

Division of Behavioral and Cognitive Sciences (BCS) 2019 Committee of Visitors (COV) Final Report

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When the National Science Foundation is called upon to tackle big questions in the basic sciences—whether it involves technological connectivity and autonomy, artificial intelligence, adaptation to climate change, or national security—advances in behavioral and cognitive sciences provide key insights about the human element involved in these questions. Consider that connected systems will only work optimally when we take into account the flexibility of human cognition and action that interfaces with those systems; development of artificial intelligence will benefit greatly from leveraging knowledge about child development and learning in humans; and adaptation to climate change will be illuminated by understanding how climate change across time and scale has impacted human behavior and communities. In other words, Behavioral and Cognitive Sciences (BCS) within the Directorate for Social, Behavioral & Economic Sciences (SBE) is a knowledge hub that connects the spokes of multiple directorates across the NSF. The 2019 Committee of Visitors (COV) had the privilege of reviewing funding activities in all 11 programs within BCS between 2015-18 and advising the BCS staff as they consider priorities for the future. Specifically, we have evaluated the merit review process, reviewer selection, program management, portfolio balance, communication with the scientific community and public, discussed issues related to open science, and flagged emerging questions for the next 10 years.

Key Findings of the COV

- The COV finds the activities across all 11 programs to be robust and effective. Management of the programs, structure of the assessment processes, and stewardship of available funds have been undertaken in an effective and professional manner. The BCS Division is poised to contribute substantially to ongoing activities of other Directorates at the NSF including SBE, by continuing its trajectory and also by incorporating suggested modifications and improvements summarized in this review.
- With respect to the merit review process, we suggest that each BCS program develop and optimize internally consistent guidelines and exemplars for the Broader Impacts criterion.
- Each program should assess whether there is any association between the number of reviews and funding rate for proposals.
- We recommend recording and reporting aggregated data on panel characteristics (e.g., geographic location of reviewers, institution type (public/private), academic rank, sub-discipline, gender, and race/ethnicity) for review by the division, directorate, and next COV.
- With respect to equity in funding support and representation across the programs and investigators, we suggest that BCS assess the ratio of total proposals submitted to each program relative to the program's total annual budget, as well as the cost of doing that type of research, to redress any imbalances.

- We recommend that BCS more effectively collect demographic data on all applicants (PI and co-PI) and compare these data to earned doctorates in their respective fields to ensure that BCS is providing equitable access to funding support.
- We encourage all programs in BCS to develop outreach and engagement projects, a few of which already have been funded by SBE programs (e.g., IDEAS program funded by Biological Anthropology and SPARK Society funded by Perception, Action, Cognition) in order to develop and secure more robust participation by underrepresented groups in the NSF funding process.
- Finally, given the impending move of the Documenting Endangered Languages (DEL) program under the Linguistics umbrella, we urge the creation of a dedicated Program Officer (PO) position within Linguistics to ensure the continued specialized process of nurturing and maintaining relationships with diverse institutions and Indigenous scholars and communities.

Overview of the Evaluation Process

The COV was led by a chair (Dr. Nilanjana Dasgupta) and two co-chairs (Dr. Aina Puce and Dr. Agustin Fuentes) with 22 additional members who evaluated the 11 BCS programs (2 reviewers per program). The Appendix lists the names, titles, and affiliations of all COV members. The team convened at the National Science Foundation (NSF) Headquarters in Alexandria, VA for 3 days from September 11-13, 2019.

Prior to the onsite meeting at the NSF, all COV members were briefed on NSF's Conflicts of Interest (COI) policy and declared all potential COIs. The COV had access to summary documents for each program in e-Jacket form, containing also 1000 grant proposals (90-130 per program) that had been submitted during FY 2015-18, external reviews, panel summaries, PO analysis reports, correspondence, and funding decisions associated with those proposals (50% funded and 50% declined).

During the onsite meeting, COV members met in their two-person program teams to review and discuss grant proposal documents, ask clarifying questions of POs, and evaluate the program on the following dimensions: (a) the merit review process, (b) reviewer selection, (c) program management, (d) portfolio review; (e) generate emerging research questions and associated infrastructure needs, (f) discuss implications of open science issues, and (g) assess communication needs. In addition to two-person program team meetings, the COV met as a whole on several occasions to discuss and consolidate our assessment across BCS programs across the above dimensions. Each program-focused team prepared a written review of their program's operations and opportunities. The chair and co-chairs of the COV coalesced the opinions of the evaluators into one report.

The following sections of this report present our evaluation of BCS guided by the five topics in the COV template provided by the NSF to each program. These sections also include our assessment of the responsiveness of each program and division to the recommendations in the 2015 COV report.

