOUS APPLICATIONS, PAST 5 YEARS[a]
DESCRIPTION OF CURRENT INSTITUTION				
AMONG THE TOP 20 IN FEDERAL RESEARCH FUNDING	25.3	20.5	19.1	10.9
OTHER Ph.D.-GRANTING INSTITUTION	41.9	50.0	40.9	54.3
OTHER ACADEMIC INSTITUTIONS[c]	6.8	18.0	26.3	23.5
GOVERNMENT	10.4	6.7	9.2	7.1
NON-ACADEMIC	10.2	1.0	1.1	.5
OTHER, INCLUDING NOT CLASSIFIED	5.4	3.9	3.4	3.6
TOTAL	1068	2684	565	604
REGION OF CURRENT INSTITUTION				
NORTHEAST	29.9	28.6	32.1	24.3
SOUTH	21.6	24.1	25.3	29.6
MIDWEST	23.7	23.3	23.3	26.5
WEST	24.9	23.8	19.4	19.7
TOTAL	1010[b]	2591[b]	546	585
SOURCE OF RESEARCH FUNDING - PAST 5 YRS.				
NO GOVT. RESEARCH FUNDING	25.9	16.2	35.1	36.0
NON-NSF FUNDING ONLY	21.8	11.5	21.9	28.5
NSF AND OTHER GOVT. FUNDING[d]	26.8	33.7	19.4	15.8
NSF FUNDING ONLY[d]	25.6	38.6	23.6	19.7
TOTAL	1025[b]	2538[b]	535[b]	594[b]

[a]Does not include most recent proposal action

[b]Excludes non-responses and uncodeable responses.

[c]Institutions with limited Ph.D-granting programs and 4-year academic institutions.

[d]*Includes* most recent proposal action. For respondents with no previous applications during the past 5 years and those with only unsuccessful previous applications,(i.e., right-most two columns) refers *exclusively* to recent proposal--e.g., 19.4 percent of respondents with no previous application to NSF during the past 5 years were funded by another government agency plus an NSF award for their recent proposal.

| | REVIEWERS | APPLICANTS | | |
	% OF ALL RESPONDENTS	% OF ALL RESPONDENTS	% OF RESPONDENTS WITH NO PREVIOUS APPLICATIONS PAST 5 YEARS[a]	% OF RESPONDENTS WITH ONLY UNSUCCESSFUL PREVIOUS APPLICATIONS PAST 5 YEARS[a]
NO. OF NSF AWARDS RECEIVED PAST 5 YRS.[b]				
NO APPLICATIONS	36.0	---		
APPLICATION, NO AWARD	13.1	26.5		
1 AWARD	19.9	25.6		
2 AWARDS	16.1	21.1	NOT APPLICABLE	
3 AWARDS	6.6	10.7		
4 OR MORE AWARDS	7.9	12.8		
OTHER (NOT CODEABLE)	2.3	3.3		
TOTAL	1068	2684		
REVIEWING EXPERIENCE				
% SERVING AS NSF PEER AND/OR PANEL REVIEWERS DURING PAST 2 YRS.	100%	59.3%	31.9	38.9
TOTAL	1068	2660[c]	565[c]	604[c]

[a]Does not include most recent proposal action

[b]Includes most recent action.

[c] excludes non-responses and uncodeable responses.

Both samples have virtually the same geographic distribution.

Half of the reviewers report that they have received funding from NSF during the past five years, as compared to seventy percent of the applicants. The latter group includes both those who received funding from NSF during the five years prior to submittal of the proposal which led to sampling the respondent for this study, and those whose only funding was a result of their most recent proposal.

Only twenty-five percent of the reviewers report that their *only* research funding during this period came from NSF, as compared to almost forty percent of the applicants who report this. This difference is also statistically significant at the 95 percent confidence level.

Fifty-nine percent of the *applicants* report that they have served as either independent "ad hoc" mail reviewers or review panel members during the past two years.

In designing this research we were particularly concerned about our ability to compare the attitudes of successful and unsuccessful applicants for NSF funding. The decision to select a relatively large sample was based primarily on this concern. As indicated above, respondents to the applicant survey did include 1075 applicants whose most recent proposal was declined, comprising forty percent of the sample (see Table 3). But, as Table 4 indicates, only *twenty-seven percent* of the respondents to the applicant survey reported that they had not received *any* NSF funding during the previous five years. Forty-five percent of the applicants had not received NSF funding during the period *prior* to submitting the proposal discussed in the questionnaire. Half of these had not applied during this period, while the other half had applied unsuccessfully.

Table 4 shows that respondents who had not previously applied for NSF grants during the past five years and those who had been unsuccessful in all of their previous applications during this period are considerably less similar to reviewers than are applicants in general. Those who have not previously applied during the five year period, a group which pre-sumably includes many first-time applicants, on the average belong to more recent academic generations, are more likely to be affiliated with less heavily funded Ph.D.-granting universities or institutions with limited Ph.D.-granting programs or four-year academic institutions, and are more likely not to have received *any* government research funds

during the past five years, as compared to reviewers. Previously
unsuccessful applicants are quite similar to previous non-applicants,
although on the average they belong to a somewhat earlier academic
generation. Differences between reviewers and each of these two groups
of applicants with regard to academic generation, academic affiliation
and funding source are statistically significant at the 95 percent
confidence level.

Summary

A comparison of professional background data on reviewers and
applicants indicates that reviewers are quite similar to applicants.
This finding was anticipated since there is a great deal of overlap
between the two groups in the population. Both reviewers and applicants
are likely to have doctorate degrees, to be currently situated at Ph.D.-
granting institutions and to have received their doctoral degrees during
the 'sixties' or earlier. Applicants are somewhat more likely than
reviewers to belong to a more recent academic generation and to be
currently located at institutions with limited Ph.D.-granting programs or
four-year academic institutions. These differences are statistically
significant at the 95 percent confidence level. Differences in background
characteristics between reviewers and less frequent applicants, and reviewers
and less successful applicants, are larger than differences between the
total reviewer and applicant samples.

REVIEWERS' EXPERIENCES WITH THE PEER REVIEW PROCESS

Reviewers were asked about their recent participation in the
peer review process and their perception of the effectiveness of this
process based on their own experiences. About eighty-nine percent of
the respondents had reviewed proposals independently rather than in group
sessions. These are referred to by NSF as "ad hoc" or mail reviewers.
During the two years prior to the survey some of these reviewers had
completed reviews for more than one directorate. Only ten percent of
the respondents had served as review panel members during that period.
Analysis of the NSF file of reviews for fiscal 1974 indicates that

ad hoc reviews were *solicited* for seventy-two percent of the proposals
acted upon in that year: sixty-one percent of the latter received ad
hoc or mail review *only* while about thirty-nine percent received *both*
ad hoc review *and* panel review. About twenty-eight percent of proposals
acted upon received panel review only.

Table 5 presents some descriptive statistics about reviewers'
participation in the peer review process. For ad hoc reviewers we may
examine differences and similarities among directorates. However, the
small number of respondents who served as panel members precludes sub-
group comparisons in this case.

Table 5 shows that there are few differences in reviewers' descriptions
of their experiences with the ad hoc process by directorate. The median
number of ad hoc reviews completed by respondents over a two-year period
is 3.3; thirty percent report completing one or two, while twenty-five
percent report completing more than six. The average reviewer reports
spending about three hours reviewing each proposal, twenty-five percent
indicate spending less than two hours and twenty-five percent say they
spent more than four hours. Not surprisingly, the average review panel
member had participated in reviews of a much larger number of proposals.
These respondents reported spending half as much time in reviewing each
proposal, as compared to ad hoc reviewers, including time spent both
prior to and during the session.

Table 5 also shows the distribution of responses to two questions
dealing with personal relationships among reviewers, program officers
and applicants for NSF funds. Again few differences can be discerned
among directorates. But a greater proportion of ad hoc reviewers report
having been personally acquainted with the principal investigator of a
substantial number of the proposals they reviewed, as compared to panel
review members. This difference is statistically significant at the 95 percent
confidence level.

Ad hoc and panel reviewers' perceptions of why they were selected
as reviewers by NSF program officers are quite similar. About two-
thirds of all reviewers indicate that they think one reason for their
selection was that their own professional work was known to NSF staff.
About half of the ad hoc reviewers think that the fact that they

Table 5

CHARACTERISTICS OF THE PEER REVIEW PROCESS, REPORTED BY AD HOC/MAIL REVIEWERS AND REVIEW PANEL MEMBERS

		AD HOC/MAIL REVIEWERS						PANEL REVIEWERS
	All Directorates	Biological, Behavioral and Social Sciences	Mathematics, Physical Science and Engineering	Astronomical Atmospheric, Earth and Ocean Science	Education	RANN		All Directorates
Number of Respondents Completing Reviews - Past 2 Years[a]	943	347	440	120	44	127		110
Median # of Proposals Reviewed by Ad Hoc Reviewer/ Review Panel	3.3	3.5	3.1	4.3	1.9	2.0		24.9
Median # of Hours Spent by Reviewer on Average Per Proposal (For Panel, before Panel Convened)	3.0	3.0	2.9	2.0	3.0	2.9		1.0
Median # of Hours Spent by Review Panel on Average Per Proposal During Panel Session	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		0.5
Proportion of Proposals Reviewed which had Principal Investigator(s) with Whom Reviewer was Personally Acquainted - % indicating each response								
None	19.9	18.3	20.1	6.7	23.3	17.3		33.0
Less than one-quarter	7.4	7.8	6.4	5.0	11.6	7.9		29.5
About one-quarter	17.2	20.8	16.5	12.6	16.3	21.3		14.3
About one-half	25.6	25.8	28.6	26.9	20.9	23.6		10.7
About three-quarters	11.8	11.3	11.7	23.5	16.3	15.7		3.6
All or almost all	18.0	16.2	16.7	25.2	11.6	14.2		8.9
TOTAL	940[b]	345[b]	437[b]	119[b]	43[b]	127[b]		110
Reviewers' Perceptions of Reasons for their Selection - % indicating each response[c]								
Had previously served on review panel	16.8	17.9	15.2	18.3	31.8	28.1		—
Had previously served as ad hoc reviewer	--	—	--	--	—	--		33.8
Applicant referred NSF staff to me	10.8	10.7	13.9	9.2	13.6	12.5		--
Colleague/professional acquaintance referred NSF staff to reviewer	24.9	28.0	24.1	22.5	22.7	32.0		25.4
NSF staff aware of reviewer's work because reviewer had previously applied for NSF funds	48.3	47.6	52.3	53.3	63.6	39.8		--
NSF staff aware of reviewer's work through their knowledge of area	68.9	68.0	69.1	82.5	70.5	81.3		53.8
Reviewer had personal knowledge of applicant's work	18.4	17.8	20.5	30.0	18.2	15.6		n.a.
Reviewer was personally acquainted with NSF staff	18.8	15.9	19.3	27.5	36.4	33.6		23.1

[a] Some respondents served as reviewers for more than one directorate; and are counted in each appropriate column: others did not specify the directorate. Thus numbers in directorate columns do not add to 943.

[b] Excludes non-responses and uncodeable responses.

[c] Respondents could select more than one response category; responses therefore add to more than 100 percent.

themselves had previously applied for NSF funds had acquainted NSF staff
with their work. About one-fifth indicated that personal acquaintance
with NSF staff may have been a reason for their selection. (Since
respondents were asked to indicate all reasons why they might have
been selected, and many respondents indicated multiple reasons, per-
centages in this section of Table 5 total more than 100 percent.)

Reviewers were also asked to assess how well NSF program officers
do in matching reviewers to proposals, and providing information to
reviewers. Table 6 shows that responses to these questions were over-
whelmingly positive. Again there were only negligible differences
among directorates. Review panel members' evaluation of the professional
composition of review panels was also overwhelmingly positive.

Table 6 also presents the distribution of reviewers' responses to
the following question: "Overall, would you say the ad hoc/mail review
process as used for proposals you have reviewed during the past two
years is:

- a sound peer review mechanism,
- an acceptable peer review mechanism with some weaknesses,
- a questionable peer review mechanism with many weaknesses."

Few respondents selected the most negative response; however, about half
of the ad hoc reviewers chose the middle option. A larger proportion of
panel review members--sixty percent--were strongly positive about the
panel review process, believing it to be a "sound peer review mechanism
with few weaknesses." This difference is statistically significant at
the 95 percent confidence level.

Table 7 presents the percentage distribution of responses to this
question, by selected background variables. There is no statistically
significant relationship between academic generation and evaluation, or
between region and evaluation. The relationships between evaluation and
institutional affiliation, funding source and NSF applicant status
are all statistically significant ($p < .05$, $p < .05$ and $p < .01$ respectively).[1]
Generally reviewers from academic institutions which are not among the
most heavily funded and reviewers whose own funding source is not NSF

[1]The value of "p" is the probability of obtaining the value of Chi-square
that was calculated for the bivariate relationship between the specified varia-
bles if the two variables were statistically independent. If $p < .05$ we can infer
at the 95 percent confidence level, that the two variables specified are not
statistically independent, or that the relationship between them is "statistically
significant."

Table 6

ASSESSMENT OF THE EFFECTIVENESS OF THE PEER REVIEW PROCESS, BY AD HOC/MAIL REVIEWERS AND REVIEW PANEL MEMBERS

		AD HOC/MAIL REVIEWERS					REVIEW PANEL MEMBERS
	All Directorates	Biological, Behavioral, and Social Sciences	Mathematics, Physical Science and Engineering	Astronomical Atmospheric, Earth and Ocean Science	Education	RANN	All Directorates
Number of Respondents Reporting Reviews[a]	943	347	440	120	44	127	110
% Reporting Enough Information was provided to Conduct an Adequate Review	95.1	95.1	96.3	95.0	100.0	92.9	92.8
% Reporting Panel had enough time to conduct adequate discussion	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	84.7
% Reporting proposals well matched with own background and expertise	98.6	98.3	98.9	100.0	97.7	100.0	n.a.
% Reporting sufficient breadth of experience and expertise on panel	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	92.0
% Reporting enough specialized expertise on panel	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	87.3
Evaluation of Ad Hoc/Mail Review and Panel Review by those reporting participating in each- % indicating each response							
A sound peer review mechanism	45.5	45.2	46.2	52.6	48.8	45.5	60.0
An acceptable peer review mechanism with some weakness	50.1	50.0	50.5	45.6	44.2	43.1	34.5
A questionable peer review mechanism with many weaknesses	4.4	4.8	3.3	1.8	7.0	9.8	5.5
TOTAL	908[b]	336[b]	424[b]	114[b]	43[b]	123[b]	110[b]

[a] Some respondents served as reviewers for more than one directorate; and are counted in each appropriate directorate column; others did not specify a directorate. Thus numbers in directorate columns do not add to 943.

[b] Excludes non-response and uncodeable responses.

Table 7

REVIEWERS' OVERALL EVALUATION OF AD HOC REVIEW SYSTEM BY SOURCE OF OWN FUNDING,
ACADEMIC GENERATION, CURRENT INSTITUTION AND REGION

	% "RESPONDING SOUND PEER REVIEW SYSTEM"	% "RESPONDING ACCEPTABLE PEER REVIEW SYSTEM-SOME WEAKNESSES"	% "RESPONDING QUESTIONNABLE PEER REVIEW SYSTEM MANY WEAKNESSES"	TOTAL [a]
Funding Source, Past 5 Years				
No government research funding	44.6	52.5	3.0	202
Some government research funding, not from NSF	35.5	56.3	8.1	197
Funded by NSF and other federal agency	46.0	49.2	4.8	252
Funded by NSF only	52.3	45.5	2.3	222
NSF Applicant Status, Past 5 Years				
No NSF application	42.8	52.7	4.5	292
Unsuccessful NSF application	33.1	59.3	7.6	118
Successful NSF application	49.1	47.4	3.6	477
Academic Generation-Date Degree Received				
Before 1960	45.6	49.1	5.4	428
1960-1969	45.2	52.0	2.8	394
1970 on	41.4	51.7	6.9	58
Current Institution				
Top 20 in federal research funding	54.4	42.2	3.4	237
Other Ph.D. granting institution	40.3	55.4	4.3	392
Other Academic institution	38.9	55.6	5.6	54
Non-Academic	44.0	50.5	5.5	91
Government	50.6	48.2	1.2	83
Region				
Northeast	43.2	51.4	5.4	257
South	41.8	53.3	4.9	182
Mid-West	46.1	52.5	1.5	204
West	51.9	45.4	2.8	216

[a] Excludes non-response and uncodeable responses.

evaluate the system somewhat less positively than others. But the associations between these variables and evaluation are weak (Phi < .3).[1]

Reviewers were asked to elaborate on their overall evaluation of the review process by volunteering what they feel are the strengths and weaknesses of these systems, and how they would improve the system. Table 8 shows the distribution of coded responses to the questions about the ad hoc review process. (Because of the small number of panel review members among respondents, responses regarding that process were not coded.)

Two strengths of the ad hoc process--the ability to match individual reviewers' expertise with the substantive area of the proposal and the involvement of a broad spectrum of professionals--were mentioned as strengths of the ad hoc review system by a substantial proportion of respondents (50 percent and 24 percent respectively). Smaller proportions of respondents mentioned such strengths as lack of bias (15 percent of respondents) anonymity of reviewers (9 percent) and independence of reviewers' evaluation (6 percent). Smaller numbers indicated that the system is efficient, economical or flexible. Some respondents simply said the system is good because it produces good reviews or that it is the best system available. All of these latter responses are categorized as "other-positive" in Table 8 since relatively few respondents volunteered each of these.

Asked about weaknesses, about 15 percent of respondents cited the lack of opportunity for discussion among reviewers. Also cited as a weakness was the opportunity for bias which some feel is presented by the ad hoc process. No one particular type of bias was mentioned by a substantial proportion of reviewers but small percentages did cite bias against younger professionals (4 percent) certain institutions or regions (2.5 percent) favoritism towards friends (11 percent) or against enemies (4 percent) or cited bias as a general problem (11 percent). Some reviewers feel bias is generated or heightened by the reviewer selection process employed by the NSF program officers (5 percent). Although only small percentages of *respondents* volunteered each of these concerns it is interesting to note that 34 percent of all negative *responses* (349 out of 1018) related to the issue

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[1]Phi is a measure of the strength of a relationship between two nominal variables. Phi takes on the value of 0 when no relationship exists and the value of +1 when a perfect relationship exists.

Table 8

REVIEWER'S PERCEPTIONS OF STRENGTHS AND WEAKNESSES OF THE AD HOC
REVIEW SYSTEM[a]

STRENGTHS	% of Respondents Mentioning
Reviewers are well-matched with proposals	50.3
Broad participation of professionals	23.6
Unbiased process	14.8
Anonymity of Reviewers	9.5
Valuable to have independent reviews	5.6
Provides review by peers	3.4
Lack of burden for reviewer	5.3
Relative lack of bureaucratization	3.6
Number of other positive - cost effective, best system possible, etc.	28.3
TOTAL NUMBER OF AD HOC REVIEWERS VOLUNTEERING ONE OR MORE	728

WEAKNESSES	
Lack of opportunity for discussion among reviewers	14.7
No feedback to reviewers	7.0
Allows favoritism towards friends and colleagues	10.7
Allows bias against professional enemies	3.8
Biased against innovative proposals	6.6
Biased against younger researchers	4.2
Biased against certain types of institutions or certain regions	2.5
Allows too much opportunity for bias, no special type mentioned	11.1
Selection of reviewers can be biased against applicant	4.8
Reviewers are unrepresentative	5.7
Reviewers are unqualified	9.1
Does not provide objective review	7.3
Does not permit relative evaluation by reviewer	3.9
Reviewers acting independently may not treat job seriously enough	4.4
May cause infringement of proprietary rights	2.9
Process takes too long	4.4
Other Negative Comments	34.8

TOTAL NUMBER OF AD HOC/MAIL REVIEWERS VOLUNTEERING ONE OR MORE WEAKNESSES 682

[a]Respondents wrote-in free responses to 3 questions:
   -"What do you think are the strengths of this system?"
   -"What do you think are the weaknesses of this system?"
   -"What, if anything, do you think should be done to improve the ad hoc/
      mail review system?"
Up to three different responses were coded for each question. When a response
could fit into either a general or specific category, the most specific code category
was used. Percentages in this table add to more than 100 percent because multiple
responses were possible.

Table 8

(continued)

NEEDED IMPROVEMENTS	% of Respondents Mentioning
Improve selection of reviewers; general	13.7
Increase turn-over of reviewers, improve updating of reviewer file	4.0
Increase number of reviewers	9.6
"Match" reviewers to proposals randomly	1.9
Provide verbatim review to applicants	5.8
Permit rebuttal by applicants	10.2
Do not identify applicant to reviewer	5.0
Increase feed-back to reviewers	10.0
Increase feed-back, general	10.4
Identify reviewers to applicants	3.1
Eliminate reviewers with vested interest	5.0
Protect anonymity of reviewers	5.0
Pay reviewers for their time	3.7
Other miscellaneous improvements	38.2
TOTAL NUMBER OF AD HOC REVIEWERS SUGGESTING ONE OR MORE IMPROVEMENTS	943

of bias in some fashion. Other weaknesses reported by small numbers
of respondents included the possibility of not identifying poor proposals,
overdependence on "grantsmanship" of the applicant, over-use of some
reviewers and the lack of a formal appeals procedure. These less frequent
responses are categorized as "other-negative" in Table 8.