- Part I: Quality and effectiveness of the program's use of the merit review process;
- Part II: Selection of reviewers;
- Part III: Management of the program;
- Part IV: Portfolio of research;
- Part V: Divisional level questions--Emerging topics in programs, open science needs, communication with the community and the public.

The sections below contain 28 Recommendations for NSF's consideration.

Part I: Quality and Effectiveness of the Merit Review Process

Are the review methods (for example, panel, ad hoc, site visits) appropriate?

We appreciate the care and thoroughness with which all POs conducted the merit review process, both in terms of the materials that they provided the COV and also their feedback at the onsite meeting with the full COV. In terms of specifics, the COV review revealed that in-person panels worked very effectively, allowing in-depth discussion among panelists and resolution of conflicting reviews. However, virtual panels, especially large panels, reduced interaction among reviewers. Reviewers presented their review and did not engage with each other quite as much as in-person meetings to resolve any differences in opinion. As a result, the panel summaries emerging from large virtual panels were not always as cohesive or informative. On the other hand, we learned the virtual panels can be effective if they are small. Additionally, virtual panels allow a broader diversity of reviewers (e.g., panelists who have travel constraints for professional or personal reasons are able to participate in virtual panels, but not in-person panels) and they function well when the group is small and POs facilitate the discussion. Importantly, virtual panels decrease the environmental impact of long-distance travel by panelists. Finally, there is an automatic cost savings benefit associated with conducting panels online. We noted that a majority of BCS programs have tried and tested various panel procedures in the time since the 2015 COV review.

RECOMMENDATION 1: Use panel procedures that best balance the pros and cons and are appropriate for each BCS program. If virtual meetings are used, keep them small and ensure that program officers play an active facilitation role to work through conflicting reviews.

Were both criteria addressed? Intellectual merit and broader impacts

There was good agreement among panelists in identifying the intellectual merit of proposals. However, there were differing opinions about broader impacts (BI). In COV discussions, there was strong agreement that effective dissemination of scientific results not only to academic audiences, but also to public stakeholders is an important broader impact. Another suggestion about which there was good agreement involved providing prompts asking PIs about specific types of BI (e.g, public outreach, education of trainees, application of research findings, etc.), instead of all types being group together under the one BI label, as is the current procedure.

Opinions varied about other aspects of broader impacts. Many of these differences in opinion varied by program. Some COV members felt strongly that proposals should be first evaluated on intellectual merit. If a proposal passed that threshold, only then should reviewers focus on BI. COV members associated with other programs thought that intellectual merit and broader impacts were inextricably linked in their disciplines. Some argued that specific types of activities should count as broader impact, whereas others argued that we should let "a thousand flowers bloom." The COV wondered if NSF panels weighted some BI criteria more heavily than other criteria, and if so which. We also wondered if reviewers and PIs were interpreting BI similarly or differently. Given the variability among BCS programs and in the meaning and role of BIs in grant proposals, the COV thought it would be most useful to provide program specific guidance on BIs (in addition to the NSF-wide guidelines and the NSF webpage on BI). Thus, program reports from the COV have attempted to offer tailored descriptions of what BIs mean in specific programs with the addition of some allied examples of BI.

RECOMMENDATION 2: We suggest that each BCS program develop an outline of what it considers the most important dimensions of broader impacts and a set of prompts associated with these dimensions (e.g., public outreach, education of trainees, application of research findings, etc.). Include this information in future solicitations and draw prospective principal investigators and reviewers' attention to it. A single proposal may not address all types of broader impact, but it should be clear from the writing and evaluation which types of broader impacts are covered.

Do written reviews provide substantive comments to explain their evaluation?

The COV thought that panel reviews and ad hoc reviews in most programs provided substantive comments that were thoughtfully written. But a few programs found some reviews to be lacking narrative coherence; it was sometimes difficult to tease out answers to specific online prompts from these reviews. This is an area where current program officers are actively working to remediate the variance in reviewer responses. The COV recognizes that this issue may continue to be an ongoing one, because of the continual influx of new reviewers and panelists to the NSF proposal review process.

RECOMMENDATION 3: Nudge reviewers to respond to all online review questions/prompts. We found the number of reviews to be quite variable (3 -7) both within or across programs. We understand that proposals that span disciplines and programs might have more reviews, and that these are often responding to program announcements that span sub-disciplines of BCS or cut across directorates. That said, however, for a couple of programs, the COV wondered if there might be an association between the number of reviews and funding decisions. Specifically, COV members reviewing some programs noted that it appeared that if a proposal had a small number of reviews, it had a higher chance of being funded. Conversely, another COV team thought the opposite: for proposals that had a smaller number of reviews, one bad review could eliminate its chances of securing funding.

RECOMMENDATION 4: Look for inadvertent associations between the number of reviews and funding rate. Is a small (or large) number of reviews associated with a lower probability of funding? This information should be reviewed by program officers and be made available to future Committees of Visitors.