Modifications in the reviewer selection process, mentioned by 27
percent of respondents, topped the list of suggested improvements
offered by reviewers. In addition, some reviewers suggested that more
feedback--to both reviewers and applicants--be built into the process.
A small percent of respondents suggested identifying reviewers to appli-
cants, while a slightly larger number asked for continuing the policy of
anonymity. Other miscellaneous suggestions included requiring the use
of panel review to supplement the ad hoc process, making more research
funds available, instituting a formal appeals system and letting applicants
nominate reviewers. But less than 5 percent of respondents mentioned
each of these.

Summary

Reviewers' assessment of the peer review process based on their own
experiences during the past two years is largely positive. Few see the
system as seriously flawed. In their own experience the review process
involves an appropriate mix of professionals and provides adequate time
and information to conduct reviews.

However about half of the ad hoc reviewers and one-third of the
review panel members feel that each of these two systems, while "acceptable,"
has some weaknesses. Views of the system generally do not differ
significantly among reviewer sub-groups. There are weak but statistically
significant relationships between reviewers, institutional affiliation
and evaluation of the ad hoc process, and reviewers' funding source and
evaluation. Generally, reviewers from less heavily funded institutions
and reviewers who are not themselves funded by NSF tend to evaluate the
ad hoc review process *less* positively than others.

Volunteered responses about strengths and weaknesses of the system
are extremely diverse. Broad participation of professionals and appropriate
matching of reviewers to proposals are most frequently volunteered as
strengths of the ad hoc system. Lack of opportunity for discussion among

reviewers is the single most frequently mentioned weakness. But about one-third of all responses regarding weaknesses of the ad hoc process relate to potential for bias in this system.

Improvements in reviewer selection procedures lead the list of suggestions for strengthening the ad hoc process. But there is little consensus on the improvements which should be made.

APPLICANTS' EXPERIENCES WITH THE PEER REVIEW PROCESS

Applicants were asked about their experiences with the peer review process as it was implemented for their most *recent* proposal to the Foundation. In interpreting their answers to these questions it is important to keep in mind that many of these respondents did have extensive *previous* experience applying for NSF funds during the past five years; more than two-thirds of these had been successful in one or more of their previous applications.

In addition to knowing their *opinions* about the peer review process, we wanted to find out what these applicants knew about the review procedures which were used for their most recent proposal. Table 9 shows that about thirty percent of all respondents do *not* know what kind of review procedures were used. The proportion of "don't know's" varies by directorate with the smallest proportion among applicants to the Astronomical, Atmospheric, Earth and Ocean Sciences Directorate and the largest proportion among Biological, Behavioral and Social Sciences applicants. More than half report that mail review procedures were used and one-third report that the proposal was submitted for panel review.[1] Relationships between type of review reported and directorate are statistically significant (p < .01). But this may reflect differences in perception and knowledge among respondents rather than true differences in procedures used.

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[1]Among those respondents who indicated they knew what procedures were used, about eighty percent indicated ad hoc review and about fifty percent indicated panel review procedures were used alone or in combination. These figures are quite close to the distribution recorded in the NSF action file.

One criticism of the NSF peer review process that has been made is
that it provides too great an opportunity for those who are more know-
ledgeable about the process to influence evaluations of proposals. We
asked applicants about the extent of their acquaintance with reviewers,
as one indicator of the extent of their knowledge about the process.

Table 9 shows that most applicants who thought mail or ad hoc review
had been used for their proposal did *not* know the names of the reviewers.
Most who indicated panel review had been used also did not know the names
of panel members. Respondents were slightly more likely to know the
names of and be personally acquainted with at least some of the review
panel members than was the case for mail reviewers. A small fraction
of respondents reported that they had participated in the selection of
some of the latter.

Oral feedback from program officers regarding the review process
for the respondent's last proposal was received by almost half of those
who applied; written feedback was received by less than twenty percent.

Critics of the peer review system who feel that more knowledgeable
applicants can exercise influence over the process have also suggested
that those who are more knowledgeable comprise an elite sub-group of
all applicants. Table 10 shows the distribution of "knowledgeables"
defined variously as those who participated in reviewer selection, were
acquainted with reviewers, and asked for and received feedback about the
process, by selected background variables. Differences by academic
generation are negligible except with regard to receiving oral feedback.
Applicants with recent degrees are less likely to receive oral feedback.
Applicants from the Ph.D.-granting universities are more likely to know
reviewers and to get feedback about the process than respondents from
institutions with limited Ph.D.-granting programs and four-year academic
institutions. Applicants who have served as reviewers and those who have
been previously funded by the Foundation are quite a bit more likely to
be acquainted with peer reviewers for their proposal and to have received
feedback about the process. Applicants whose most *recent* proposal was
successful are more likely to be acquainted with peer reviewers. Relation-
ships between these background variables and indicators of knowledge are
all statistically significant $(p < .01)$, but the associations are all
weak $(Phi < .3)$.

Table 9

CHARACTERISTICS OF PEER REVIEW PROCESS, REPORTED BY APPLICANTS, BY DIRECTORATE

	All Directorates	Biological, Behavioral, and Social Sciences	Mathematics, Physical Science and Engineering	Astronomical, Atomospheric, Earth and Ocean Science	Education	RANN
TYPE OF REVIEW RECEIVED BY PROPOSAL[a,b]						
Percent Reporting** NSF staff review	29.2	29.7	20.7	24.1	44.5	49.3
Ad Hoc/Mail Review**	57.6	52.0	70.5	80.5	23.3	52.7
Panel Review**	33.6	49.1	14.1	48.5	51.6	29.1
Site Visit**	3.9	3.6	2.1	7.7	3.2	10.3
Don't Know**	29.5	35.2	26.6	14.2	34.3	26.1
TOTAL[c]	2684	704	988	261	283	203
PERCENT OF APPLICANTS REPORTING PARTICIPATION IN SELECTION OF AD HOC REVIEWERS (of total mentioning ad hoc review)	6.6	6.2	6.5	6.1	1.3	13.8
TOTAL[c]	1522	370	706	213	75	109
PROPORTION OF AD HOC REVIEWERS WITH WHOM APPLICANTS WERE PERSONALLY ACQUAINTED (of total mentioning ad hoc review)						
Knew names, but not personally acquainted with any	3.5	1.7	3.0	3.7	7.9	7.5
Personally acquainted with some	12.4	13.0	8.4	18.2	6.6	23.4
Personally acquainted with all	0.6	0.6	0.3	1.9	1.3	0.0
Did not know names of any reviewers	83.5	84.8	88.3	76.2	84.2	69.2
TOTAL	1497	362	691	214	76	107
PROPORTION OF REVIEW PANEL MEMBERS WITH WHOM APPLICANTS WERE ACQUAINTED (of total mentioning panel review)						
Knew names, but not personally acquainted with any	3.4	5.2	1.7	4.0	2.0	1.8
Personally acquainted with some	17.3	19.3	7.6	36.0	6.6	21.1
Personally acquainted with all	0.9	0.8	0.0	4.0	0.0	1.8
Did not know names of any reviewers	78.3	74.6	90.7	56.0	91.4	75.4
TOTAL[c]	916	362	172	125	151	57

[a]Some respondents did not specify the directorate to which their application was submitted, thus less than 2684 cases are accounted for in the breakdown by directorate.

[b]Respondents indicated each type of review used. Thus percents sum to more than 100.

[c]Excludes non-responses and uncodeable responses.

*χ^2 Significant, p < .05

**χ^2 Significant, p < .01

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Table 9 (Continued)

	All Directorates	Biological, Behavioral and Social Science	Mathematics, Physical Science and Engineering	Astronomical, Atmospheric, Earth and Ocean Science	Education	RANN
PERCENT OF APPLICANTS REPORTING VERBAL FEEDBACK ON REVIEW FROM PROGRAM OFFICER **	44.8	46.9	44.6	57.9	23.3	58.1
TOTAL [a, b]	2574	.704	988	261	283	203
PERCENT OF APPLICANTS REPORTING WRITTEN FEEDBACK ON REVIEW FROM PROGRAM OFFICER **	18.2	15.5	15.9	30.7	18.7	24.6
TOTAL [b]	2574	704	988	261	283	203
PERCENT OF UNSUCCESSFUL APPLICANTS WHO ASKED FOR REASONS FOR DECLINATION **	59.2	64.3	59.5	73.1	42.4	61.5
TOTAL [b]	1029	314	385	67	125	78

[a] Some respondents did not specify the directorate to which their application was submitted, thus less than 2684 cases are accounted for in the breakdown by directorate.

[b] Excludes non-responses and uncodeable responses

** χ^2 significant, $p < .01$

Table 10

INDICATORS OF APPLICANTS KNOWLEDGE ABOUT PEER REVIEW PROCESS, BY SELECTED BACKGROUND CHARACTERISTICS[a]

	% Who Participated in Selection of Ad Hoc Reviewers	% Who Knew Some or All Ad Hoc Reviewers Personally	% Who Knew Some or All Review Panel Members Personally	% Who Received Oral Feedback from Program Officer	% Who Received Written Feedback from Program Officer	% Who Asked for Reasons for Declination (Declinees Only)
ACADEMIC GENERATION - Date Degree Received	(of those reporting Ad hoc review)	(of those reporting Ad hoc review)	(of those reporting Panel review)			
Before 1960	7.9 (555)	9.5 (547)	21.3 (319)	44.6 (886)	16.9 (886)	60.4 (298)
1960-1969	6.0 (733)	14.1 (716)	17.3 (440)	49.2 (1205)	19.7 (1205)	60.7 (504)
1970 on	6.5 (246)	16.7 (246)	15.8 (178)	35.5 (519)	18.3 (519)	52.2 (251)
	n.s.	n.s.	n.s.	**	n.s.	n.s.
CURRENT INSTITUTION						
Top 20 in federal research funding	4.9 (368)	14.2 (364)	24.3 (193)	46.3 (549)	16.8 (549)	66.0 (156)
Other Ph.D. Granting institutions	7.2 (870)	10.9 (855)	19.0 (460)	49.3 (1342)	18.6 (1342)	64.6 (539)
Other Academic Institution	4.1 (170)	11.4 (167)	9.5 (200)	28.6 (482)	18.9 (482)	41.4 (268)
Government	11.7 (94)	25.5 (90)	21.3 (61)	44.1 (179)	19.6 (179)	60.7 (61)
Other	25.0 (12)	23.1 (13)	60.0 (10)	53.6 (28)	7.1 (28)	28.6 (7)
	**	**	**	**	n.s.	**
REGION						
Northeast	7.3 (425)	12.4 (420)	16.7 (270)	43.1 (742)	20.1 (742)	61.9 (286)
South	7.7 (364)	13.8 (354)	16.2 (228)	45.6 (625)	19.2 (625)	52.9 (280)
Midwest	6.2 (338)	12.0 (333)	16.2 (216)	39.4 (607)	14.0 (607)	57.0 (270)
West	5.6 (395)	12.6 (390)	25.5 (216)	50.4 (617)	19.1 (617)	64.0 (203)
	n.s.	n.s.	n.s.	**	*	*
NSF REVIEWER STATUS, PAST 2 YEARS						
Served as Reviewer	6.8 (1125)	14.1 (1107)	26.9 (558)	51.2 (1583)	18.4 (1583)	71.1 (409)
Has not served as reviewer	6.0 (449)	10.2 (443)	6.3 (399)	35.7 (1101)	18.5 (1101)	51.2 (672)
	n.s.	**	**	**	n.s.	**
PAST EXPERIENCE SEEKING NSF FUNDS[b]						
No previous applications	6.0 (248)	8.6 (243)	13.4 (201)	31.0 (565)	15.6 (565)	47.3 (300)
Previous application, no previous funding	8.4 (323)	15.8 (315)	12.6 (199)	46.9 (604)	12.2 (604)	58.4 (363)
Funded previously	6.0 (928)	12.7 (917)	22.2 (505)	49.4 (1377)	19.0 (1377)	67.1 (371)
	n.s.	**	*	**	n.s.	**
DISPOSITION OF MOST RECENT NSF PROPOSAL						
Granted	6.7 (914)	14.4 (894)	25.8 (523)	44.2 (1429)	14.8 (1429)	Not
Declined or withdrawn	6.3 (585)	10.0 (568)	7.6 (382)	45.2 (1117)	23.4 (1117)	Applicable
	n.s.	**	**	n.s.	**	

[a] Numbers in parentheses indicate the base for calculating percent. This base excludes non-responses and uncodeable responses.

[b] Does not include most recent proposal.

* χ^2 Significant, $p < .05$

** χ^2 Significant, $p < .01$

n.s. χ^2 not significant

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Reviewer status and funding experience are themselves associated with academic generation and institutional affiliation. Table 11 presents a three-way cross tabulation of reviewer status, previous funding experience and institutional affiliation and academic generation, with indicators of knowledge about the peer review process. Generally, reviewer-applicants and previously funded applicants who are at larger institutions are more likely than others to be knowledgeable about the process. Non-reviewers, not previously-funded applicants at institutions with limited Ph.D.-granting programs and four-year academic institutions are *least* likely to be knowledgeable about the process.

The applicant questionnaire included two items which asked respondents to evaluate the NSF review and decision-making process as it was implemented for their most recent proposal. Respondents who indicated that they knew what type of review was used for their proposal were asked whether they thought the review procedures used were "appropriate" or "inappropriate." Respondents whose proposals were "declined" were asked whether they thought the decision was "fair" or "unfair." We might expect the first type of assessment to be strongly dependent on the disposition of the proposal and the second to be generally negative, given its context. Table 12 shows this to be the case. Disposition of the proposal is obviously the primary determinant of evaluation of "appropriateness" of review procedures. Controlling for disposition, there are only negligible differences by academic generation, institutional affiliation or region. However, among those whose proposals were declined, reviewers and previously successful applicants are less likely to be negative than non-reviewers and previously unsuccessful applicants. The relationships between reviewer status and evaluation and funding history and evaluation are statistically significant ($p < .05$ and $p < .01$ respectively).

We were interested in whether applicants who were more knowledgeable about the review process—those who participated in the selection of reviewers, were acquainted with reviewers, or asked for and received feedback about the review process from program officers—would be more likely to perceive review procedures positively and to view a decision to decline as "fair." But Table 12 shows that there is no statistically significant relationship between indicators of knowledge about the process and evaluation, among unsuccessful applicants.

Table 11

DISTRIBUTION OF KNOWLEDGE ABOUT PEER REVIEW PROCESS BY ACADEMIC GENERATION AND INSTITUTIONAL AFFILIATION, AMONG
APPLICANTS WHO HAVE RECEIVED PREVIOUS FUNDING OR WHO HAVE SERVED AS NSF REVIEWERS,
AND OTHER APPLICANTS

	SERVED AS REVIEWER AND/OR PREVIOUSLY FUNDED BY NSF						OTHER APPLICANTS					
	Academic Generation			Institutional Affiliation[b]			Academic Generation			Institutional Affiliation[b]		
	Before 1960	1960-1969	1970 on	Top 20 in research funding	Other Ph.D granting	Other Academic	Before 1960	1960-1969	1970 on	Top 20 in research funding	Other Ph.D granting	Other Academic
PERCENT PARTICIPATED IN SELECTION OF REVIEWERS	7.5	5.9	9.6	4.6	7.5	3.9	11.5	6.6	2.7	6.8	6.1	4.4
TOTAL[a]	494	597	136	324	707	102	61	136	110	44	163	68
		n.s			n.s.			n.s.			n.s.	
PERCENT KNEW SOME OR ALL AD HOC REVIEWERS	9.9	15.1	21.0	14.6	11.5	13.0	6.7	9.8	11.1	11.9	8.1	9.0
TOTAL[a]	487	583	138	322	695	100	60	133	108	42	160	67
		**			n.s.			n.s.			n.s.	
PERCENT KNEW SOME OR ALL PANEL REVIEWERS	24.6	20.4	24.1	27.5	21.8	14.7	2.1	9.0	8.4	3.8	9.8	3.3
TOTAL[a]	272	318	83	167	348	109	47	122	95	26	112	91
		n.s.			**			n.s.			n.s.	
PERCENT RECEIVED ORAL FEEDBACK ON REVIEW PROCESS	46.8	52.4	46.2	46.8	52.1	39.7	34.0	40.8	27.2	43.4	41.2	19.8
TOTAL[a]	733	874	225	466	995	214	153	331	294	83	347	268
		*			*			**			**	
PERCENT RECEIVED WRITTEN FEEDBACK ON REVIEW PROCESS	16.8	19.6	19.1	16.3	18.2	20.6	17.6	19.9	17.7	19.3	19.6	17.5
TOTAL[a]	733	874	225	466	995	214	153	331	294	83	347	268
		*			n.s.			**			n.s.	
PERCENT ASKED FOR REASONS FOR DECLINATION (DECLINEES ONLY)	67.4	66.7	61.2	66.4	70.3	51.8	48.1	53.8	48.9	65.2	57.6	36.8
TOTAL[a]	190	270	67	110	296	83	108	234	184	46	243	185
		n.s.			*			n.s.			**	

[a] Totals exclude non-responses and uncodeable responses.

[b] Excludes respondents with non-academic affiliation.

* χ^2 significant, p < .05

** χ^2 significant, p < .01

n.s. χ^2 not significant

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Table 12

APPLICANTS' EVALUATION OF REVIEW PROCESS FOR MOST RECENT PROPOSAL, BY
SELECTED BACKGROUND CHARACTERISTICS AND DISPOSITION
OF PROPOSAL

	Percent Saying Review Procedures Were "Appropriate" (Applicants Who knew What Review Procedures Were Used Only)[a]			Percent Saying Decision was Fair (Declinees Only)
	TOTAL	SUCCESSFUL APPLICANTS	UNSUCCESSFUL APPLICANTS	
ALL RESPONDENTS	76.5 (1933)	92.2 (1154)	51.4 (691)	43.5 (897)
ACADEMIC GENERATION (Date Degree Received)				
Before 1960	78.4 (656)	92.0 (437)	50.3 (191)	39.6 (255)
1960-1969	77.1 (903)	92.8 (526)	52.5 (339)	44.2 (407)
1970 - on	74.9 (331)	92.0 (174)	53.9 (141)	48.6 (208)
	n.s.	n.s.	n.s.	n.s.
CURRENT INSTITUTION				
Top 20 in federal research funding	82.0 (412)	95.1 (287)	49.5 (109)	46.4 (140)
Other Ph.D. granting inst.	77.2 (1010)	91.7 (601)	54.1 (336)	42.8 (449)
Other Academic institution	75.2 (302)	91.3 (149)	56.7 (141)	45.5 (209)
Government	68.0 (125)	89.9 (79)	27.0 (37)	40.4 (52)
Other	77.8 (18)	92.9 (14)	33.3 (3)	60.0 (5)
	*	n.s.	*	n.s.
REGION				
Northeast	75.9 (532)	92.4 (331)	48.3 (180)	39.4 (226)
South	75.2 (435)	91.2 (239)	52.3 (174)	43.1 (239)
Midwest	77.5 (436)	95.6 (249(	52.6 (173)	46.5 (217)
West	79.7 (473)	90.7 (313)	54.7 (137)	47.5 (177)
	n.s.	n.s.	n.s.	n.s.

[a]Numbers in parentheses indicate the base for calculating the percent. This
base excludes non-responses and uncodeable responses.

*χ^2 significant, $p < .05$.
n.s. χ^2 not significant

Table 12 (continued)

REVIEWER STATUS	Percent Saying Review Procedures Were "Appropriate" (Applicants Who Knew What Review Procedures Were Used Only)			Percent Saying Decision was Fair (Declinees Only)
	TOTAL	SUCCESSFUL APPLICANTS	UNSUCCESSFUL APPLICANTS	
Served as Reviewer	83.2(1264)	92.1 (910)	57.0 (302)	46.8 (357)
Has not served as Reviewer	63.8(669) **	92.6 (244) n.s.	47.0 (389) *	41.3 (540) n.s.
PREVIOUS FUNDING EXPERIENCE				
No previous Application	74.9(338)	94.0 (166)	55.1 (158)	48.1 (231)
Previous Application No Funding	60.3(416)	85.6 (174)	41.7 (235)	36.9 (312)
Previous Funding	83.8(1088) **	93.2 (792) **	57.3 (281) **	46.5 (318) *
KNOWLEDGE OF REVIEW PROCESS				
Knew What Procedures were Used	N.A.	N.A.		43.8 (608)
Did not Know What Procedures Were Used				42.9 (289)
ACQUAINTANCE WITH AD HOC REVIEWERS				
Knew All or Some	83.3(186)	90.6 (127)	63.3 (49)	39.2 (51)
Knew None or Did Not Even Know Names	76.3(1179) *	91.0 (722) n.s.	51.1 (403) n.s.	40.9 (428) (n.s.)
ACQUAINTANCE WITH PANEL REVIEWERS				
Knew All or Some	88.5(165)	91.7 (133)	74.1 (27)	51.6 (31)
Knew None or Did Not Even Know Names	75.8(653) **	93.1 (350) n.s.	54.0 (272) n.s.	46.7 (291) n.s.
VERBAL FEEDBACK ABOUT PROCESS				
Received Feedback	73.7(1010)	89.3 (571)	51.3 (382)	42.4 (448)
Did not Receive Feedback	79.6 (923)	95.0 (583)	51.5 (309)	44.5 (449)

* χ^2 significant, p < .05

** χ^2 significant, p < .01

n.s. χ^2 not significant

Table 12 (Continued)

	TOTAL	Percent Saying Review Procedures Were "Appropriate" (Applicants Who Knew What Review Procedures Were Used Only)		Percent Saying Decision was Fair (Declinees Only)
		SUCCESSFUL APPLICANTS	UNSUCCESSFUL APPLICANTS	
WRITTEN FEEDBACK ABOUT PROCESS				
Received Feedback	70.1 (402)	86.5 (185)	55.4 (195)	41.8 (239)
Did not Receive Feedback	78.2 (1531) **	93.3 (969) **	49.8 (496) n.s.	44.1 (658) n.s.
PARTICIPATION IN SELECTION OF REVIEWERS				
Suggested Names of Reviewers	78.7 (94)	89.7 (58)	67.7 (31)	37.5 (32)
Did not Suggest Names of Reviewers	77.1 (1289) n.s.	91.1 (798) n.s.	51.6 (430) n.s.	41.7 (460) n.s.

** χ^2 Significant, $p < .01$

n.s. χ^2 not significant

Declinees were asked if they would or would not have appealed the decision to decline if a formalized appeals process had existed at the time. About eighty-four percent of declinees who thought the decision was unfair responded that they *would* have appealed. About seventy-three percent of *all* applicants including both grantees and declinees, indicated they would favor NSF adopting a formal appeal system. Declinees are somewhat more favorable towards an appeals process than grantees (79 percent as compared to 69 percent), but both groups are strongly in favor of such a system. Not surprisingly, declinees who thought the decision on their most recent proposal was unfair are more likely to approve of setting up an appeals process than declinees who thought that decision was fair (90 percent as compared to 66 percent).

Respondents were asked to volunteer reasons for supporting or opposing adoption of such a system. The reason most frequently offered by proponents is that an appeals process would provide a remedy for mistakes and misjudgments. Opponents' most frequent explanation for their stance is that an appeals process will further bureaucratize and burden the review process and is likely to increase the elapsed time from submission of a proposal to disposition.

Finally, respondents who said review procedures used for their last proposal were "inappropriate" were asked to volunteer the reasons for their response. Table 13 shows the distribution of coded responses to this question. About one-third of those who evaluated the process negatively gave reasons related to selection of reviewers, matching of reviewers' expertise to proposals or incompetence of reviewers. About one-fifth criticized the system for lack of feedback to applicants. Less than ten percent specifically mentioned "bias" as a problem; of these about half referred to bias against certain regions or institutional types and half to bias against innovative proposals. Miscellaneous responses categorized as "other" in Table 13 include idiosyncratic references to details regarding the applicants proposals, feelings that reviewers should be identified, that a different type of review would have been more appropriate, that opportunity should be given for rebuttal and that verbatim reviews should be given to applicants. But only a small fraction of respondents mentioned any of these. Because multiple responses were coded, percentages in Table 13 add to more than 100.

Table 13

REASONS VOLUNTEERED FOR NEGATIVE EVALUATION OF REVIEW PROCEDURES, APPLICANT
SURVEY

RESPONSE CATEGORIES	PERCENT OF RESPONDENTS
Procedures unfair, no reason given	10.4
Procedures biased against certain region, types of institutions	4.2
Procedures biased against innovative proposals	3.8
Reviewers poorly selected, general	11.9
Reviewers not well-matched to proposals	10.4
Reviewers are incompetent	8.5
Reviewers don't spend enough time	3.6
Applicants don't get to participate in selection of reviewers	3.0
No feed-back to Applicants, general	11.2
Inadequate or no reason given for decision	10.0
Program focus not adequately communicated by program officer	4.7
Process too long	4.2
Other bureaucratic problems	8.9
Other	23.6
TOTAL NUMBER OF RESPONDENTS WHO INDICATED THEY THINK REVIEW PROCEDURES WERE "INAPPROPRIATE," VOLUNTEERING ONE OR MORE REASONS FOR NEGATIVE EVALUATION OF REVIEW PROCEDURES	589

[a]Respondents who indicated they thought review procedures used for their last
proposal were inappropriate wrote in free responses to the question: "Why
do you feel this way?" Up to 3 different responses were coded for each
respondent. If a response could fit into either a general or a specific
category, the most specific code category was used.

Percentages in this table add to more than 100 percent because multiple
responses were possible.

Summary

Applicants indicate varying degrees of knowledge about the review procedures used for their most recent proposal. About 29 percent do not know what *type* of review--ad hoc or panel--was used. The extent of acquaintanceship with reviewers and feedback from program officers varies with institutional affiliation, NSF reviewer experience, past experience seeking NSF funds and disposition of current proposal. But relationships between these background variables and knowledge about the review process, while statistically significant, are weak.

Applicants' assessments of the peer review process based on their personal experiences with regard to the last proposal they submitted to the Foundation are largely positive. Seventy-six percent of those who knew what review procedures were used thought they were "Appropriate." Not surprisingly, evaluations of the appropriateness of the review procedures used are related to disposition of the proposal. But even among those whose proposals were declined, half feel the procedures were appropriate. A majority of unsuccessful applicants feel that the decision to decline was unfair but a substantial proportion--forty-three percent--feel that the decision was fair. About eighty-four percent of declinees who thought the decision was unfair say they would have appealed the decision if a formal appeals process had existed.

Assessments of appropriateness of procedures and fairness of the funding decision do not appear to be related to academic generation, institutional affiliation or region. However, those who have served as NSF reviewers or who have received NSF grants in the past are more likely to evaluate their most recent experience positively--even if they were turned down--than those with less successful experience dealing with NSF. Relationships between reviewer status and evaluation and funding history and evaluation are statistically significant but relatively weak.

About seventy-three percent of the applicants including both grantees and declinees would favor NSF adopting a formal appeals system. The reason for supporting such a system which is volunteered most frequently is that it would provide a remedy for mistakes and misjudgments. The leading reason for opposing it is that it will further bureaucratize and burden the review process.

PERCEPTIONS OF OUTCOMES OF THE PEER REVIEW PROCESS

We have seen that reviewers and applicants are generally positive
about the peer review process, based on their own recent experiences.
But other attitudinal surveys have shown that individuals who are
generally *positive* about their *own* experience with a particular process
or system nevertheless may express generally *negative* views about the
system in *general*. Thus while a majority of respondents to the peer
review surveys seem to view their own experiences in a positive light,
it is possible that they have a different view of the system in general.
About half of the survey questions sought to elicit more general views
about the peer review process.

Perhaps the most serious criticism of the NSF peer review process
which has been made is that it is "biased" against proposals from less
prestigious institutions, proposals by younger researchers, and proposals
which are "innovative" in character. Data from these surveys cannot be
used to confirm or refute this charge, since we collected no substantive
or qualitative information about proposals. However, we were interested
in knowing whether those who had direct experience with the peer review
process *believe* that the system is biased. As indicated above, some
respondents who were critical about the peer review process, based on
their experiences as reviewers or applicants, did cite "bias" as a
problem. However, the proportion of these respondents in both samples
is relatively small. In order to measure respondents' more general
perceptions of bias in the system, we included the following three
questions in both reviewer and applicant questionnaires:

o   "In general, if two equally good proposals are submitted
    to NSF in your area, one from a well-known institution
    and one from a lesser-known institution, do you think both
    proposals have an equal chance of being recommended for
    funding by the peer reviewers or one has a better chance
    that the other?"

o   "What if two equally good proposals are submitted, one
with a young not-yet-established principal investigator
and one with an older well-established principal investi-
gator--do you think both proposals have an equal chance
of being recommended for funding by the peer reviewers
or one has a better chance than the other?"

o   "What about two equally good proposals, one for a project
using approaches which are consistent with the mainstream
of thought in your profession and one for a project which
challenges the mainstream of thought--do you think both
proposals have an equal chance of being recommended for
funding by the peer reviewers or one has a better chance
than the other?"

Three response categories were offered:

o   Both (proposals) have an equal chance

o   Proposal from (well-known institution/with younger not-
yet-established P.I./consistent with mainstream) has
better chance

o   Proposal from (less-known institution/with older, well-
established P.I./which challenges mainstream) has better
chance

o   Don't know

The questions were identically worded and appeared in the same order
in both questionnaires. However, for each of the question items
reviewers were also asked whether they *personally* had ever had an
experience where this issue was raised by the review process, and,
if so, what the outcome was.

We do not know how many of the respondents were able to accept
our hypothetical cases and respond in the contexts presented. Some
may have rejected the notion that proposals from lesser-known
institutions or younger-not-yet established principal investigators
could be qualitatively equal to proposals from well-known institutions

or with principal investigators of established reputations. The issue
of perceived bias against "innovative proposals" was particularly
difficult to deal with. The National Science Board task committee
which reviewed the questionnaires felt that the concept of "research
which challenges the mainstream" best described "innovative proposals."
But we do not know whether respondents in general understood the concept.
Of course, respondents *interpretations* of such phrases as "well-known
institution" and "approaches consistent with the mainstream of research"
could be expected to differ. Finally responses to these questions do
not indicate the respondent's normative standpoint on the issue of bias:
For example, a respondent may believe that the NSF review
process "favors" proposals from older, well-established P.I.'s *and that
this is a good thing.* In sum, these items are intended to measure
respondents' perceptions of the likely outcomes of the peer review
process under the conditions stated and do not provide answers to more
complex questions about bias in the review process.

Table 14 shows that a majority of reviewers and applicants think that
the NSF peer review process does favor proposals from well-known insti-
tutions, proposals by older, well-established P.I.'s and proposals which are
"in the mainstream." Reviewers are somewhat more likely than applicants
to think the system gives proposals from less-known institutions,
proposals by younger P.I.'s and innovative proposals an even chance. These
differences are statistically significant at the 95 percent confidence level.
Less than 10 percent of both respondent samples think proposals from less-
known institutions, proposals by younger P.I.'s or proposals which "challenge
the mainstream" are favored by the process. The percent of "don't
knows," larger than experienced for other questions, indicates that a
substantial proportion of both groups could not (or would not) judge
the likely outcome under the conditions stated.

Only fifteen to twenty percent of the reviewers said they had
personally had an experience which raised one of the issues indicated.
Table 14A shows the distribution of their responses regarding the
actual outcome in these cases.

Table 14

REVIEWERS' AND APPLICANTS' PERCEPTIONS OF OUTCOMES
OF THE PEER REVIEW PROCESS

	REVIEWERS %	APPLICANTS %
A. DOES THE PEER REVIEW PROCESS FAVOR PROPOSALS FROM WELL-KNOWN INSTITUTIONS OVER PROPOSALS FROM LESSER-KNOWN INSTITUTIONS?		
Both have an equal chance	28.9	15.9
Proposal from well-known institution has better chance	51.1	60.6
Proposal from lesser-known institution has better chance	2.2	2.7
Don't know	17.9	20.7
TOTAL	1036[a]	2641[a]
B. DOES THE PEER REVIEW PROCESS FAVOR WELL-ESTABLISHED P.I.'s OVER NOT-YET-ESTABLISHED P.I.'s?		
Both have an equal chance	18.7	13.2
Young, not-yet-established P.I. has better chance	4.7	4.1
Older, well-established P.I. has better chance	60.6	66.7
Don't know	16.1	16.0
TOTAL	1032[a]	2641[a]
C. DOES THE PEER REVIEW PROCESS FAVOR "MAINSTREAM" PROPOSALS OVER PROPOSALS WHICH CHALLENGE MAINSTREAM?		
Both have an equal chance	23.6	15.8
Proposal which is consistent with mainstream has better chance	46.9	55.8
Proposal which challenges mainstream has better chance	6.8	6.1
Don't know	22.7	22.3
TOTAL	1031[a]	2634[a]

[a] Excludes non-responses and uncodeable responses.

Table 14A

DISTRIBUTION OF REVIEWERS' RESPONSES REGARDING OUTCOME OF CASES WHERE
ISSUES RELATED TO INSTITUTIONAL PRESTIGE, P.I. REPUTATION, OR "MAINSTREAM"
RESEARCH WERE RAISED

OUTCOME OF CASES WHICH RAISED ISSUE	REVIEWERS %
-- When two Proposals were from Institutions Differing in Prestige	
Proposal from well-known institution recommended	43.9
Proposal from less-known institution recommended	13.5
Both recommended	25.2
Don't know	17.4
TOTAL[a]	155
-- When two Proposals were by P.I.'s Differing in Age and Established Reputation	
Proposal with younger P.I. recommended	19.8
Proposal with older P.I. recommended	45.2
Both recommended	19.3
Don't know	15.7
TOTAL[a]	197
-- When one Proposal was "In Mainstream" and other not	
Proposal consistent with mainstream recommended	51.5
Proposal which challenged mainstream recommended	16.4
Both recommended	21.0
Don't know	11.1
TOTAL[a]	171

[a]Excludes non-responses and uncodeable responses

Tables 15A - B show the distribution of perceptions of outcomes
by academic generation, region and academic affiliation, for reviewers
and applicants respectively. Among both samples there are apparent
differences in perceptions of institutional bias by academic generation,
institutional affiliation, and region. Perceptions of age bias also
vary by academic generation and academic affiliation. Among reviewers, these
relationships between background variables and perceptions of bias
are generally not statistically significant but among applicants they are
generally significant (p < .01). Applicants who are themselves younger or
from institutions with limited Ph.D.-granting programs or four-year academic
institutions are more likely to perceive institutional and age biases in the
system than others. Among both reviewers and applicants the differences in
perceptions of outcomes regarding "mainstream" or "non-mainstream" research by
academic generation, region and institutional affliction are generally smaller.

Table 15C shows the distribution of reviewers' and applicants'
perceptions of outcomes by reviewer status (for applicants) and by
previous experience applying for NSF funds. Applicants who are not
also reviewers are significantly more likely than reviewers to perceive
various kinds of bias. Applicants whose most recent proposals were
turned down by the Foundation are more likely to perceive bias than
those who were successful. The applicants who are most likely to
think the system favors well-known institutions, older P.I.s and/or
mainstream proposals are declinees who were also unsuccessful in previous
attempts to obtain NSF funds. Those who are *least* likely to perceive
bias are recent grantees who have also received NSF grants previously
in the past five years. Relationships between reviewer status and
perceptions of bias and funding experience and perceptions of bias
are statistically significant (p < .01). Interestingly, among
reviewers only the relationship between perception of institutional
bias and experience is statistically significant (p < .01). Reviewers'
perceptions of age bias and bias against "innovative" proposals do not
vary with personal experience seeking NSF funds.

Table 15A

REVIEWERS PERCEPTIONS OF OUTCOMES, BY ACADEMIC GENERATION, REGION, AND
INSTITUTIONAL AFFILIATION

| | ACADEMIC GENERATION | | | REGION | | | | INSTITUTIONAL AFFILIATION[a] | | |
	Before 1960	1960-1969	1970 on	North	South	Mid-West	West	Top 20 in research funds	Other Ph.D. Granting	Other Academic
	%	%	%	%	%	%	%	%	%	%
A. DOES THE PEER REVIEW PROCESS FAVOR PROPOSALS FROM WELL-KNOWN INSTITUTIONS OVER PROPOSALS FROM LESSER-KNOWN INSTITUTIONS										
Both have an equal chance	31.2	26.4	22.5	25.0	25.8	31.4	32.7	33.0	28.7	19.4
Proposal from well-known institution has better chance	46.9	55.3	60.6	53.4	57.3	47.9	47.3	42.8	54.2	62.5
Proposal from lesser-known institution has better chance	2.6	2.1	---	2.7	1.4	1.7	2.9	4.2	1.6	2.8
Don't know	19.3	16.3	16.9	18.9	15.5	19.1	17.1	20.1	15.5	15.3
TOTAL[b]	507	436 n.s.	71	296	213 n.s.	236	245	264	439 n.s.	72
B. DOES THE PEER REVIEW PROCESS FAVOR WELL-ESTABLISHED P.I.'s OVER NOT-YET-ESTABLISHED P.I.'s?										
Both have an equal chance	19.4	18.7	11.3	15.3	18.8	21.2	19.7	20.3	18.9	13.9
Young, not-yet-established P.I. has better chance	6.3	3.2	1.4	4.7	2.8	5.9	4.5	6.9	4.1	4.2
Older, well-established P.I. has better chance	54.9	65.2	74.6	60.7	64.3	56.4	61.9	57.1	61.0	69.4
Don't know	19.4	12.9	12.7	19.3	14.1	16.5	13.9	15.7	15.9	12.5
TOTAL[b]	506	434 **	71	295	213 n.s.	236	244	261	439 n.s.	72
C. DOES THE PEER REVIEW PROCESS FAVOR "MAINSTREAM" PROPOSALS OVER PROPOSALS WHICH CHALLENGE MAINSTREAM?										
Both have an equal chance	22.5	24.6	25.4	20.7	23.6	28.1	22.1	24.5	23.2	26.8
Proposal which is consistent with mainstream has better chance	48.5	45.1	49.3	50.3	49.1	40.9	47.5	45.6	45.8	56.3
Proposal which challenges mainstream has better chance	6.2	7.4	5.6	5.8	5.7	6.0	9.0	5.4	7.3	2.8
Don't know	22.9	23.0	19.7	23.1	21.7	25.1	21.3	24.5	23.7	14.1
TOTAL[b]	503	435 n.s.	71	294	212 n.s.	235	244	261 n.s.	439	71

[a] Excludes respondents at non-academic institutions.

[b] Excludes non-responses and uncodeable responses.

** χ^2 significant, $p < .01$

n.s. χ^2 not significant

Table 15B

APPLICANTS' PERCEPTIONS OF OUTCOMES BY ACADEMIC GENERATION, REGION,
AND INSTITUTIONAL AFFILIATION

| | | ACADEMIC GENERATION | | | | REGION | | | INSTITUTIONAL AFFILIATION[a] | | |
		Before 1960	1960-1969	1970 on	North	South	Mid-West	West	Top 20 in federal research funds	Other Ph.D. granting	Other Academic
		%	%	%	%	%	%	%	%	%	%
A.	DOES THE PEER REVIEW PROCESS FAVOR PROPOSALS FROM WELL-KNOWN INSTITUTIONS OVER PROPOSALS FROM LESSER-KNOWN INSTITUTIONS?										
	Both have an equal chance	20.9	16.2	6.8	17.1	11.4	16.0	19.6	28.1	14.4	9.2
	Proposal from well-known institution has better chance	49.4	63.8	72.2	54.5	71.7	61.6	55.4	39.0	63.4	73.8
	Proposal from lesser-known institution has better chance	4.6	2.2	.8	3.8	1.4	1.5	4.1	6.1	2.5	.6
	Don't know	25.1	17.8	20.2	24.6	15.5	20.9	20.9	26.8	19.7	16.3
	TOTAL[b]	872	1195 **	515	736	621 **	599	607	541	1330 **	478
B.	DOES THE PEER REVIEW PROCESS FAVOR WELL-ESTABLISHED P.I.'s OVER NOT-YET-ESTABLISHED P.I.'s?										
	Both have an equal chance	18.8	11.9	7.2	12.2	11.1	14.3	16.1	17.4	14.0	7.5
	Young, not-yet-established P.I. has better chance	6.8	3.5	1.4	4.4	3.2	4.5	4.6	6.8	4.6	1.5
	Older, well-established P.I. has better chance	53.9	70.7	79.5	65.0	73.7	65.6	63.0	57.5	66.2	77.0
	Don't know	20.6	13.9	12.0	18.4	12.0	15.6	16.3	18.3	15.2	14.0
	TOTAL[b]	869	1197 **	517	732	623 **	601	608	541	1330 **	479
C.	DOES THE PEER REVIEW PROCESS FAVOR "MAINSTREAM" PROPOSALS OVER PROPOSALS WHICH CHALLENGE MAINSTREAM?										
	Both have an equal chance	18.5	14.1	15.1	15.9	15.3	15.7	16.4	17.5	16.3	13.4
	Proposal which is consistent with mainstream has better chance	51.7	57.8	57.2	54.7	58.7	54.7	55.6	51.8	56.1	59.4
	Proposal which challenges mainstream has better chance	8.2	5.8	3.3	5.7	6.9	5.7	6.5	8.7	6.5	3.1
	Don't know	21.6	22.3	24.4	23.7	19.1	24.0	21.4	22.0	21.1	24.1
	TOTAL[b]	865	1195 **	516	735	622 n.s.	600	602	542	1324 n.s.	478

[a]Excludes respondents at non-academic institutions.

[b]Excludes non-responses and uncodeable responses.

* χ^2 significant, $p < .05$

** χ^2 significant, $p < .01$

n.s. χ^2 not significant

APPLICANTS' AND REVIEWERS' PERCEPTIONS OF OUTCOMES BY REVIEWER STATUS AND
PRESENT AND PAST EXPERIENCE SEEKING NSF FUNDS

	APPLICANTS								REVIEWERS		
	REVIEWER STATUS		EXPERIENCE OBTAINING NSF FUNDS						EXPERIENCE OBTAINING NSF FUNDS		
			Grantees			Declinees					
	Reviewers	Non-Reviewers	No Previous Application	Previously Unsuccessful	Previously Successful	No Previous Application	Previously Unsuccessful	Previously Successful	No Previous Application	Previously Unsuccessful	Previously Successful
A. DOES THE PEER REVIEW PROCESS FAVOR PROPOSALS FROM WELL-KNOWN INSTITUTIONS OVER PROPOSALS FROM LESSER-KNOWN INSTITUTIONS	%	%	%	%	%	%	%	%	%	%	%
Both have an equal chance	22.7	6.1	19.5	11.7	25.8	6.4	3.6	12.3	25.0	21.8	32.9
Proposal from well-known institution has better chance	51.4	74.0	54.1	65.0	46.0	73.3	82.7	66.8	53.7	62.4	47.1
Proposal from lesser-known institution has better chance	3.8	1.1	2.2	1.4	4.1	.9	.8	2.8	1.1	0.8	3.2
Don't know	22.1	18.8	24.2	22.0	24.1	19.3	12.9	18.1	20.2	15.0	16.8
TOTAL[a]	1565 **	1076	231	214	964	326 **	388	397	352	133 **	535
B. DOES THE PEER REVIEW PROCESS FAVOR WELL-ESTABLISHED P.I.'s OVER NOT-YET-ESTABLISHED P.I.'s?											
Both have an equal chance	17.8	6.5	14.3	11.2	19.8	5.8	6.2	10.2	17.7	17.4	19.9
Young, not-yet-established P.I. has better chance	5.3	2.4	4.8	2.3	5.2	1.5	2.6	6.1	3.4	6.1	5.1
Older, well-established P.I. has better chance	59.7	76.8	63.6	70.6	56.4	76.3	80.7	70.1	61.0	64.4	59.3
Don't know	17.2	14.4	17.3	15.9	18.6	16.4	10.6	13.7	17.9	12.1	15.8
TOTAL[a]	1561 **	1080	231	214	964	329 **	388	394	351	132 n.s.	533
C. DOES THE PEER REVIEW PROCESS FAVOR "MAINSTREAM" PROPOSALS OVER PROPOSALS WHICH CHALLENGE MAINSTREAM?											
Both have an equal chance	18.9	11.3	19.0	16.6	20.7	9.1	10.9	11.9	24.4	16.7	25.2
Proposal which is consistent with mainstream has better chance	53.0	60.0	46.6	50.7	46.9	62.0	69.1	67.8	46.9	54.5	45.8
Proposal which challenges mainstream has better chance	7.4	4.2	7.8	6.6	8.4	5.8	2.1	3.8	7.1	4.5	6.8
Don't know	20.8	24.6	26.7	26.1	24.0	23.1	17.9	16.5	21.6	24.2	22.2
TOTAL[a]	1559 **	1075	232	211	963	329 **	385	394	352	132 n.s.	531

[a] Excludes non-responses and uncodeable responses.

** χ_2^2 significant, p < .01

n.s. χ^2 not significant

Summary

A substantial majority of both reviewers and applicants believe that the NSF peer review process favors proposals from well-known institutions, proposals by well-established P.I.'s and proposals which are "in the mainstream" We do not know how respondents evaluate this perceived outcome.

Reviewers in general, and applicants who have also served as reviewers are significantly less likely to perceive bias in the process than other applicants. Perceptions of bias appear to be somewhat related to academic generation and institutional affiliation. Among both reviewers and applicants those who belong to the most recent academic generation and those at institutions with limited Ph.D.-granting programs or four-year academic institutions are most likely to perceive institutional and generational bias in the review process. Among applicants relationships between background variables and perceptions of bias are statistically significant, but weak. Applicants who have not been successful in obtaining NSF grants recently or in the past are most likely to think that process is biased. Among reviewers, perceptions of bias generally do not differ significantly by experience obtaining NSF funds.

VIEWS ON REQUIRING PEER REVIEW AND CHANGING REVIEWER SELECTION PROCEDURES

We have seen that while a majority of reviewers and applicants are positive about their personal experiences with the NSF peer review process, a substantial number feel that the system has some weaknesses. What aspects of the peer review process would these respondents favor continuing and what would they like to see changed? We asked both groups the following questions about peer review procedures:

o   Currently some proposals which are submitted to NSF are reviewed only by NSF staff, while others are subjected to a peer review process in addition to receiving NSF staff review. How do you feel about this—do you think NSF should:
- Use only NSF staff review for all proposals
- Require some type of peer review for all proposals
- Continue current practice—some proposals receive peer review, others do not

o At present, NSF uses several different types of peer review. Some proposals are reviewed only by individuals who are selected in an ad hoc fashion and normally mail in their reviews. Other proposals are reviewed only by standing review panels, and others are reviewed by ad hoc/mail reviewers and standing review panels. How do you feel about this--do you think NSF should:

- Use only ad hoc/mail review for all proposals
- Use only panel review for all proposals
- Use both ad hoc/mail reviews and panel review for all proposals
- Use whatever type of review is appropriate for specific proposal

o If a panel review procedure is used, how do you think panel members should be selected?

- By NSF staff, based on their best judgment
- By NSF staff, from a previously identified, broadly-based pool of experts in that program area
- By a random sampling technique from a previously identified, broadly-based pool of experts
- Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts

o If an ad hoc/mail review procedure is used, how do you think reviewers should be selected?

- By NSF staff alone, based on their best judgment
- By NSF staff and the prospective principal investigator
- By NSF staff from a previously identified, broadly-based pool of experts
- By a random sampling technique from a previously identified, broadly-based pool of experts
- Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts

Table 16 shows that about sixty percent of both reviewers and applicants favor requiring some sort of peer review for all proposals. And about sixty percent of each group indicates that the *type* of review used should

Table 16

REVIEWERS' AND APPLICANTS' VIEWS ABOUT THE USE OF PEER
REVIEW AND REVIEWER SELECTION PROCEDURES

	Reviewers %	Applicants %
A. SHOULD PEER REVIEW BE REQUIRED FOR ALL PROPOSALS, OR NOT?		
Use only NSF staff review for all proposals	1.1	2.8
Require some type of peer review for all proposals	62.7	59.2
Continue current practice - some proposals receive peer review, others do not	36.2	38.0
TOTAL[a]	1025	2605
B. WHAT TYPE OF PEER REVIEW SHOULD BE REQUIRED?		
Use only ad hoc/mail review for all proposals	4.4	4.4
Use only panel review for all proposals	3.3	5.8
Use both ad hoc/mail reviews and panel review for all proposals	32.1	26.2
Use whatever type of review is appropriate for specific proposal	60.2	63.6
TOTAL[a]	1025	2598
C. HOW SHOULD AD HOC REVIEWERS BE SELECTED?		
By NSF staff alone, based on their best judgment	25.0	18.2
By NSF staff and the prospective principal investigator	12.2	21.7
By NSF staff from a previously identified, broadly-based pool of experts	29.8	20.8
By a random sampling technique from a previously identified, broadly-based pool of experts	9.6	15.5
Some proportion selected by NSF staff and the rest selected by a rando-sampling technique, from a previously identified, broadly-based pool of experts	23.5	23.8
TOTAL[a]	1004	2545
D. HOW SHOULD PANEL REVIEWERS BE SELECTED?		
By NSF staff, based on their best judgment	27.0	22.3
By NSF staff, from a previously identified, broadly-based pool of experts in that program area	31.1	26.7
By a random sampling technique from a previously identified, broadly-based pool of experts	11.4	18.9
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts	30.5	32.0
TOTAL[a]	1016	2581

[a]Excludes non-response and uncodeable responses.

depend on the specific proposal. But a substantial minority--thirty-two percent of the reviewers and twenty-six percent of the applicants--favor requiring the use of *both* ad hoc and panel reviews for all proposals. Small proportions of each group would favor requiring ad hoc mail review alone or panel review alone.

About two-thirds of the respondents to both surveys are in favor of relying largely on NSF staff judgment for ad hoc reviewer selection, as is the current practice. Twenty-two percent of applicants favor participation of the applicant in reviewer selection, but only twelve percent of reviewers favor such a procedure. About twenty-one percent of applicants and thirty percent of reviewers indicate NSF staff should make their selection of ad hoc mail reviewers from a pool of "previously identified, broadly-based pool of experts." All of these differences between reviewers and applicants are statistically significant at the 95 percent confidence level.

About one-third of reviewers and thirty-nine percent of applicants favor introducing some degree of randomization into the process of selecting ad hoc reviewers. Most of these respondents would prefer a procedure which combined NSF staff selection with a random sampling technique. About forty-two percent of reviewers and fifty-one percent of applicants would favor introducing randomization into the process of selecting review *panel* members. Again, these differences between reviewers and applicants are statistically significant at the 95 percent confidence level.

Respondents who indicate they favor selection of reviewers from a "pool of experts" (either by the NSF staff or by a random sampling technique) were asked to volunteer suggestions regarding methods for constructing such a pool. Table 17 shows that suggestions were diverse with no single technique favored by a majority of those answering this question. The most frequent response, volunteered by about one-third of respondents, was that reviewers should be selected by consulting citation indices. Respondents also suggested asking for nominations by NSF staff and by professional societies, and using undefined "experts." Less frequently suggested were nomination by professional journal editors, university department chairmen and university deans, and NSF advisory panels. Also less frequently suggested were selecting previous NSF

Table 17

REVIEWERS' AND APPLICANTS' VOLUNTEERED SUGGESTIONS REGARDING SELECTION
OF "REVIEWER POOL"

	Techniques for Constructing a Pool of Ad Hoc Reviewers[a]		Techniques for Constructing a Pool of Review Panel Members[a]	
	% of Reviewers Mentioning (of those who suggested one or more techniques)	% of Applicants Mentioning (of those who suggested one or more techniques)	% of Reviewers Mentioning (of those who suggested one or more techniques)	% of Applicants Mentioning (of those who suggested one or more techniques)
Base on Citation Index	32.3	28.5	32.4	29.2
Nomination by Professional Societies	17.2	13.1	19.1	12.6
Nomination by Journal Editors	4.3	3.3	3.8	3.2
Nomination by Department Chairman or Deans	6.6	7.6	6.5	8.3
Nomination by NSF Advisory Panels	4.0	1.8	5.3	2.1
Nomination by NSF Staff	20.6	15.1	19.1	11.7
Nomination by Experts	9.7	7.6	9.1	7.8
Peer Recommendations	7.3	4.8	6.7	5.0
Use Scientific Rosters	1.2	2.5	1.2	2.3
Use NSF grantees	5.7	8.8	6.1	9.2
Use "Experts" in Field	20.1	19.8	19.8	20.4
Use Members of Professional Society	4.7	7.4	5.3	7.4
Competitive Process	1.2	1.8	1.5	1.8
Other	34.7	36.1	32.4	37.6
TOTAL NUMBER OF RESPONDENTS SUGGESTING AT LEAST ONE TECHNIQUE	576	1401	658	1692

[a]Respondents who indicated selections should be made from a "previously identified pool of experts" were asked: "How do you think this pool of experts should be identified?" Up to 3 different responses were coded. If a response could fit into either a general or a specific category the most specific code category was used.

Percentages in this table add to more than 100 percent because multiple responses were possible. The base used in calculating percentages is the total number of respondents who made one or more responses to the question.

grantees, undefined "experts" and members of professional societies.
The large proportion of "other" responses is accounted for by respondents
giving second and third responses which elaborated upon their first
(codeable) response in some idiosyncratic fashion and responses which
were too general or too vague to code. This category also includes
such types of responses as "reviewers should be selected by applicants,"
"select by general nomination" and "use previous NSF applicants," given
by less than 5 percent of those responding to the question. A few
respondents presented detailed suggestions for constructing a computer
data base of reviewers, indexed by field of research and other characteristics.

Tables 18A – B present reviewers' and applicants' attitudes towards
requiring peer review and changing reviewer selection procedures, by
directorate. A larger proportion of reviewers for the Biological Behavioral
and Social Sciences Directorate and applicants who submitted proposals to
this directorate, favor requiring the use of some type of peer review for
all proposals as compared to other Directorates; RANN and Education reviewers
and applicants are least likely to favor requiring peer review. BBSS and
the Astronomical, Atmospheric, Earth and Ocean Sciences Directorate
reviewers and applicants are more likely to favor requiring the use of
both ad hoc and panel review for all proposals as compared to reviewers and
applicants in Mathematics, Physical Sciences and Engineering, Education and
RANN. Fewer consistent differences among directorates are observed for
responses to questions about reviewer selection procedures.

Table 19A – B present the distribution of reviewers' and applicants'
attitudes towards requiring peer review for all proposals, requiring
specific types of review and introducing randomization into the reviewer
selection process, by academic generation, region and institutional
affiliation. While the distribution of attitudes on these issues among
reviewers and applicants does vary somewhat across generational, regional
and institutional categories, there is no *consistent* pattern of differences.

There is however, a consistent pattern of differences in attitudes
on these issues between reviewers and non-reviewers among applicants and
between successful and unsuccessful applicants. Table 19C presents these
data. In particular, applicants who are not also reviewers are significantly
more likely to favor randomization of reviewer selection as compared to

REVIEWERS' VIEWS ABOUT REQUIRING PEER REVIEW AND CHANGING REVIEWER SELECTION
PROCEDURES, BY DIRECTORATE

	Biological Behavioral, and Social Sciences %	Mathematics, Physical Science and Engineering %	Astronomical, Atmospheric, Earth and Ocean Science %	Education %	RANN %
A. SHOULD PEER REVIEW BE REQUIRED FOR ALL PROPOSALS, OR NOT?					
Use only NSF staff review for all proposals	.9	1.2	.9	--	1.6
Require some type of peer review for all proposals	73.7	59.5	66.7	53.5	44.3
Continue current practice--some proposals receive peer review, others do not	25.4	39.3	32.5	46.5	54.1
TOTAL[a]	334	427	114	43	122
B. WHAT TYPE OF PEER REVIEW SHOULD BE REQUIRED?					
Use only ad hoc/mail review for all proposals	3.0	5.2	6.1	--	3.2
Use only panel review for all proposals	5.3	1.2	.9	2.3	5.6
Use both ad hoc/mail reviews and panel review for all proposals	42.4	22.3	42.6	27.9	20.2
Use whatever type of review is appropriate for specific proposal	49.2	71.3	50.4	69.8	71.0
TOTAL[a]	337	422	115	43	124

[a]Respondents who did not specify the directorate for which they conducted reviews are excluded. Respondents who reviewed for more than one directorate are included in the tabulation for all appropriate directorates. Non-responses and uncodeable responses are excluded.

C. HOW SHOULD AD HOC REVIEWERS BE SELECTED?	Biological Behavioral, and Social Sciences	Mathematics, Physical Science and Engineering	Astronomical, Atmospheric, Earth and Ocean Science	Education	RANN
	%	%	%	%	%
By NSF staff alone, based on their best judgment	21.6	29.5	32.4	34.9	29.8
By NSF staff and the prospective principal investigator	9.8	13.3	14.4	11.6	10.7
By NSF staff from a previously identified, broadly-based pool of experts	38.4	27.5	21.6	18.6	27.3
By a random sampling technique from a previously identified, broadly-based pool of experts	6.7	8.9	12.6	7.0	6.6
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts	23.5	20.8	18.9	27.9	25.6
TOTAL[a]	328	414	111	43	121

D. HOW SHOULD PANEL REVIEWERS BE SELECTED?					
By NSF staff, based on their best judgment	26.0	29.3	26.1	37.2	33.9
By NSF staff, from a previously identified, broadly-based pool of experts in that program area	36.7	30.5	27.9	23.3	29.0
By a random sampling technique from a previously identified, broadly-based pool of experts	8.7	9.8	16.2	9.3	7.3
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts	28.7	30.5	29.7	30.2	29.8
TOTAL[a]	335	417	111	43	124

[a]Respondents who did not specify the directorate for which they conducted reviews are excluded. Respondents who reviewed for more than one directorate are included in the tabulation for all appropriate directorates. Non-responses and uncodeable responses are excluded.

APPLICANTS' VIEWS ABOUT REQUIRING PEER REVIEW AND CHANGING REVIEWER SELECTION

PROCEDURES BY DIRECTORATE

	Biological Behavioral, and Social Sciences	Mathematics, Physical Science and Engineering	Astronomical, Atmospheric, Earth and Ocean Science	Education	RANN
A. SHOULD PEER REVIEW BE REQUIRED FOR ALL PROPOSALS, OR NOT?	%	%	%	%	%
Use only NSF staff review for all proposals	1.5	2.1	2.3	3.3	8.8
Require some type of peer review for all proposals	70.2	60.2	59.1	46.4	39.4
Continue current practice—some proposals receive peer review, others do not	28.3	37.6	38.6	50.4	51.8
TOTAL[a]	689	958	259 **	274	193
B. WHAT TYPE OF PEER REVIEW SHOULD BE REQUIRED?					
Use only ad hoc/mail review for all proposals	3.3	6.5	3.9	1.4	3.2
Use only panel review for all proposals	7.9	5.2	3.1	5.0	5.3
Use both ad hoc/mail reviews and panel review for all proposals	39.7	21.0	34.1	14.7	14.7
Use whatever type of review is appropriate for specific proposal	49.2	67.3	58.8	78.8	76.8
TOTAL[a]	675	967	255 **	278	190

[a] Excludes respondents who did not specify directorate to which application was submitted and non-response and uncodeable responses.

** χ^2 significant, $p < .01$

C. HOW SHOULD AD HOC REVIEWERS BE SELECTED?	Biological Behavioral, and Social Sciences	Mathematics, Physical Science and Engineering	Astronomical, Atmospheric, Earth and Ocean Science	Education	RANN
	%	%	%	%	%
By NSF staff alone, based on their best judgment	13.5	22.2	24.8	15.4	16.9
By NSF staff and the prospective principal investigator	20.0	23.6	24.4	12.4	28.0
By NSF staff from a previously identified, broadly-based pool of experts	25.0	19.9	21.3	14.7	19.6
By a random sampling technique from a previously identified, broadly-based pool of experts	18.4	13.1	11.0	20.3	11.6
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts	23.2	21.2	18.5	37.2	23.8
TOTAL[a]	669	940	254 **	266	189

D. HOW SHOULD PANEL REVIEWERS BE SELECTED?					
By NSF staff, based on their best judgment	17.4	26.5	26.8	16.7	24.4
By NSF staff, from a previously identified, broadly-based pool of experts in that program area	31.6	25.2	26.5	21.4	28.0
By a random sampling technique from a previously identified, broadly-based pool of experts	22.1	18.3	14.4	19.6	13.5
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts	28.9	30.0	32.3	42.4	34.2
TOTAL[a]	678	944	257 **	276	193

[a]Excludes respondents who did not specify directorate to which application was submitted and non-response and uncodeable responses.

** χ^2 significant, p < .01

Table 19A

REVIEWERS' VIEWS ABOUT REQUIRING PEER REVIEW AND CHANGING REVIEWER SELECTION PROCEDURES

BY SELECTED BACKGROUND CHARACTERISTICS

	Academic Generation			Region				Institutional Affiliation [b]		
	Before 1960 %	1960-1969 %	1970 on %	North %	South %	Mid-West %	West %	Top 20 in federal research funding %	Other Ph.D. granting institution %	Other Academic Institution %
A. SHOULD PEER REVIEW BE REQUIRED FOR ALL PROPOSALS, OR NOT?										
Use only NSF staff review for all proposals	1.0	.9	1.5	2.1	.5	.0	.8	.8	.9	.0
Require some type of peer review for all proposals	57.9	69.7	54.4	64.9	61.6	61.6	65.2	61.6	65.7	77.8
Continue current practice--some proposals receive peer review, others do not	41.1	29.4	44.1	33.0	37.9	38.4	34.0	37.6	33.4	22.2
TOTAL [a]	494	435 **	68	288	211	229 n.s.	244	258	428 n.s.	72
B. WHAT TYPE OF PEER REVIEW SHOULD BE REQUIRED?										
Use only ad hoc/mail review for all proposals	5.1	3.5	2.9	4.8	3.8	2.6	5.8	3.5	4.8	2.8
Use only panel review for all proposals	4.0	1.6	5.7	3.8	1.9	3.0	2.5	2.7	2.3	5.6
Use both ad hoc/mail reviews and panel review for all proposals	27.5	37.4	30.0	33.9	33.6	32.0	29.2	33.9	34.9	35.2
Use whatever type of review is appropriate for specific proposal	63.4	57.5	61.4	57.5	60.7	62.3	62.5	59.9	58.0	56.3
TOTAL [a]	494	433 *	70	292	211	231 n.s.	240	257	436 n.s.	71

[a] Excludes non-responses and uncodeable responses

[b] Excludes responses at non-academic institutions

* χ^2 significant, p < .05

** χ^2 significant, p < .01

n.s. χ^2 not significant

	Academic Generation				Region				Institutional Affiliation [b]		
C. HOW SHOULD AD HOC REVIEWERS BE SELECTED?	Before 1960 %	1960–1969 %	1970 on %	North %	South %	Mid-West %	West %	Top 20 in federal research funding %	Other Ph.D. granting institutions %	Other Academic Institution %
By NSF staff alone, based on their best judgment	28.9	21.5	20.6	24.2	23.5	26.8	26.0	31.0	22.0	20.6
By NSF staff and the prospective principal investigator	12.0	12.3	11.1	10.7	14.2	11.0	12.8	14.7	13.3	4.4
By NSF staff from a previously identified, broadly-based pool of experts	29.7	29.8	23.8	28.0	27.0	29.4	34.0	30.6	28.8	27.9
By a random sampling technique from a previously identified, broadly-based pool of experts	9.4	9.0	14.3	12.1	10.8	7.9	7.2	5.2	10.1	14.7
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts	20.0	27.4	30.2	24.9	24.5	25.0	20.0	18.7	25.8	32.4
TOTAL [a]	491	423 n.s.	63	289	204	228 n.s.	235	252	427 *	68
D. HOW SHOULD PANEL REVIEWERS BE SELECTED?										
By NSF staff, based on their best judgment	29.5	25.5	17.1	25.3	26.8	32.0	23.1	29.9	24.7	22.9
By NSF staff, from a previously identified, broadly-based pool of experts in that program area	30.7	31.1	30.0	30.5	27.2	28.1	38.2	37.4	28.6	27.1
By a random sampling technique from a previously identified, broadly-based pool of experts	11.2	11.5	14.3	13.0	14.1	10.8	8.8	6.3	13.7	17.1
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified broadly based pool of experts	28.7	31.9	38.6	31.2	31.9	29.0	29.8	26.4	33.0	32.9
TOTAL [a]	492	427 n.s.	70	285	213	231 n.s.	238	254	430 n.s.	70

[a] Excludes non-responses and uncodeable responses.

[b] Excludes respondents at non-academic institutions.

* χ^2 significant, $p < .05$

** χ^2 significant, $p < .01$

n.s. χ^2 not significant

APPLICANTS' VIEWS ABOUT REQUIRING PEER REVIEW AND CHANGING REVIEWER
SELECTION PROCEDURES, BY SELECTED BACKGROUND CHARACTERISTICS

	Academic Generation			Region				Institutional Affiliation		
A. SHOULD PEER REVIEW BE REQUIRED FOR ALL PROPOSALS, OR NOT?	Before 1960 %	1960 1969 %	1970 on %	North %	South %	Mid-West %	West %	Top 20 in federal research funding institutions %	Other Ph.D. granting institutions %	Other Academic Institution %
Use only NSF staff review for all proposals	2.7	3.2	2.2	3.6	3.0	2.5	2.4	2.4	2.5	3.0
Require some type of peer review for all proposals	53.2	61.7	63.5	59.0	59.2	60.8	58.8	60.9	61.9	57.5
Continue current practice—some proposals receive peer review, others do not	44.1	35.1	34.4	37.4	37.8	36.7	38.9	36.7	35.6	39.5
TOTAL [a]	850	1180 **	509	727	608 n.s.	594	594	537	1312 **	466
B. WHAT TYPE OF PEER REVIEW SHOULD BE REQUIRED?										
Use only ad hoc/mail review for all proposals	4.1	4.9	3.3	4.7	4.0	4.7	3.7	4.9	4.7	3.2
Use only panel review for all proposals	4.5	5.8	7.5	6.8	6.3	3.5	5.7	4.9	5.5	5.6
Use both ad hoc/mail reviews and panel review for all proposals	26.5	26.7	24.9	27.1	26.0	24.3	27.8	29.8	27.6	22.1
Use whatever type of review is appropriate for specific proposal	64.9	62.7	64.3	61.3	63.8	67.5	62.9	61.2	62.1	69.1
TOTAL [a]	849	1173 n.s.	510	716	607 n.s.	593	598	534	1313 *	466

[a] Excludes non-responses and uncodeable responses.

* χ^2 Significant, p < .05
n.s. χ^2 Not significant

| | Academic Generation | | | Region | | | | Top 20 in fed-eral re-search funding % | Institutional Affiliation | |
	Before 1960 %	1960-1969 %	1970 on %	North %	South %	Mid-West %	West %		Other Ph.D. granting insti-tutions %	Other Academic Institution %
C. HOW SHOULD AD HOC REVIEWERS BE SELECTED?										
By NSF staff alone, based on their best judgment	23.0	17.9	9.9	18.3	14.8	16.7	22.5	23.0	18.6	11.1
By NSF staff and the prospective principal investigator	21.1	22.0	23.3	22.3	22.4	22.3	19.3	22.1	22.3	19.3
By NSF staff from a previously identified, broadly-based pool of experts	25.4	19.5	17.6	23.0	18.1	19.4	23.7	25.9	21.5	15.0
By a random sampling technique from a previously identified, broadly-based pool of experts	10.7	16.1	21.7	13.6	19.1	18.4	11.2	8.5	15.8	22.1
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts	19.8	24.5	27.5	22.7	24.7	23.1	23.5	20.5	21.8	32.5
TOTAL [a]	839	1148 **	494	699	596 **	576	591	517	1280 **	461
D. HOW SHOULD PANEL REVIEWERS BE SELECTED?										
By NSF staff, based on their best judgment	26.6	21.2	17.3	22.2	20.3	21.5	24.5	27.0	22.1	15.2
By NSF staff, from a previously identified, broadly-based pool of experts in that program area	30.5	25.4	24.4	30.4	23.1	23.0	30.5	32.3	26.8	20.3
By a random sampling technique from a previously identified, broadly-based pool of experts	12.9	21.4	23.8	16.4	22.3	23.2	14.4	12.9	19.7	24.7
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified broadly based pool of experts	29.9	31.9	34.5	31.0	34.2	32.3	30.6	27.8	31.4	39.8
TOTAL [a]	852	1168 **	496	703	605 **	586	604	529	1297 **	462

[a] Excludes non-responses and uncodeable responses.

* χ^2 Significant, p < .05

n.s. χ^2 not significant

Table 19C

APPLICANTS' AND REVIEWERS' VIEWS ABOUT THE USE OF PEER REVIEW AND SELECTION OF REVIEWERS
BY REVIEWER STATUS AND EXPERIENCE SEEKING NSF FUNDS

	APPLICANTS								REVIEWERS		
	Reviewer Status		Past Experience Obtaining NSF Funds								
			Grantees			Declinees				Previous	Previous
	Reviewers %	Non-Reviewers %	No Previous Application %	Previous - Unsuccessful %	Previous Successful %	No Previous Application %	Previous- Unsuccessful %	Previous- Successful %	No Application %	Unsuccessful Application %	Successful Application %
A. SHOULD PEER REVIEWS BE REQUIRED FOR ALL PROPOSALS, OR NOT?											
Use only NSF staff review for all proposals	1.7	4.3	1.3	1.9	1.4	4.1	5.6	4.4	0.9	2.3	0.8
Require some type of peer review for all proposals	59.1	59.2	51.5	61.3	51.0	68.0	69.8	66.1	62.2	69.7	62.2
Continue current practice - some proposals receive peer review, others do not	39.2	36.3	47.2	36.8	47.7	27.9	24.6	29.4	36.9	28.0	37.0
TOTAL [a]	1545 **	1060	229	212	959 **	319	378	384	352 n.s.	132	521
B. WHAT TYPE OF PEER REVIEW SHOULD BE REQUIRED?											
Use only ad hoc/mail review for all proposals	4.5	4.2	3.5	5.2	3.1	2.8	7.0	6.8	2.9	5.2	5.1
Use only panel review for all proposals	3.9	8.5	3.9	3.8	2.6	7.2	13.1	7.8	3.8	5.2	2.3
Use both ad hoc/mail reviews and panel review for all proposals	28.5	22.9	26.0	27.2	23.8	29.6	27.3	28.8	29.9	33.3	33.5
Use whatever type of review is appropriate for specific proposal	63.1	64.4	66.7	63.8	70.5	60.4	52.7	56.6	63.5	56.3	59.0
TOTAL [a]	1534	1064	231	213	949	321	374	385	345	135 n.s.	525
C. HOW SHOULD AD HOC REVIEWERS BE SELECTED?											
By NSF staff alone, based on their best judgment	23.6	10.3	21.4	16.5	28.4	7.7	7.1	11.2	25.3	18.3	26.7
By NSF staff and the prospective principal investigator	21.4	22.1	18.8	20.9	19.5	20.5	23.8	28.1	10.5	12.2	13.2
By NSF staff from a previously identified, broadly-based pool of experts	25.0	14.7	28.1	19.9	23.6	16.3	15.6	19.5	31.4	28.2	28.9
By a random sampling technique from a previously identified, broadly-based pool of experts	9.1	24.9	12.1	17.0	6.2	27.9	27.7	18.4	10.2	12.2	8.6
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts	20.9	28.0	19.6	25.7	22.3	27.6	25.8	22.7	22.7	29.0	22.6
TOTAL [a]	1509 **	1036	224	206	939 **	312	365	374	344 n.s.	131	509

[a] Excludes non-responses and uncodeable responses.

** χ^2 Significant, p < .01.

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D. HOW SHOULD PANEL REVIEWERS BE SELECTED?	Reviewer Status		APPLICANTS — Past Experience Obtaining NSF Funds							REVIEWERS		
			Grantees			Declinees						
	Reviewers %	Non-Reviewers %	No Previous Application %	Previous - Unsuccessful %	Previous Successful %	No Previous Application %	Previous Unsuccessful %	Previous Successful %	No Application %	Previous Unsuccessful Application %	Previous Successful Application %
By NSF staff, based on their best judgment	26.4	16.3	23.8	19.6	31.0	12.9	12.4	19.1	28.0	22.6	27.5
By NSF staff, from a previously identified, broadly-based pool of experts in that program area	31.5	19.8	35.4	25.7	31.0	21.4	19.7	24.1	31.8	30.1	30.6
By a random sampling technique from a previously identified, broadly-based pool of experts	12.4	28.5	12.6	22.0	8.0	31.1	32.7	25.7	10.7	15.8	11.2
Some proportion selected by NSF staff and the rest selected by a random sampling technique, from a previously identified, broadly-based pool of experts	29.7	35.4	28.3	32.7	30.0	34.6	35.1	31.2	29.5	31.6	30.8
TOTAL[a]	1532 **	1049	223	214	946 **	318	370	382	346	133 n.s.	517

[a]Excludes non-response and uncodeable responses.

** χ^2 Significant, p < .01.

n.s. χ^2 not significant

applicant-reviewers (53 percent as compared to 30 percent). Declinees and previously unsuccessful grantees are more likely than other applicants to favor introducing randomization into the reviewer selection process. Interestingly, among reviewers views on these issues do not vary significantly.

Summary

A majority of reviewers and applicants are in favor of requiring peer review for all proposals. but would permit flexibility in determining the type of review used. A majority favor continuance of a strong role for NSF program officers in reviewer selection. But many would like to see reviewers selected from a "previously identified pool of experts," whether by the NSF staff, by a random sampling technique or a combination of the two. Suggestions for constructing such a pool, which were volunteered by respondents, include deriving names from citation indices, nomination by NSF staff and nomination by professional societies, among others. But suggestions were diverse, with no single proposal favored by a majority of respondents. A substantial minority of respondents is in favor of introducing some degree of randomization into the reviewer selection process. Attitudes towards these aspects of review procedures vary somewhat by directorate. A larger proportion of BBSS reviewers and applicants are in favor of requiring peer review than those in other directorates. Those in the Education Directorate and RANN are least likely to favor such a requirement. Reviewers and applicants in BBSS and AAEO are more likely to favor requiring *both* ad hoc and panel review for all proposals than those in other directorates. Among applicants, those in Education and BBSS are more likely to favor introducing randomization into the reviewer selection process than those in other directorates. Among reviewers, views on this issue are more similar across directorates.

Reviewers'and applicants' attitudes towards requiring peer review, requiring specific *types* of peer review and introducing randomization into the reviewer selection process do not vary consistently with academic generation, region or academic affiliation.

Among applicants, those who have not served as reviewers and those
who have been less successful in obtaining NSF funds are more likely to
favor introducing some degree of randomization into the reviewer selection
process.

Among reviewers attitudes on these issues do not vary with past
experience seeking NSF funding.

ATTITUDES TOWARDS CHANGING NSF POLICY ON RELEASING INFORMATION ABOUT REVIEWS

The National Science Board and the House Committee on Science and
Technology were interested in knowing whether NSF applicants are satisfied
with the amount of feedback about the review process they receive from
the Foundation.

As reported above about 45 percent of respondents indicated they asked for
and received oral feedback about reviews, while about 18 percent received written
feedback. Most of the applicants who report having received feedback
about reviews of their last NSF proposal indicate they received a summary
of reviewers' comments. The applicant questionnaire asked respondents who
indicated either that they had received some feedback or that they would
have liked to, which of the following they would have found more useful:
summaries of reviewers' comments or *verbatim* copies of such comments.
These applicants were also asked whether information about reviewers'
reactions to their proposal would have been more useful if the reviewers
were identified or whether knowing reviewers' identities would not have
made much difference.

Almost two-thirds of the respondents who either received or were
desirous of feedback indicate that they would have found *verbatim*
comments more useful than summaries. Thirty-six percent indicate that
information about reviewers' reactions would have been more useful if
reviewers were identified by name. Almost half indicate that knowing
reviewers' names would not have made much difference.

Tables 20A - C show the distribution of applicants' evaluations of
the usefulness of verbatim reviews and identifying reviewers, by directorate,
academic generation, region, institutional affiliation and past experience

Table 20A

APPLICANTS' EVALUATION OF USEFULNESS OF VERBATIM REVIEW COMMENTS AND
IDENTIFICATION OF REVIEWERS, BY DIRECTORATE

	DIRECTORATE				
	Biological, Behavioral and Social Sciences	Mathematics, Physical Sciences and Engineering	Astronomical, Atmospheric Earth and Ocean Science	Education	RANN
A. WHAT KIND OF INFORMATION WOULD BE MORE USEFUL	%	%	%	%	%
Verbatim	72.1	64.3	59.0	65.2	60.6
Summary by a Program Officer	27.9	35.7	41.0	34.8	39.4
TOTAL[a]	609	812	212 **	244	175
B. WHAT DIFFERENCE WOULD KNOWING REVIEWER'S NAME MAKE?					
Comments _more_ useful	38.8	33.7	36.5	27.5	40.3
Comments _less_ useful	17.3	20.1	18.5	15.9	14.7
No difference	44.0	46.2	45.1	56.6	45.0
TOTAL[a]	637	852	233 *	251	191

[a]Respondents who did not specify directorate to which they submitted proposal are excluded from this tabulation. Non-responses and uncodeable responses are also excluded.

* χ^2 Significant, p < .05
** χ^2 Significant, p < .01

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APPLICANTS' EVALUATION OF USEFULNESS OF VERBATIM REVIEW COMMENTS AND
IDENTIFICATION OF REVIEWERS, BY SELECTED BACKGROUND
CHARACTERISTICS

	Before 1960 %	Academic Generation 1960-1969 %	1970 on %	North-east %	South %	Region Mid-West %	West %	Top 20 in federal research funding %	Other Ph.D. Granting Institution %	Other Academic Institution %
A. WHAT KIND OF INFORMATION WOULD BE MORE USEFUL?										
Verbatim	57.2	67.8	75.5	66.3	65.0	69.6	62.9	62.3	66.9	66.6
Summary by a Program Officer	42.8	32.2	24.5	33.7	35.0	30.4	37.1	37.7	33.1	33.4
TOTAL[a]	697	1034 **	468	618	531 n.s.	514	517	435	1124 n.s.	437
B. WHAT DIFFERENCE WOULD KNOWING REVIEWER'S NAME MAKE?										
Comments _more_ useful	34.2	36.1	38.7	35.2	35.8	36.1	35.3	34.3	34.8	33.0
Comments _less_ useful	20.9	16.6	15.1	18.0	18.8	14.5	19.8	21.0	17.3	17.9
No difference	44.9	47.3	46.2	46.8	45.5	49.4	44.9	44.8	47.9	49.1
TOTAL[a]	733	1092 n.s.	491	654	565 n.s.	532	546	458	1194 n.s.	452

Institutional Affiliation

[a]Excludes non-response and uncodeable responses.

** χ^2 Significant, p < .01

n.s. χ^2 Not significant

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APPLICANTS' EVALUATION OF USEFULNESS OF VERBATIM REVIEW COMMENTS
AND IDENTIFICATION OF REVIEWERS, BY PAST EXPERIENCE WITH NSF

	REVIEWER STATUS		PREVIOUS EXPERIENCE OBTAINING NSF FUNDS					
				Grantees			Declinees	
	Reviewer	Non-Reviewer	No Previous Application	Previously Unsuccessful	Previously Successful	No Previous Application	Previously Unsuccessful	Previously Successful
A. WHAT KIND OF INFORMATION WOULD BE MORE USEFUL?	%	%	%	%	%	%	%	%
Verbatim	60.7	73.8	57.0	69.7	54.2	75.6	74.4	78.9
Summary by a Program Officer	39.3	26.6	43.0	30.3	45.8	24.4	25.6	21.1
TOTAL[a]	1269 **	988	186	178 **	788	303	352	342
B. WHAT DIFFERENCE WOULD KNOWING REVIEWER'S NAME MAKE?								
Comments _more_ useful	31.9	41.6	28.0	36.7	26.7	40.3	50.5	41.2
Comments _less_ useful	20.6	14.0	21.0	18.6	21.9	12.6	12.1	16.0
No difference	47.5	44.4	51.0	44.7	51.4	47.2	37.4	42.8
TOTAL[a]	1346 **	1029	200	188 **	817	318	372	374

[a] Excludes non-responses and uncodeable responses.

** χ^2 Significant, p < .01

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dealing with NSF. Views on the usefulness of receiving verbatim review comments do not vary significantly by region or institutional affiliation. Applicants to the BBSS, Education and MPSE directorates are more likely to prefer verbatim reviews, as compared to those applying to other directorates. Applicants who belong to more recent academic generation are more likely to prefer verbatim comments, as compared to those who received their degrees earlier. Applicants who have not served as reviewers during the past two years are more likely to prefer verbatim comments than those who have served as reviewers. Those whose most recent proposal was declined are more likely to prefer verbatim comments, as compared to more successful applicants. Among the latter, respondents who were previously unsuccessful in obtaining funds are more likely to prefer verbatim comments. Relationships between directorate, reviewer status and experience obtaining NSF funds, and preference for verbatim or summary reviews are statistically significant (p < .01) but weak (Phi < .3).

About one-third of respondents who either received or were desirous of feedback indicate that knowing reviewers' names would make information about review comments more useful. There is no statistically significant relationship between attitudes on this issue and academic generation, region or institutional affiliation. Applicants to RANN and BBSS are more likely to express this view, than applicants to other directorates. Forty-two percent of applicants who have not served as reviewers recently feel identifying reviewers would be useful to them as applicants, as compared to thirty-two percent of those who have been reviewers. Among declinees we find greater support for this point of view. About forty-four percent of declinees generally and half of those declinees who have also been unsuccessful in obtaining NSF funds in the past indicate they would have found knowing reviewers' names useful. Relationships between directorate, reviewer status and experience obtaining NSF funds, and assessment of the usefulness of identifying reviewers to applicants are statistically significant (p < .05, p < .01 and p < .01, respectively), but weak (Phi < .3).

The questionnaire items discussed above asked the respondent to focus on the specific value of different kinds of information for his understanding of the NSF review process as it was implemented for his most recent proposal. Both the reviewer and the applicant questionnaires also asked respondents for their *general* attitudes towards possible changes in NSF policy on releasing information about reviews. Specifically, respondents were asked whether they would approve or disapprove of each of the following:

(1) Providing a verbatim copy of each review to the applicant with the reviewer's name *deleted*;

(2) Providing a verbatim copy of each review to the applicant with the reviewer's name *included*;

(3) Treating all reviews with the reviewer's name included as public information available to anyone upon request.

At the time the questionnaires were sent to respondents the National Science Board had already adopted a policy of providing verbatim review comments to applicants.[1] Respondents were not asked about their attitudes towards NSF's *previous* policy of providing paraphrased reviewer comments to applicants.

The possibility of identifying reviewers to applicants has been under discussion in the scientific community for some time. Treating reviews as public information has been suggested by some Congressional critics of the NSF peer review process.

Table 21 shows that the policy of providing verbatim review comments to applicants is approved--"strongly" or "somewhat"--by three-quarters of both the reviewers and applicants. Nineteen percent of the reviewers and thirty percent of the applicants would approve--"strongly" or "somewhat"-- of identifying the reviewer to the applicant. Less than twenty percent of each of these groups would approve--"strongly" or "somewhat"--of a policy of treating review comments as "public information." Interestingly, reviewers' and applicants' views do not differ significantly *except* with regard to identifying reviewers to applicants, a policy which receives substantially greater support from the latter group.

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[1] This policy became effective January 1, 1976.

Table 21

REVIEWERS' AND APPLICANTS' ATTITUDES TOWARD CHANGES IN NSF POLICY
ON RELEASING INFORMATION ABOUT THE REVIEW PROCESS

	Reviewers %	Applicants %
Attitude towards "providing copy of each review to the applicant <u>with the reviewer's name deleted</u>"		
Approve strongly	53.2	52.8
Approve somewhat	25.6	23.9
Disapprove somewhat	11.7	11.6
Disapprove strongly	7.6	9.2
Undecided	1.9	2.4
TOTAL[a]	1034	2547
Attitude towards "providing copy of each review to the applicant <u>with the reviewer's name included</u>"		
Approve strongly	9.7	20.3
Approve somewhat	9.2	9.8
Disapprove somewhat	16.2	17.6
Disapprove strongly	61.7	48.4
Undecided	3.2	3.8
TOTAL[a]	1042	2556
Attitude towards "treating all reviews with the reviewer's name included as public information, available to anyone upon request"		
Approve strongly	9.0	13.1
Approve somewhat	6.1	5.0
Disapprove somewhat	10.6	12.4
Disapprove strongly	71.9	65.8
Undecided	2.4	3.7
TOTAL[a]	1045	2563

[a]Excludes non-responses and uncodeable responses.

This difference is statistically significant at the 95 percent confidence level.

Reviewers were also asked to indicate if they would continue to serve as reviewers if each of the policy changes were adopted. Although not all reviewers agree with the policy of providing verbatim comments, 81 percent indicate they will "continue" as reviewers now that the policy has been adopted by the Board; an additional 13 percent say they will "continue, but on a more limited basis." Only one percent say they will refuse to serve as reviewers in the future. Thirty-five percent indicate 'they would refuse to serve as reviewers if a policy of identifying reviewers by name were adopted; an additional twenty-seven percent indicate they would "continue, but on a more limited basis." Almost *half* the reviewers (48%) say they would refuse to serve as reviewers if reviews were to be treated as "public information"; an additional nineteen percent say they would limit their participation under such conditions.

Tables 22A - B show that attitudes towards these possible modifications in information policy vary somewhat across directorates. Among reviewers, those serving the Education Directorate and AAEO are more likely to support identifying reviewers than those in other directorates. Among applicants, those who have applied to RANN and to BBSS are more likely to support identifying reviewers than those who have applied to other directorates. But no directorate shows a majority in support of such a change and feelings against a policy of treating reviews as public information are strongly negative across directorates.

Tables 23A - B show that among reviewers attitudes towards changes in NSF policy on releasing information about reviews generally do not vary significantly with academic generation and current institutional affiliation. The relationships between region and these attitudes are statistically significant, but the differences in the distributions are small. Among applicants relationships between these background variables and attitudes towards changing NSF information policy are generally statistically significant ($p < .01$), but weak ($Phi < .3$). Respondents from more recent

REVIEWERS' ATTITUDES TOWARDS CHANGES IN INFORMATION POLICY,
BY DIRECTORATE

Attitude towards NSF providing verbatim reviews with reviewers' names deleted to applicants	Biological Behavioral and Social Sciences %	Mathematics, Physical Sciences and Engineering %	Astronomical, Atmospheric Earth and Ocean Science %	Education %	RANN %
Approve strongly	52.2	50.2	55.5	35.7	51.6
Approve somewhat	22.6	28.6	22.7	40.5	27.0
Disapprove somewhat	14.8	11.3	15.1	11.9	10.3
Disapprove strongly	8.6	7.8	5.0	7.1	7.9
Undecided	1.8	2.1	1.7	4.8	3.2
TOTAL[a]	337	434	119	42	126

In light of this change, do you think you will continue to serve as a reviewer or refuse to serve as a reviewer in the future?

	Biological Behavioral and Social Sciences	Mathematics, Physical Sciences and Engineering	Astronomical, Atmospheric Earth and Ocean Science	Education	RANN
Continue	78.1	80.8	77.8	84.2	85.6
Continue, but on a more limited basis	15.6	14.4	18.9	15.8	11.3
Refuse	2.2	.9	---	---	1.0
Undecided	4.1	3.9	3.3	---	2.1
TOTAL[a]	270	334	90	38	97

Attitude towards NSF providing verbatim reviews with reviewers' names included to applicants

	Biological Behavioral and Social Sciences	Mathematics, Physical Sciences and Engineering	Astronomical, Atmospheric Earth and Ocean Science	Education	RANN
Approve strongly	8.8	6.4	11.0	11.6	8.9
Approve somewhat	8.5	8.3	13.6	20.9	12.1
Disapprove somewhat	14.1	15.6	15.3	16.3	14.5
Disapprove strongly	65.1	67.4	57.6	51.2	61.3
Undecided	3.5	2.3	2.5	---	3.2
TOTAL[a]	341	436	118	43	124

[a]Excludes reviewers who did not specify directorate for which they served as reviewer. Respondents who reported serving as reviewers for more than one directorate are tabulated in each appropriate directorate. Non-responses and uncodeable responses are excluded.

REVIEWERS ATTITUDES TOWARDS CHANGES IN INFORMATION POLICY,
BY DIRECTORATE

Do you think you would continue to serve as a reviewer if such a policy were adopted or refuse to serve as a reviewer in the future?	Biological, Behavioral and Social Sciences	Mathematics Physical Science and Engineering	Astronomical, Atmospheric Earth and Ocean Science	Education	RANN
	%	%	%	%	%
Continue	28.5	23.9	29.4	44.2	27.3
Continue, but on a more limited basis	24.8	28.4	33.0	25.6	32.2
Refuse	38.0	38.2	30.3	25.6	32.2
Undecided	8.6	9.5	7.3	4.7	8.3
TOTAL[a]	326	419	109	43	121

Attitude towards treating reviews as public information					
Approve strongly	8.5	6.7	11.9	11.4	8.1
Approve somewhat	7.4	3.7	4.2	15.9	7.3
Disapprove somewhat	8.5	10.3	11.0	15.9	9.7
Disapprove strongly	74.4	76.8	68.6	56.8	73.4
Undecided	1.2	2.5	4.2	0.0	1.6
TOTAL[a]	340	435	118	44	124

Do you think you would continue to serve as a reviewer if such a policy were adopted or refuse to serve as reviewer in the future?					
Continue	23.9	17.2	16.0	34.9	18.2
Continue, but on a more limited basis	18.7	18.4	24.5	25.6	19.0
Refuse	48.6	54.0	49.1	39.5	49.6
Undecided	8.9	10.4	10.4	--	13.2
TOTAL[a]	327	413	106	43	121

[a]Excludes reviewers who did not specify directorate for which they served as reviewer. Respondents who reported serving as reviewers for more than one directorate are tabulated in each appropriate directorate. Non-responses and uncodeable responses are excluded.

Table 22B

APPLICANTS' ATTITUDES TOWARDS CHANGES IN INFORMATION POLICY,
BY DIRECTORATE

Attitude towards NSF providing verbatim reviews with reviewers' names deleted to applicants	Biological Behavioral and Social Sciences	Mathematics Physical Science and Engineering	Astronomical, Atmospheric, Earth and Ocean Science	Education	RANN
	%	%	%	%	%
Approve strongly	53.5	52.3	47.8	56.5	51.6
Approve somewhat	24.6	24.4	23.5	22.9	26.1
Disapprove somewhat	9.8	11.3	15.1	12.9	11.7
Disapprove strongly	10.3	9.2	10.4	5.2	9.0
Undecided	1.8	2.8	3.2	2.6	1.6
TOTAL[a]	662	950	251 n.s.	271	188

Attitude towards NSF providing verbatim reviews with reviewers' names included to applicants

	Biological Behavioral and Social Sciences	Mathematics Physical Science and Engineering	Astronomical, Atmospheric, Earth and Ocean Science	Education	RANN
Approve strongly	21.9	17.3	16.0	20.5	29.2
Approve somewhat	10.0	8.6	10.4	8.0	10.9
Disapprove somewhat	16.5	16.5	18.8	24.2	19.3
Disapprove strongly	48.3	53.8	51.2	42.0	39.1
Undecided	3.3	3.9	3.6	5.3	1.6
TOTAL[a]	667	956	250 **	264	192

Attitude towards treating reviews as public information

	Biological Behavioral and Social Sciences	Mathematics Physical Science and Engineering	Astronomical, Atmospheric, Earth and Ocean Science	Education	RANN
Approve strongly	12.9	11.1	9.8	17.5	17.3
Approve somewhat	5.2	4.9	4.7	4.6	4.7
Disapprove somewhat	10.4	11.8	12.2	15.2	16.2
Disapprove strongly	67.9	68.9	69.3	58.9	58.1
Undecided	3.6	3.3	3.9	3.8	3.7
TOTAL[a]	672	960	254 *	263	191

[a] Excludes respondents who did not specify directorate to which proposals were submitted; also excludes non-responses and uncodeable responses.

* χ^2 Significant, $p < .05$.

** χ^2 Significant, $p < .01$.

n.s. χ^2 Not significant.

REVIEWERS'ATTITUDES TOWARDS CHANGES IN INFORMATION POLICY, BY SELECTED BACKGROUND CHARACTERISTICS

	Academic Generation			Region				Institutional Affiliation[a]		
Attitude towards NSF providing verbatim reviews with reviewers' names deleted to applicants	Before 1960 %	1960-1969 %	1970 on %	North %	South %	Mid-West %	West %	Top 20 in federal research funding %	Other Ph.D. Granting Institutions %	Other Academic Institutions %
Approve strongly	49.5	55.9	65.3	56.7	50.2	55.6	51.0	42.9	58.9	69.0
Approve somewhat	27.2	24.6	20.8	25.9	24.2	28.6	24.5	31.7	22.9	12.7
Disapprove somewhat	13.3	10.3	4.2	8.5	8.5	12.8	15.3	15.3	10.4	9.9
Disapprove strongly	7.8	7.8	5.6	6.8	12.8	2.6	8.0	8.2	6.7	7.0
Undecided	2.2	1.4	4.2	2.0	4.3	.4	1.2	1.9	1.2	1.4
TOTAL[b]	503	435	72	293	211	234	249	268	433	71
		n.s.			**				**	
In light of this change, do you think you will continue to serve as a reviewer or refuse to serve as a reviewer in the future?										
Continue	81.3	82.0	86.8	82.1	82.0	87.6	78.0	79.4	85.1	88.5
Continue, but on a more limited basis	13.4	12.5	9.4	11.6	12.2	9.5	17.0	14.7	11.0	5.8
Refuse	2.0	.9	.0	2.7	1.7	.6	.5	1.4	1.2	1.9
Undecided	3.2	4.6	3.8	3.6	4.1	2.4	4.5	4.6	2.7	3.8
TOTAL[b]	402	328	53	224	172	169	200	218	328	52
		n.s.			n.s.				n.s.	
Attitude towards NSF providing verbatim reviews with reviewers' names included to applicants										
Approve strongly	9.1	10.0	13.9	10.3	11.9	9.4	7.2	5.6	11.0	11.0
Approve somewhat	10.3	7.7	9.7	7.0	13.8	11.1	6.4	7.8	9.4	8.2
Disapprove somewhat	14.4	18.1	19.4	15.3	16.7	14.1	20.3	14.9	14.4	23.3
Disapprove strongly	62.3	61.9	55.6	64.3	52.4	62.8	63.7	69.5	61.8	53.4
Undecided	4.0	2.3	1.4	3.0	5.2	2.6	2.4	2.2	3.4	4.1
TOTAL[b]	506	441	72	300	210	234	251	269	437	73
		n.s.			*				*	

[a]Excludes those at non-academic institutions.

[b]Excludes non-responses and uncodeable responses.

* χ^2 Significant, $p < .05$.

** χ^2 Significant, $p < .01$.

n.s. χ^2 not significant

Do you think you would continue to serve as a reviewer if such a policy were adopted or refuse to serve as a reviewer in the future?	Academic Generation				Region				Institutional Affiliation[a]		
	Before 1960	1960-1969	1970 on	North	South	Mid-West	West	Top 20 in Federal Research Funding	Other Ph.D. Grant-ing Insti-tutions	Other Academic Insti-tutions
	%	%	%	%	%	%	%	%	%	%
Continue	30.0	29.2	31.9	27.9	36.9	30.0	25.8	20.7	32.0	36.2
Continue, but on a more limited basis	25.7	27.7	31.9	25.4	24.1	25.5	32.5	28.7	27.9	17.4
Refuse	35.4	34.9	31.9	39.4	26.6	35.9	35.0	43.3	30.8	34.8
Undecided	8.8	8.2	4.3	7.3	12.3	8.6	6.7	7.3	9.4	11.6
TOTAL[b]	486	415	69	287	203	220	240	261	416	69
		n.s.				*			*	
Attitude towards treating reviews as public information										
Approve strongly	7.7	10.4	11.1	9.7	12.4	6.4	7.6	4.1	10.4	11.0
Approve somewhat	5.7	6.3	4.2	3.7	10.6	6.8	4.0	5.3	5.4	2.7
Disapprove somewhat	8.9	11.5	16.7	11.0	12.0	10.7	9.6	7.9	10.8	11.0
Disapprove strongly	74.4	70.7	65.3	73.3	61.8	73.9	76.8	79.3	71.8	74.0
Undecided	3.3	1.1	2.8	2.3	3.2	2.1	2.0	3.4	1.6	1.4
TOTAL[b]	508	443	72	300	217	234	250	256	444	73
		n.s.				*			*	
Do you think you would continue to serve as a reviewer if such a policy were adopted or refuse to serve as reviewer in the future?										
Continue	20.5	24.8	23.5	20.7	31.0	21.5	19.3	16.3	25.0	23.5
Continue, but on a more limited basis	16.6	20.1	32.4	14.4	18.2	19.6	26.1	18.3	20.0	11.8
Refuse	51.5	45.9	39.7	55.1	38.4	47.5	47.9	56.7	44.8	48.5
Undecided	11.3	9.2	4.4	9.8	12.3	11.4	6.7	8.7	10.1	16.2
TOTAL[b]	487	412	68	285	203	219	238	252	424	68
		*				**			*	

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[a] Excludes those of non-academic institutions.

[b] Excludes non-responses and uncodeable responses.

* χ^2 Significant, $p < .05$.

** χ^2 Significant, $p < .01$.

n.s. χ^2 not significant

Table 23B

APPLICANTS' ATTITUDES TOWARDS CHANGES IN INFORMATION POLICY BY
SELECTED BACKGROUND CHARACTERISTICS

	Academic Generation			Region				Institutional Affiliation[a]		
	Before 1960 %	1960-1969 %	1970 on %	North %	South %	Mid-West %	West %	Top 20 in federal research funding %	Other Ph.D. Granting Institutions %	Other Academic Institutions %
Attitude towards NSF providing verbatim reviews with reviewers' names deleted to applicants										
Approve strongly	44.2	56.7	58.8	50.8	57.7	53.4	49.3	46.0	55.4	56.6
Approve somewhat	26.4	22.8	23.1	25.8	23.5	23.1	24.4	25.9	23.3	24.0
Disapprove somewhat	14.4	9.8	10.8	11.5	7.9	11.3	15.9	14.0	10.4	10.8
Disapprove strongly	12.0	8.6	5.5	9.3	7.7	10.6	8.5	12.5	8.2	6.2
Undecided	3.0	2.1	1.8	2.5	3.2	1.7	1.9	1.5	2.8	2.4
TOTAL[b]	833	1159	493	710	596	577	590	528	1286	454
		**				**			**	
Attitude towards NSF providing verbatim reviews with reviewers' names included to applicants										
Approve strongly	17.3	21.5	22.2	18.4	22.2	21.0	18.6	13.1	19.1	24.9
Approve somewhat	6.2	9.7	15.7	10.7	9.6	10.5	8.9	9.6	9.3	11.3
Disapprove somewhat	14.6	18.8	19.7	17.0	19.2	18.6	15.6	15.0	17.5	21.4
Disapprove strongly	58.6	46.3	37.2	50.4	44.0	46.3	53.6	59.7	50.8	35.5
Undecided	3.3	3.7	5.3	3.6	5.0	3.6	3.4	2.6	3.3	6.8
TOTAL[b]	842	1159	492	702	595	581	597	533	1285	453
		**			n.s.				**	
Attitude towards treating reviews as public information										
Approve strongly	9.9	13.3	16.8	11.7	13.6	13.9	11.9	6.5	12.4	20.2
Approve somewhat	3.3	5.6	6.7	5.0	5.1	5.3	5.0	4.1	5.0	5.2
Disapprove somewhat	8.8	14.0	14.3	9.9	11.9	15.9	12.3	11.2	11.6	15.5
Disapprove strongly	75.9	62.9	57.1	69.6	64.5	62.2	67.8	75.9	67.2	54.0
Undecided	2.1	4.3	5.1	3.8	4.9	2.7	3.0	2.2	3.8	5.2
TOTAL[b]	845	1167	489	707	589	584	603	535	1298	446
		**			n.s.				**	

[a] Excludes those of non-academic institutions.

[b] Excludes non-responses and uncodeable responses.

** χ^2 Significant, p < .01.

n.s. χ^2 Not significant.

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academic generations and from institutions with limited Ph.D.-granting
programs and four-year academic institutions are more likely to support
a policy of identifying reviewers.

Table 23C shows that among applicants, non-reviewers are more likely
than reviewers to favor both identifying reviewers to applicants and
treating reviews as public information. Declinees are more likely than
grantees to support these policies. Relationships between reviewer status
and attitudes towards changing NSF information policy, and experience
obtaining NSF funds and attitudes, are statistically significant (p < .01),
but weak (Phi < .3). Interestingly, among reviewers there are no statis-
tically significant relationships between experience obtaining NSF funds
and attitudes towards changing NSF policy on releasing information about reviews.

Respondents were asked to indicate reasons for their attitudes towards
each of these possible changes in information policy. Table 24 shows the
distribution by code category of responses volunteered by reviewers and
applicants. The reasons for approving a policy of providing verbatim
review comments which were most frequently volunteered by respondents are
that this will increase feedback generally and will permit applicants to
learn about the reasons for reviewers' reactions, to judge reviewers'
competence and possibly to rebut the review themselves. Reasons for
disapproving of such a policy were diverse. Most frequently mentioned
were that anonymity is important to reviewers (no further explanation
given) and that the quality of reviews would suffer. No one reason for
approving of a policy of identifying reviewers by name was given by a
substantial proportion of respondents. The most frequently mentioned reason
for *disapproving* of such a policy is that it will lead to lower quality
reviews, because reviewers will not want to make as severe judgments as
would otherwise be the case. Other reasons include a fear that reviewers'
judgments will be affected by concern about the effect of their reviews
on their own chances of future funding, a concern that such a policy will
lead to conflict within academic circles and the statement that anonymity is
important to reviewers. Reasons given for disapproving a policy of treating
reviews as public information are similar. An additional reason mentioned for

Table 23C

APPLICANTS' AND REVIEWERS' ATTITUDES TOWARDS CHANGES IN INFORMATION POLICY
BY REVIEWER STATUS AND EXPERIENCE OBTAINING NSF FUNDS

	Reviewer Status		Applicants Experience Obtaining NSF Funds						Reviewers		
			Grantees			Declinees					
Attitude towards NSF providing verbatim reviews with reviewers' names deleted to applicants	Reviewer	Non-Reviewer	No Previous Application	Previously Unsuccessful	Previously Successful	No Previous Application	Previously Unsuccessful	Previously Successful	No Previous Application	Previously Unsuccessful Application	Previously Successful Application
	%	%	%	%	%	%	%	%	%	%	%
Approve strongly	48.9	58.7	48.2	58.3	44.8	57.8	60.2	59.9	55.0	60.3	50.9
Approve somewhat	25.8	21.2	27.4	24.8	28.6	22.2	17.6	19.1	22.5	22.1	28.1
Disapprove somewhat	12.6	10.0	12.8	10.7	13.4	10.5	8.7	10.8	10.8	11.8	11.7
Disapprove strongly	9.9	8.2	10.2	5.3	10.4	7.5	10.6	8.1	8.3	5.9	7.7
Undecided	2.8	1.9	1.3	1.0	2.8	2.0	3.0	2.2	3.4	--	1.5
TOTAL	1522 **	1025	226	206	951 **	306	369	372	351	136 n.s.	530
Attitude towards NSF providing verbatim reviews with reviewers' names included to applicants											
Approve strongly	13.3	30.7	14.2	16.3	9.9	32.9	36.4	25.6	11.3	15.2	7.3
Approve somewhat	7.7	13.0	10.2	9.1	7.0	11.8	13.4	12.5	9.6	8.7	9.0
Disapprove somewhat	15.2	21.2	16.4	19.1	17.3	19.8	19.7	14.9	15.0	18.1	16.5
Disapprove strongly	60.8	29.9	56.0	50.7	63.3	29.7	26.8	40.7	59.8	55.1	64.6
Undecided	2.9	5.3	3.1	4.8	2.4	5.8	3.6	6.3	4.2	2.9	2.6
TOTAL	1530 **	1026	225	209	946 **	313	365	383	353	138 n.s.	534
Attitude towards treating reviews as public information											
Approve strongly	7.8	21.0	8.3	9.6	6.9	22.1	24.7	15.0	9.8	13.1	7.5
Approve somewhat	3.8	7.0	3.9	5.3	2.9	7.8	13.9 / 5.7	7.7	7.3	3.6	5.8
Disapprove somewhat	10.8	14.7	12.2	14.4	11.2	15.3		9.8	11.0	12.4	9.9
Disapprove strongly	75.2	51.5	71.6	66.5	76.9	49.7	51.1	63.1	68.0	69.3	75.2
Undecided	2.3	5.9	3.9	4.3	2.1	5.2	4.6	4.5	3.9	1.5	1.7
TOTAL	1543 **	1020	229	209	956 **	308	368	379	356	137 n.s.	536

[a]Excludes non-responses and uncodeable responses

** χ^2 Significant, p < .01.

Table 24

REVIEWERS' AND APPLICANTS' REASONS FOR APPROVING OR DISAPPROVING OF CHANGES IN NSF POLICY
ON RELEASING INFORMATION ABOUT REVIEW PROCESS

POLICIES

	PROVIDE VERBATIM REVIEWS		IDENTIFY REVIEWERS TO APPLICANTS		TREAT REVIEWS AS PUBLIC INFORMATION	
	Reviewers % of Respondents Mentioning	Applicants % of Respondents Mentioning	Reviewers % of Respondents Mentioning	Applicants % of Respondents Mentioning	Reviewers % of Respondents Mentioning	Applicants % of Respondents Mentioning
Reasons for Approval[a]						
Will lead to higher quality reviews	6.7	6.9	2.3	5.5	1.4	2.4
More feedback, general	18.1	30.3	-	3.6	-	1.2
Applicants will learn reasons for NSF action	7.6	6.4	-	-	-	-
Applicants can judge competence of reviews	1.7	8.0	-	6.1	-	-
Applicants might be able to rebut critiques	3.8	4.2	-	1.1	-	-
Other Positive	21.0	20.1	5.9	8.5	5.4	6.8
Reasons for Disapproval[a]						
Provides no useful information to applicant	-	1.8	-	1.6	-	-
Serves no purpose, general	3.4	2.8	3.6	3.1	5.2	5.9
Will make it more difficult to write reviews	9.2	1.2	3.4	-	4.0	-
Will make it more difficult to get reviewers	5.9	1.0	2.8	4.5	2.9	5.5
Anonymity important to reviewer	23.1	8.6	16.4	21.7	13.0	14.6
Will lead to biased reviews, general	1.7	2.0	8.2	5.4	5.5	3.6
Will cause reviewers to favor friends, colleagues	-	-	5.1	2.5	3.1	1.5
Will cause reviewers to favor high prestige institutions and researchers	-	-	1.4	-	-	-
Will lower quality of reviews	17.6	9.8	32.2	39.4	26.6	31.1
Reviewers will fear hurting their own chances	2.1	-	21.1	4.3	14.8	3.2
Will lead to pressure on reviewers	1.3	1.2	5.3	5.6	5.0	5.9
Will lead to pressure on reviewers from friends and colleagues .	-	-	-	-	-	-
Increase conflict within academic circles	5.9	1.4	20.5	7.7	11.6	4.9
Will lead to political pressure on reviewers, e.g., from Congress	-	-	2.2	1.1	4.7	4.1
Infringement of proprietary rights		1.4	-		16.9	15.6
Increase bureaucratization	-	16.4	-	-	1.2	-
Other Negative	18.1	1341	13.0	8.8	21.4	19.1
TOTAL NUMBER OF RESPONDENTS[b]	238		645	2001	636	1984

83

[a] Respondents were asked to volunteer their reasons for attitudes towards changes in NSF policy in response to open-ended follow-up probes: "Why do you feel this way?" Up to 3 different responses could be coded for each question. In cases where a response might fit both a general or specific category was always used. Responses tabulated add to more than 100 percent because multiple responses were possible.

[b] Total number of respondents volunteering one or more reasons for approval or disapproval of each policy.

NATIONAL SCIENCE FOUNDATION

NATIONAL SCIENCE BOARD

WASHINGTON, D.C. 20550

November 10, 1975

Dear Colleague:

As you may know, both the National Science Board and the Congress have been
studying the methods used for review and selection of proposals for funding by
the National Science Foundation. As part of this study, the Board in cooperation
with the Congress is conducting a survey of opinions of individuals who have
recently submitted proposals to NSF. A report on the survey results will be
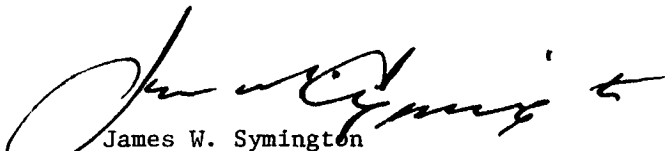presented to the House Committee on Science and Technology early in 1976.

Your name was selected for this survey by a systematic random sampling technique
from lists of prospective Principal Investigators who submitted proposals in Fiscal
Year 1975 without regard to whether or not an award was made. Approximately 3,000
individuals have been selected for the survey of prospective Principal Investigators.
While your response is voluntary, timely return of the questionnaire will be of
great value in assuring that the report of survey results presented to the Congress
is truly representative of the views of all who have submitted proposals. The
enclosed questionnaire, which will take only a short time to complete, asks for
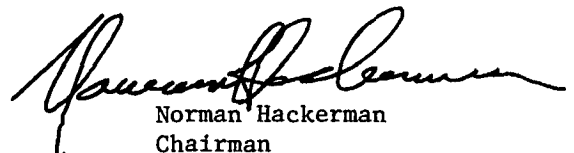your opinions about the NSF peer review process.

The enclosed postage-paid return envelope indicates your name and address so that
receipt of the completed questionnaire can be properly logged in. The questionnaire
itself does not contain any name or other identification. Once questionnaires are
removed from the return envelopes, they are not identifiable by respondent name.
As soon as all responses have been converted to machine readable form, the hard copy
questionnaires will be destroyed. At the request of the Congress, the Congressional
General Accounting Office is working with NSF during the data processing stage to
assure the appropriateness of all procedures and the anonymity of all respondents.

The report of survey results will be presented as statistical tabulations and
analyses only. To prevent any possible identification of survey respondents,
statistical findings will not be presented for small subsamples of respondents.

We urge you to respond promptly to this important survey. If you would like further
information about the survey, please call Ms. Barbara Sands (202) 282-7591 collect.

Sincerely yours,

James W. Symington
Chairman, Subcommittee on Science,
    Research, and Technology
Committee on Science and Technology
U.S. House of Representatives

Norman Hackerman
Chairman
National Science Board

Enclosures

1-5

6-1

SURVEY OF PROSPECTIVE PRINCIPAL INVESTIGATORS

NSF APPLICANTS

We would like to know your opinions about the review procedures that were used the last time you submitted a proposal to NSF. If you have a proposal currently under review by NSF please answer the following questions with regard to <u>the most recent previous proposal</u> for which the NSF review and decision-making process was completed.

1. When was the last time you submitted a proposal to NSF?

   YEAR

7-8   19 ☐☐

2. What area at NSF dealt with that proposal?

9   -1 ◯ RANN

   -2 ◯ Education

   -3 ◯ Biological, Behavioral and Social Sciences

   -4 ◯ Mathematical and Physical Sciences and Engineering (including Chemistry, Computer Science and Materials Science)

   -5 ◯ Astronomical, Atmospheric, Earth and Ocean Sciences

   -6 ◯ Other - Please Specify: _____

   _____

   -8 ◯ DON'T KNOW

3. Which of the following review procedures were used for that proposal?
   (Please check all that apply and answer other questions as indicated).

10-*1* ◯ NSF STAFF REVIEW

11-*1* ◯ AD/HOC MAIL REVIEW

⬇

    A.Did you suggest the names of people who would be appropriate to review your proposal?

12

-*1* ◯ YES

-*2* ◯ NO

⬇

> A.1. Do you think the results of the review would have been different if you had participated in the selection of reviewers, or do you think the results would probably have been the same?
>
> 13
>
> -*1* ◯ WOULD HAVE BEEN DIFFERENT
>
> -*2* ◯ PROBABLY THE SAME

    B.Did you know who reviewed that proposal?

◯ YES - KNEW NAMES OF SOME OR ALL THE REVIEWERS

⬇

> B.1. Were you personally acquainted with:
>
> 14
>
> -*1* ◯ ALL OF THESE REVIEWERS
>
> -*2* ◯ SOME OF THESE REVIEWERS
>
> -*3* ◯ NONE OF THESE REVIEWERS

-*4* ◯ NO

15-*1* ◯ PANEL REVIEW

⬇

    A.Did you know who was on the panel?

◯ YES - KNEW NAMES OF SOME OR ALL OF THE REVIEWERS

⬇

> A.1. Were you personally acquainted with:
>
> 16
>
> -*1* ◯ ALL OF THESE REVIEWERS
>
> -*2* ◯ SOME OF THESE REVIEWERS
>
> -*3* ◯ NONE OF THESE REVIEWERS

-*4·* ◯ NO

17-*1* ◯ SITE VISIT

⬇

    A.Were you personally acquainted with:

18

-*1* ◯ ALL OF THE SITE VISITORS

-*2* ◯ SOME OF THE SITE VISITORS

-*3* ◯ NONE OF THE SITE VISITORS

19-*1* ◯ DON'T KNOW *(PLEASE SKIP TO QUESTION 5, PAGE 3)*

4. Do you think the review procedure(s) used for your proposal were appropriate or inappropriate?

20

−1   ◯ APPROPRIATE

−2   ◯ INAPPROPRIATE
         ⬇

A. Why do you feel this way?
_____
_____
_____

5. Currently some proposals which are submitted to NSF are reviewed only by NSF staff, while others are subjected to a peer review process in addition to receiving NSF staff review. How do you feel about this-- do you think NSF should:

21

−1   ◯ USE ONLY NSF STAFF REVIEW FOR ALL PROPOSALS

−2   ◯ REQUIRE SOME TYPE OF PEER REVIEW FOR ALL PROPOSALS

−3   ◯ CONTINUE CURRENT PRACTICE - SOME PROPOSALS RECEIVE PEER
         REVIEW, OTHERS DO NOT

6. At present, NSF uses several different types of peer review. Some proposals are reviewed only by individuals who are selected in an ad hoc fashion and normally mail in their reviews. Other proposals are reviewed only by standing review panels, and others are reviewed by ad hoc/mail reviewers and standing review panels. How do you feel about this--do you think NSF should:

22

−1   ◯ USE ONLY AD HOC/MAIL REVIEW FOR ALL PROPOSALS

−2   ◯ USE ONLY PANEL REVIEW FOR ALL PROPOSALS

−3   ◯ USE BOTH AD HOC/MAIL REVIEWS AND PANEL REVIEW FOR ALL PROPOSALS

−4   ◯ USE WHATEVER TYPE OF REVIEW IS APPROPRIATE FOR SPECIFIC PROPOSAL

7. If a panel review procedure is used, how do you think panel members
    should be selected?   *(CHECK ONLY ONE)*

23
-1   ◯ BY NSF STAFF, BASED ON THEIR BEST JUDGMENT

-2   ◯ BY NSF STAFF, FROM A PREVIOUSLY IDENTIFIED, BROADLY-BASED
            POOL OF EXPERTS IN THAT PROGRAM AREA

-3   ◯ BY A RANDOM SAMPLING TECHNIQUE FROM A PREVIOUSLY IDENTIFIED,
            BROADLY-BASED POOL OF EXPERTS

-4   ◯ SOME PROPORTION SELECTED BY NSF STAFF AND THE REST SELECTED
            BY A RANDOM SAMPLING TECHNIQUE, FROM A PREVIOUSLY IDENTIFIED,
            BROADLY-BASED POOL OF EXPERTS

> A. How do you think this pool of experts should be identified?
>
> _____
>
> _____
>
> _____

8. For what length of time do you think individuals should serve as
    members of a review panel?

24
-1   ◯ AT DISCRETION OF NSF STAFF AND INDIVIDUAL

-2   ◯ SPECIFIED TERM
            ⬇

> A. What length do you think would be appropriate?
>
>   # Years

25-26   ☐☐

9. If an ad hoc/mail review procedure is used, how do you think reviewers should be selected?

27

-1   ◯ BY NSF STAFF ALONE, BASED ON THEIR BEST JUDGMENT

-2   ◯ BY NSF STAFF AND THE PROSPECTIVE PRINCIPAL INVESTIGATOR

-3   ◯ BY NSF STAFF FROM A PREVIOUSLY IDENTIFIED, BROADLY-BASED
         POOL OF EXPERTS

-4   ◯ BY A RANDOM SAMPLING TECHNIQUE FROM A PREVIOUSLY IDENTIFIED,
         BROADLY-BASED POOL OF EXPERTS

-5   ◯ SOME PROPORTION SELECTED BY NSF STAFF AND THE REST SELECTED
         BY A RANDOM SAMPLING TECHNIQUE, FROM A PREVIOUSLY IDENTIFIED,
         BROADLY-BASED POOL OF EXPERTS

A.   How do you think this pool of experts should be identified?

_____

_____

_____

10. The last time you submitted a proposal to NSF, did you get any feed-back about the review process, other than being informed about the final disposition of the proposal?

28

-1 ◯ YES *(Please answer Q.A-1 through A-4)*

-2 ◯ NO *(Please skip to Q.11)*

A. Did you speak with the NSF staff about reviewers' reactions to your proposal?

◯ YES

A-1. What kind of information did you receive?

_____

_____

_____

29

A-2. Was this information:

-1 ◯ VERY USEFUL

-2 ◯ SOMEWHAT USEFUL

-3 ◯ NOT VERY USEFUL

-4 ◯ NOT AT ALL USEFUL

-5 ◯ NO

B. Did you receive anything in writing from NSF staff about reviewers' reactions to your proposal?

◯ YES

30

B-1. What kind of information did you receive?

-1 ◯ SUMMARY OR EXCERPT FROM COMMENTS

-2 ◯ VERBATIM REVIEW COMMENTS

-3 ◯ OTHER: PLEASE SPECIFY _____

_____

31

B-2. Was this information:

-1 ◯ VERY USEFUL

-2 ◯ SOMEWHAT USEFUL

-3 ◯ NOT VERY USEFUL

-4 ◯ NOT AT ALL USEFUL

32-1 ◯ NO

C. If you did not receive verbatim comments: Would you have found verbatim comments of reviewers more useful than the information you did receive, or would this not have made much difference?

33

-1   ◯ VERBATIM COMMENTS MORE USEFUL

-2   ◯ VERBATIM COMMENTS WOULD NOT MAKE MUCH DIFFERENCE

D. Would information about reviewers' reactions to your proposal have been more useful to you if you knew the names of the reviewers or would knowing reviewers' names not have made much difference?

34

-1   ◯ COMMENTS MORE USEFUL IF REVIEWERS' NAMES WERE KNOWN

-2   ◯ KNOWING REVIEWERS' NAMES WOULD NOT MAKE MUCH DIFFERENCE

-3   ◯ COMMENTS MORE USEFUL IF REVIEWERS' NAMES NOT KNOWN

> (Please skip to Q.12)

11. Would you have liked to receive some information about reviewers' reactions to your proposal or didn't it make much difference to you?

◯ WOULD HAVE LIKED INFORMATION

⬇

A. What kind of information would you have found more useful?

35

-1   ◯ SUMMARY OF REVIEWERS' COMMENTS PREPARED BY NSF STAFF

-2   ◯ VERBATIM COMMENTS BY REVIEWERS

B. Would information about reviewers reactions to your proposal have been more useful if you knew the names of the reviewers, or would knowing reviewers' names not have made much difference?

36

-1   ◯ COMMENTS MORE USEFUL IF REVIEWERS' NAMES KNOWN

-2   ◯ KNOWING REVIEWERS' NAMES WOULD NOT MAKE MUCH DIFFERENCE

-3   ◯ COMMENTS MORE USEFUL IF REVIEWERS' NAMES NOT KNOWN

37-1   ◯ DIDN'T MAKE MUCH DIFFERENCE

12. Recently, a number of modifications to NSF's peer review procedures have been proposed. <u>As an applicant for NSF funding,</u> do you approve or disapprove of the following:

A. Providing a verbatim copy of each review to the applicant with the reviewer's name deleted?

38
-1   ○ APPROVE STRONGLY
-2   ○ APPROVE SOMEWHAT
-3   ○ DISAPPROVE SOMEWHAT
-4   ○ DISAPPROVE STRONGLY
-8   ○ UNDECIDED

Why do you feel this way?

_____

_____

_____

B. Providing a verbatim copy of each review to the applicant with the reviewer's name included?

39
-1   ○ APPROVE STRONGLY
-2   ○ APPROVE SOMEWHAT
-3   ○ DISAPPROVE SOMEWHAT
-4   ○ DISAPPROVE STRONGLY
-8   ○ UNDECIDED

Why do you feel this way?

_____

_____

_____

C. Treating all reviews with the reviewer's name included as public information, available to anyone, upon request?

40
-1   ○ APPROVE STRONGLY
-2   ○ APPROVE SOMEWHAT
-3   ○ DISAPPROVE SOMEWHAT
-4   ○ DISAPPROVE STRONGLY
-8   ○ UNDECIDED

Why do you feel this way?

_____

_____

_____

13. If NSF did adopt a policy of releasing reviewers' comments to principal investigators with the reviewer's name included, do you think this would affect written review comments or would not affect written comments?

41
-1   ◯ WOULD AFFECT WRITTEN REVIEWS

> A. How do you think written review comments would be affected?
>
> _____
>
> _____
>
> _____

-2   ◯ WOULD NOT AFFECT WRITTEN REVIEWS
-3   ◯ DON'T KNOW

42 14. Was the last proposal you submitted to NSF funded or was it declined?
-1   ◯ FUNDED
-2   ◯ DECLINED

> 43   A. Did you ask for detailed reasons for why it was declined?
> -1   ◯ YES
> -2   ◯ NO
>
> 44   B. Did you think the decision not to fund was fair or unfair?
> -1   ◯ FAIR
> -2   ◯ UNFAIR
>
> > B-1. If there had been a formalized appeals system available--for example, a standing appeals panel--would you have used this system to appeal the decision?
> > 45
> > -1   ◯ YES
> > -2   ◯ NO

46-1   ◯ WITHDRAWN

15. Would you approve or disapprove of NSF setting up a formal standing appeals panel to which prospective principal investigators could submit a written appeal in response to a decision on funding which they thought was unfair?

47
-1   ◯ APPROVE
-2   ◯ DISAPPROVE

A. Why do you feel this way?

_____

_____

_____

16. In general, if two equally good proposals are submitted to NSF in your area, one from a well-known institution and one from a lesser-known institution, do you think both proposals have an equal chance of being recommended for funding by the peer reviewers or one has a better chance than the other?

48

-1 ◯ BOTH HAVE AN EQUAL CHANCE

-2 ◯ PROPOSAL FROM WELL-KNOWN INSTITUTION HAS BETTER CHANCE

-3 ◯ PROPOSAL FROM LESSER-KNOWN INSTITUTION HAS BETTER CHANCE

-8 ◯ DON'T KNOW

17. What if two equally good proposals are submitted, one with a young not-yet-established principal investigator and one with an older, well-established principal investigator--do you think both proposals have an equal chance of being recommended for funding by the peer reviewers or one has a better chance than the other?

49

-1 ◯ BOTH HAVE AN EQUAL CHANCE

-2 ◯ YOUNG, NOT-YET-ESTABLISHED P.I. HAS BETTER CHANCE

-3 ◯ OLDER, WELL ESTABLISHED P.I. HAS BETTER CHANCE

-8 ◯ DON'T KNOW

18. What about two equally good proposals, one for a project using approaches which are consistent with the mainstream of thought in your profession and one for a project which challenges the mainstream of thought--do you think both proposals have an equal chance of being recommended for funding or one has a better chance than the other?

50

-1 ◯ BOTH HAVE AN EQUAL CHANCE

-2 ◯ PROPOSAL WHICH IS CONSISTENT WITH MAINSTREAM HAS BETTER CHANCE

-3 ◯ PROPOSAL WHICH CHALLENGES MAINSTREAM HAS BETTER CHANCE

-8 ◯ DON'T KNOW

Finally, we would like some information about your background to aid in our analysis.

19. What is the highest academic degree you have received?

51

-1　　◯　B.A., B.S.

-2　　◯　M.A., M.S., M.P.A., M.P.H.

-3　　◯　L.L.B.

-4　　◯　M.D.

-5　　◯　Ph.D., D.Sc.

-6　　◯　Other - Please Specify:_____

20. Please indicate the name of the institution which granted the degree, the year the degree was awarded and the field of degree.

52-55　　　　NAME OF INSTITUTION:_____._____

　　　　　　　　　　　　　　　　　　_____

56-57　　　　YEAR AWARDED:　　_____

58-61　　　　FIELD OF DEGREE:　_____

21. Please indicate the name of your current institution, state in which it is located and your current field of research.

62-65　　　　INSTITUTION: _____

66-67　　　　STATE:　　　　_____

68-71　　　　CURRENT FIELD OF RESEARCH: _____

1-6 22. During the past two years have you ever served as an ad hoc/mail
6-2　　　reviewer for NSF?
7

-1　　◯　YES

-2　　◯　NO

23. During the past two years, have you ever served as a member of a review panel for NSF?

8

-1　　◯　YES

-2　　◯　NO

24. How many proposals have you submitted to NSF during the past five years?

Submitted

9-10　　▢▢

25. How many proposals have been funded by NSF?

Funded

11-12 ☐☐

26. During the past five years have you submitted any applications for funding to any other federal agency?

◯ YES
⬇

> A. How many proposals have you submitted?
>
> # Submitted
>
> 13-14 ☐☐
>
> B. How many proposals have been funded?
>
> # Funded
>
> 15-16 ☐☐

17-1 ◯ NO

We are interested in any other comments, criticisims or suggestions you have about the NSF proposal review process.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thank you very much for your cooperation. Copies of the final report of statistical results will be sent to all those in the sample.

1-5 SURVEY OF NSF REVIEWERS

6-1

1. During the past two years, have you served as an ad hoc/mail reviewer of individual proposals for NSF?

7

-1 ◯ YES

-2 ◯ NO *(PLEASE SKIP TO QUESTION 9, PAGE 3)*

2. During this time, about how many proposals have you reviewed in this fashion in each of the following areas:

NUMBER

8-9 ☐☐ RANN

10-11 ☐☐ Education

12-13 ☐☐ Biological, Behavioral and Social Sciences

14-15 ☐☐ Mathematical and Physical Sciences and Engineering (including Chemistry, Computer Science and Materials Science)

16-17 ☐☐ Astronomical, Atmospheric, Earth and Ocean Sciences

18-19 ☐☐ Other - Please Specify: _____

_____

3. About how much time did you spend on the average reviewing each of these proposals:

# of Minutes

20-23 ☐☐☐☐

4. In general, would you say NSF provided you with enough information to conduct what you felt was an adequate review, or not enough information to conduct an adequate review?

24

-1 ◯ ENOUGH INFORMATION

-2 ◯ NOT ENOUGH INFORMATION

A. What type of additional information would you have found helpful?

_____

_____

_____

B. If you reviewed proposals for more than one program area: Which program areas did not provide enough information?

_____

_____

_____

5. In general, would you say the proposals you were asked to review in this fashion were:

25

-1 ◯ APPROPRIATELY MATCHED WITH YOUR BACKGROUND AND EXPERTISE

-2 ◯ NOT WELL MATCHED WITH YOUR BACKGROUND AND EXPERTISE

6. Were you personally acquainted with any of the principal investigators for any of the proposals which you reviewed?

◯ YES

⬇

26

A. About what proportion of the proposals you reviewed in this fashion had principal investigators with whom you were personally acquainted?

-1 ◯ ALL OR ALMOST ALL

-2 ◯ ABOUT 3/4

-3 ◯ ABOUT 1/2

-4 ◯ ABOUT 1/4

-5 ◯ LESS THAN 1/4

-6 ◯ NO

7. People become reviewers for NSF in a variety of ways. Which of the following do you think may have influenced NSF staff in asking you to become an ad hoc/mail reviewer? (CHECK ALL THAT APPLY)

27-1 ◯ I HAD PREVIOUSLY SERVED ON REVIEW PANEL

28-1 ◯ APPLICANT REFERRED NSF STAFF TO ME

29-1 ◯ COLLEAGUE/PROFESSIONAL ACQUAINTANCE REFERRED NSF STAFF TO ME

30-1 ◯ NSF STAFF AWARE OF MY WORK BECAUSE I HAD PREVIOUSLY APPLIED FOR NSF FUNDS

31-1 ◯ NSF STAFF AWARE OF MY WORK THROUGH THEIR KNOWLEDGE OF AREA

32-1 ◯ I HAD PERSONAL KNOWLEDGE OF APPLICANT'S WORK

33-1 ◯ I WAS PERSONALLY ACQUAINTED WITH NSF STAFF

34-1 ◯ OTHER - PLEASE SPECIFY: _____

_____

35-1 ◯ DON'T KNOW

8. Overall, would you say the ad hoc/mail review process as used for
36   proposals you have reviewed during the past two years is:

-1   ◯   A SOUND PEER REVIEW MECHANISM

-2   ◯   AN ACCEPTABLE PEER REVIEW MECHANISM WITH SOME WEAKNESSES

-3   ◯   A QUESTIONABLE PEER REVIEW MECHANISM WITH MANY WEAKNESSES

A.   What do you think are the strengths of this system?

_____

_____

_____

_____

B.   What do you think are the weaknesses of this system?

_____

_____

_____

_____

C.   What, if anything, do you think should be done to improve the
ad hoc/mail review system?

_____

_____

_____

_____

9. During the past two years, have you served as a member of a review
37   panel for NSF?

-1   ◯ YES

-2   ◯ NO   *(PLEASE SKIP TO QUESTION 20, PAGE 7)*

10. For which of the following areas did you serve as a review panel member? *(CHECK ALL THAT APPLY)*

38-1 ◯ RANN

39-1 ◯ Education

40-1 ◯ Biological, Behavioral and Social Sciences

41-1 ◯ Mathematical and Physical Sciences and Engineering
(including Chemistry, Computer Science and Materials Science)

42-1 ◯ Astronomical, Atmospheric, Earth and Ocean Sciences

43-1 ◯ Other - Please specify: _____

11. About how many proposals did the panel(s) review during the past two years?

# of Proposals

44-46 ⬜⬜⬜

12. About how much time did you personally spend on the average reviewing each of these proposals

A. <u>before the panel convened</u>:

# of Minutes

47-50 ⬜⬜⬜⬜

B. <u>during panel session</u>:

# of Minutes

51-54 ⬜⬜⬜⬜

13. In general, would you say the panel had enough time to conduct what you felt was an adequate discussion of each proposal or not enough time to conduct an adequate discussion?

55

-1 ◯ ENOUGH TIME

-2 ◯ NOT ENOUGH TIME

14. In general, would you say the panel was provided with enough information to conduct what you felt was an adequate review, or not enough information to conduct an adequate review?

56

-1 ◯ ENOUGH INFORMATION

-2 ◯ NOT ENOUGH INFORMATION
        ⬇

> A. What type of additional information would you have found helpful?
>
> _____
>
> _____
>
> _____

15. In general, would you say there was sufficient breadth of experience and expertise among panel members to permit a competent review of each proposal or do you think the experience and expertise of panel members was too narrow to permit a competent review?

57

-1 ◯ SUFFICIENT BREADTH OF EXPERIENCE AND EXPERTISE

-2 ◯ EXPERIENCE AND EXPERTISE TOO NARROW

16. In general, would you say there was enough specialized expertise among panel members to permit a competent review of each proposal or not enough specialized expertise to permit a competent review?

58

-1 ◯ ENOUGH SPECIALIZED EXPERTISE

-2 ◯ NOT ENOUGH SPECIALIZED EXPERTISE

17. Were you personally acquainted with any of the principal investigators for any of the proposals reviewed by the panel during the past two years?

◯ YES
    ⬇

> A. About what proportion of the proposals reviewed by the panel had principal investigators with whom you were personally acquainted?
>
> 59
>
> -1 ◯ ALL OR ALMOST ALL
> -2 ◯ ABOUT 3/4
> -3 ◯ ABOUT 1/2
> -4 ◯ ABOUT 1/4
> -5 ◯ LESS THAN 1/4

-6 ◯ NO

18. Which of the following do you think may have influenced NSF staff in asking you to become a review panel member?
    (CHECK ALL THAT APPLY)

60-*1* ◯ I HAD PREVIOUSLY SERVED AS AN AD HOC/MAIL REVIEWER

61-*1* ◯ COLLEAGUE/PROFESSIONAL ACQUAINTANCE REFERRED NSF STAFF TO ME

62-*1* ◯ NSF STAFF AWARE OF MY WORK THROUGH THEIR KNOWLEDGE OF AREA

63-*1* ◯ I WAS PERSONALLY ACQUAINTED WITH NSF STAFF

64-*1* ◯ OTHER - PLEASE SPECIFY: _____

_____

65-*1* ◯ DON'T KNOW

19. Overall, would you say the panel review process as used for proposals which you have reviewed during the past two years is:

66

-*1* ◯ A SOUND PEER REVIEW MECHANISM

-*2* ◯ AN ACCEPTABLE PEER REVIEW MECHANISM WITH SOME WEAKNESSES

-*3* ◯ A QUESTIONABLE PEER REVIEW MECHANISM WITH MANY WEAKNESSES

A. What do you think are the strengths of this system?

_____

_____

_____

_____

_____

B. What do you think are the weaknesses of this system?

_____

_____

_____

_____

_____

C. What, if anything, do you think should be done to improve the panel review system?

_____

_____

_____

_____

_____

20. Currently some proposals which are submitted to NSF are reviewed only by NSF staff, while others are subjected to a peer review process in addition to receiving NSF staff review. How do you feel about this-- do you think NSF should:

67

-1 ◯ USE ONLY NSF STAFF REVIEW FOR ALL PROPOSALS

-2 ◯ REQUIRE SOME TYPE OF PEER REVIEW FOR ALL PROPOSALS

-3 ◯ CONTINUE CURRENT PRACTICE - SOME PROPOSALS RECEIVE PEER REVIEW, OTHERS DO NOT

21. At present, NSF uses several different types of peer review. Some proposals are reviewed only by ad hoc/mail reviewers, other proposals are reviewed only by standing review panels and others are reviewed by ad hoc/mail reviewers and standing review panels. How do you feel about this--do you think NSF should:

68

-1 ◯ USE ONLY AD HOC/MAIL REVIEW FOR ALL PROPOSALS

-2 ◯ USE ONLY PANEL REVIEW FOR ALL PROPOSALS

-3 ◯ USE BOTH AD HOC/MAIL REVIEWS AND PANEL REVIEW FOR ALL PROPOSALS

-4 ◯ USE WHATEVER TYPE OF REVIEW IS APPROPRIATE FOR SPECIFIC PROPOSAL

22. If a panel review procedure is used, how do you think panel members should be selected? *(CHECK ONLY ONE)*

69

-1 ◯ BY NSF STAFF, BASED ON THEIR BEST JUDGMENT

-2 ◯ BY NSF STAFF, FROM A PREVIOUSLY IDENTIFIED, BROADLY-BASED POOL OF EXPERTS IN THAT PROGRAM AREA

-3 ◯ BY A RANDOM SAMPLING TECHNIQUE FROM A PREVIOUSLY IDENTIFIED, BROADLY-BASED POOL OF EXPERTS

-4 ◯ SOME PROPORTION SELECTED BY NSF STAFF AND THE REST SELECTED BY A RANDOM SAMPLING TECHNIQUE, FROM A PREVIOUSLY IDENTIFIED, BROADLY-BASED POOL OF EXPERTS

A. How do you think this pool of experts should be identified?

_____

_____

_____

1-5

6-2

23. For what length of time do you think individuals should serve as members of a review panel?

7

-1 ◯ AT DISCRETION OF NSF STAFF AND INDIVIDUAL

-2 ◯ SPECIFIED TERM

⬇

A. What length do you think would be appropriate?

\# Years

8-9 ☐☐

24. If an ad hoc/mail review procedure is used, how do you think reviewers should be selected?

10

-1 ◯ BY NSF STAFF ALONE, BASED ON THEIR BEST JUDGMENT

-2 ◯ BY NSF STAFF AND THE PROSPECTIVE PRINCIPAL INVESTIGATOR

-3 ◯ BY NSF STAFF FROM A PREVIOUSLY IDENTIFIED, BROADLY-BASED POOL OF EXPERTS

-4 ◯ BY A RANDOM SAMPLING TECHNIQUE FROM A PREVIOUSLY IDENTIFIED, BROADLY-BASED POOL OF EXPERTS

-5 ◯ SOME PROPORTION SELECTED BY NSF STAFF AND THE REST SELECTED BY A RANDOM SAMPLING TECHNIQUE, FROM A PREVIOUSLY IDENTIFIED, BROADLY-BASED POOL OF EXPERTS

A. How do you think this pool of experts should be identified?

_____

_____

_____

25. Recently, a number of modifications to NSF's peer review procedures have been proposed. <u>As a reviewer</u>, do you approve or disapprove of the following:

A. Providing a verbatim copy of each review to the applicant <u>with the reviewer's name deleted</u>?

11
-1 ◯ APPROVE STRONGLY
-2 ◯ APPROVE SOMEWHAT
-3 ◯ DISAPPROVE SOMEWHAT
-4 ◯ DISAPPROVE STRONGLY
-8 ◯ UNDECIDED

A.1. The National Science Board has decided that, as of January 1, 1976, verbatim reviews will be provided to applicants. In light of this change, do you think you will continue to serve as a reviewer or refuse to serve as a reviewer in the future?

12
-1 ◯ CONTINUE
-2 ◯ CONTINUE, BUT ON A MORE LIMITED BASIS
-3 ◯ REFUSE
-8 ◯ UNDECIDED

A.2. Why do you feel this way?
_____
_____
_____

B. Providing a verbatim copy of each review to the applicant <u>with the reviewer's name included</u>?

13
-1 ◯ APPROVE STRONGLY
-2 ◯ APPROVE SOMEWHAT
-3 ◯ DISAPPROVE SOMEWHAT
-4 ◯ DISAPPROVE STRONGLY
-8 ◯ UNDECIDED

B.1. Do you think you would continue to serve as a reviewer if such a policy were adopted or refuse to serve as a reviewer in the future?

14
-1 ◯ CONTINUE
-2 ◯ CONTINUE, BUT ON A MORE LIMITED BASIS
-3 ◯ REFUSE
-8 ◯ UNDECIDED

B.2. Why do you feel this way?
_____
_____
_____

As a reviewer, do you approve or disapprove of the following:

C. Treating all reviews with the reviewer's name included as public
information, available to anyone upon request?

15

-1 ◯ APPROVE STRONGLY

-2 ◯ APPROVE SOMEWHAT

-3 ◯ DISAPPROVE SOMEWHAT

-4 ◯ DISAPPROVE STRONGLY

-8 ◯ UNDECIDED

C.1. Do you think you would continue to serve as a reviewer
if such a policy were adopted or refuse to serve as
reviewer in the future?

16

-1 ◯ CONTINUE

-2 ◯ CONTINUE, BUT ON A MORE LIMITED BASIS

-3 ◯ REFUSE

-8 ◯ UNDECIDED

C.2. Why do you feel this way?

_____

_____

_____

26. If NSF did adopt a policy of releasing reviewers' comments to principal
investigators with the reviewer's name included, do you think this would
affect written review comments or would not affect written comments?

17

-1 ◯ WOULD AFFECT WRITTEN REVIEWS

A. How do you think written review comments would be affected?

_____

_____

_____

-2 ◯ WOULD NOT AFFECT WRITTEN REVIEWS

-8 ◯ DON'T KNOW

27. In general, if two equally good proposals are submitted to NSF in your area, one from a well-known institution and one from a lesser-known institution, do you think both proposals have an equal chance of being recommended for funding by the peer reviewers or one has a better chance than the other?

18

-1 ◯ BOTH HAVE AN EQUAL CHANCE

-2 ◯ PROPOSAL FROM WELL-KNOWN INSTITUTION HAS BETTER CHANCE

-3 ◯ PROPOSAL FROM LESS-KNOWN INSTITUTION HAS BETTER CHANCE

-8 ◯ DON'T KNOW

A. Have you personally had an experience where this issue was raised by the review process?

◯ YES
⬇

19

A-1. What was the outcome?

-1 ◯ PROPOSAL FROM WELL-KNOWN INSTITUTION RECOMMENDED

-2 ◯ PROPOSAL FROM LESS-KNOWN INSTITUTION RECOMMENDED

-3 ◯ BOTH RECOMMENDED

-8 ◯ DON'T KNOW

-5 ◯ NO

28. What if two equally good proposals are submitted, one with a young not-yet-established principal investigator and one with an older, well-established principal investigator--do you think both proposals have an equal chance of being recommended for funding by the peer reviewers or one has a better chance than the other?

20

-1 ◯ BOTH HAVE AN EQUAL CHANCE

-2 ◯ YOUNG, NOT-YET-ESTABLISHED P.I. HAS BETTER CHANCE

-3 ◯ OLDER, WELL-ESTABLISHED P.I. HAS BETTER CHANCE

-8 ◯ DON'T KNOW

A. Have you personally had an experience where this issue was raised by the review process?

◯ YES
⬇

21

A-1. What was the outcome?

-1 ◯ PROPOSAL WITH YOUNGER P.I. RECOMMENDED

-2 ◯ PROPOSAL WITH OLDER P.I. RECOMMENDED

-3 ◯ BOTH RECOMMENDED

-8 ◯ DON'T KNOW

-5 ◯ NO

29. What about two equally good proposals, one for a project using approaches which are consistent with the mainstream of thought in your profession and one for a project which challenges the mainstream of thought--do you think both proposals have an equal chance of being recommended for funding by the peer reviewers or one has a better chance than the other?

22

-1 ◯ BOTH HAVE AN EQUAL CHANCE

-2 ◯ PROPOSAL CONSISTENT WITH MAINSTREAM HAS BETTER CHANCE.

-3 ◯ PROPOSAL WHICH CHALLENGES MAINSTREAM HAS BETTER CHANCE

-8 ◯ DON'T KNOW

A. Have you personally had an experience where this issue was raised by the NSF review process?

◯ YES
⬇

23
A.1. What was the outcome?

-1 ◯ PROPOSAL CONSISTENT WITH MAINSTREAM RECOMMENDED

-2 ◯ PROPOSAL WHICH CHALLENGED MAINSTREAM RECOMMENDED

-3 ◯ BOTH RECOMMENDED

-8 ◯ DON'T KNOW

-5 ◯ NO

Finally we would like some information about your background to aid in our analysis.

30. What is the highest academic degree you have received?

24
-1 ◯ B.A., B.S.
-2 ◯ M.A., M.S., M.P.A., M.P.H.
-3 ◯ L.L.B.
-4 ◯ M.D.
-5 ◯ Ph.D., D.Sc.
-6 ◯ Other - Please Specify:_____

31. Please indicate the name of the institution which granted the degree, the year the degree was awarded and the field of degree.

25-28   NAME OF INSTITUTION:_____

29-30   YEAR AWARDED:_____

31-34   FIELD OF DEGREE:_____

32. Please indicate the name of your current institution, the state in which it is located and your current field of research.

35-38   NAME OF INSTITUTION:_____

39-40   STATE:_____

41-44   CURRENT FIELD OF RESEARCH:_____

33. During the past five years have you submitted any applications for funding to NSF?

◯ YES
⬇

A. How many proposals have you submitted?

Submitted

45-46   ☐☐

B. How many proposals have been funded?

Funded

47-48   ☐☐

49
-1   ◯ NO

34. During the past five years have you submitted any applications for funding to any other federal agency?

◯ YES

⬇

A. How many proposals have you submitted?

\# Submitted

50-51 [| |]

B. How many proposals have been funded?

\# Funded

52-53 [| |]

54
-1   ◯ NO

We are interested in any other comments, criticisims or suggestions you have about the NSF proposal review process.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thank you very much for your cooperation. Copies of the final report of statistical results will be sent to all those in the sample.

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-133183

March 5, 1977

The Honorable Ray Thornton
Chairman, Subcommittee on Science,
   Research, and Technology
Committee on Science and
   Technology
House of Representatives

Dear Mr. Chairman:

In accordance with the November 7, 1975 request of former
Subcommittee Chairman James W. Symington and subsequent agree-
ments with the Subcommittee office, we monitored the study
jointly commissioned by the Subcommittee and the National
Science Board to obtain information through questionnaires
about the scientific community's views of the National Science
Foundation peer review process.

In November 1975, the Foundation mailed questionnaires
to a random sample of 1,552 individuals, selected from its
file of about 31,000 individuals, who had reviewed a research
proposal for the Foundation in fiscal year 1974. Question-
naires were also mailed to 3,256 individuals who were randomly
selected from the Foundation's file of applicants who submit-
ted about 20,000 proposals which were awarded, declined, or
withdrawn in fiscal year 1975. The questionnaires asked the
reviewers and applicants their experiences with the Founda-
tion's proposal review process, their opinions of the review
procedures, and their feelings regarding various possible
modifications. Dr. Deborah R. Hensler 1/ was employed by the
Foundation as a private consultant to assist in the survey
design by analyzing the responses to the questionnaires and
reporting the results to the Subcommittee and the National
Science Board.

─────────────────

1/Dr. Hensler has a Ph.D in Political Science from the
  Massachusetts Institute of Technology and is an Associate
  Head of Rand Corporation's Social Science Department with
  primary responsibility for coordinating survey research.

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The scope of our work consisted of (1) maintaining the confidentiality of survey respondents' names by directly receiving the returned questionnaires and destroying the envelopes with the respondents' names, (2) determining that only those individuals selected to receive questionnaires were included in the study results by checking the returned questionnaires against the names included in the sample, (3) verifying the accuracy of processing the original questionnaire responses into a computerized data file (master data file), and (4) verifying the statistics produced from the data as reported by Dr. Hensler. 1/

Returned questionnaires were accepted through March 31, 1976, for inclusion in the study. The completed questionnaires for the reviewer and applicant surveys number 1,068 (69 percent response rate) and 2,684 (82 percent response rate), respectively. The responses were processed by a Foundation contractor (TeleSec) into a master data file containing the simple tabulated results.

Prior to releasing the completed questionnaires to the Foundation, we reproduced responses to questions at random from every second reviewer questionnaire and every third applicant questionnaire. The reviewer questionnaire had 34 questions, while the applicant questionnaire had 26 questions. The responses to questions which asked the respondent to provide an explanation for his answer were not included in our sample for verification. We used this sample to check the accuracy of TeleSec's transferring the questionnaire responses to a computerized data file. We found no errors in the transfer of sampled responses for 33 of the 34 questions asked of reviewers and for 22 of the 26 questions asked of applicants. The following table shows the questions for which we found transfer errors, the projected number of questions in the universe for which errors were likely to exist, and the estimated error rates.

_____

1/Dr. Hensler reported the analysis of the questionnaire responses in a December 1976 report entitled "Perceptions of the National Science Foundation Peer Review Process: A Report on a Survey of NSF Reviewers and Applicants." The report consists largely of 24 tables which present statistics created by analyzing the master data file. We independently verified the statistics, but did not evaluate Dr. Hensler's interpretation of the statistics.

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Questionnaire/ Question No.	Universe size	Projected no. of questions with transfer errors	Estimated % of universe with transfer errors
Reviewer			
31	1,068	63	5.88
Applicant			
2	2,684	69	2.56
8	2,684	69	2.56
10	2,684	96	3.57
21	2,684	84	3.12

The Foundation created additional data from the responses to questions 31 and 32 on the reviewers' questionnaire, and questions 20 and 21 on the applicants' questionnaire. These questions concern the institutions which awarded the respondents their highest academic degrees, and the institutions with which respondents are currently affiliated. The Foundation categorized the reviewers' and applicants' degree-awarding institutions and their current affiliation by type, using an American Association of University Professors code.1/ Our random sample of the data base created from this process showed no errors for the coding of reviewers' institutions. However, for the coding of applicants' institutions, our sample showed estimated error rates of 1.02 percent for institutions awarding the respondents their highest academic degrees and 2.04 percent for institutions with which respondents are currently affiliated.

We believe that none of the errors in the master data file of questionnaire responses would greatly affect the tabulated results. In addition, it is highly probable that the errors are randomly distributed throughout the alternative choices of responses to a question which further reduces the chances to affect the tabulated results.

We independently verified the statistics contained in Dr. Hensler's December 1976 report which were produced from
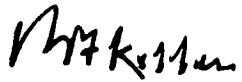

1/Generally ranks participating institutions by categories, such as type and number of degrees awarded.

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the master data file of questionnaire responses. We did not
verify report tables 8, 13, 17, and 24 which contain respon-
dents' explanatory data, and parts of tables 2 and 3 which
contain data compiled by the National Science Foundation
separate from the jointly-commissioned study. With these
exceptions, we believe the statistics in the tables accurately
present the master data file of questionnaire responses except
for insignificant differences. Furthermore, the errors con-
tained in the data base, as previously discussed, do not appear
to greatly affect the statistics presented in the tables.

    We are available to discuss our findings and to provide
any further assistance you might need in studying the Founda-
tion's peer review process.

                              Sincerely yours,

                     ACTING Comptroller General
                          of the United States