In the Documenting Endangered Languages (DEL) Program, both reviewers and PO regularly provided extensive reviews to PIs. Because many PIs in this program were typically inexperienced (high rate of first time PIs, PIs from tribal colleges, indigenous scholars, or PIs from the local community), their proposals typically focused more on BI than intellectual merit. The previous PO elected to do a lot of coaching on basic grant writing to improve the intellectual merit in resubmissions, as well as making resubmissions more realistic and potentially fundable. These actions and interactions of the PO in developing relationships with diverse institutions and indigenous scholars increased the diversity of applicant PIs especially from tribal colleges and indigenous scholars. It is particularly notable that a disproportionate number of BCS funded indigenous scholars are from the DEL program.

RECOMMENDATION 5: To ensure the future success of Documenting Endangered Languages (DEL), in light of its new home within the Linguistics program, we recommend that the NSF have a dedicated program officer whose job is to maintain and expand the previous DEL program officer's practices of outreach and relationship building to continue to attract principal investigators from tribal colleges and other diverse institutions. This program officer needs to

have relevant disciplinary expertise, which may be different from that of program officers in the main Linguistics program.

Do the panel summaries provide a rationale for the panel consensus (or reasons consensus was not reached)?

The COV has three broad observations in relation to panel summaries. First, in cases where review panels have similar evaluations of proposals, panel summaries provide a good rationale and synthesis to PIs. However, when there are conflicting opinions in reviews, more can be done in some programs to address these conflicts in the panel summary and provide guidance to the PI about what they should prioritize in the resubmission to strengthen it and increase its chances of securing funding. Second, some panel summaries were too cursory. Third, the COV also noted that for many programs the PO analysis did a more complete job of addressing conflicting opinions in reviews and explaining how that affected funding decisions. These PO analyses are currently not shared with the PI.

RECOMMENDATION 6: Make the program officer's analysis available to principal investigators. When there are conflicting opinions in reviews, program officers should encourage review panels to provide guidance to principal investigators explaining what they should prioritize to strengthen resubmissions.

Does the documentation in the jacket provide the rationale for the award/decline decision?

The PO analysis provides an excellent and thorough written rationale for award/decline decisions. In the onsite meeting with POs, it was very clear that POs spend a lot of time communicating with PIs to help them better interpret reviewers' comments and panel summaries. What is missing from the e-Jackets is information about other informal mechanisms of feedback that POs engage in with PIs. It is currently not clear from reviewing e-Jackets if declined principal investigators get individualized feedback from program officers via phone conversations etc. that might be very important for early career principal investigators and others from small institutions who may not get much grant-related guidance from their institutional colleagues. Getting such input may increase the probability of competitive resubmissions.

RECOMMENDATION 7: The Committee of Visitors would like to see better documentation of phone and email conversations with principal investigators logged in diary notes in e-Jackets, especially conversations before proposal submission and after decline notifications.

Any additional comments about programs' use of merit review process?

The COV recognizes the importance of a triage system for proposals that lack intellectual merit and/or broader impacts, and we recognize that triage processes will vary by program. In response to the 2015 COV evaluation, some POs described their triage mechanism in program reports, others explained why they do not triage proposals, but yet others did not address the issue at all. While we recognize that variation in proposal rates and panel structures across programs necessitate different triage processes, some explicit description of triage criteria for all programs should be made available to PIs, reviewers, and the COV.

RECOMMENDATION 8: We ask that each program (via the program officers) articulate their triage system and make that explicit to future Committees of Visitors through their individual program reports.

The COV wondered whether resubmitted proposals face a ‘moving target’ if panelists who evaluated their proposal are replaced by new panelists who have no record of the revisions the PI was asked to make in a prior submission. They might evaluate the proposal on different criteria creating a revolving door of resubmissions. This is especially likely if there is not constancy in the PO who is overseeing that panel. We are very concerned that programs with only rotator POs may be particularly vulnerable to this.

RECOMMENDATION 9: We ask that program officers clarify how programs guard against this moving target problem for resubmissions.

RECOMMENDATION 10: We also recommend that each program have at least one permanent program officer to provide continuity in the review process and program stability.

Comments about specific programs:

The Geography and Spatial Sciences (GSS) COV team recommended dropping the Plus One review system. The reason it was originally initiated was to manage workload. The GSS team believes that workload can be better managed by limiting the number of proposals a PI can submit each year to one proposal a year.

The Cognitive Neuroscience (Cog Neuro) COV team was of the opinion that the proposals currently being funded typically do not have well-powered samples to ensure replicability of results. This issue reflects current ongoing discussions in various branches of science regarding reproducibility and replicability of scientific studies. Discussions in cognitive neuroscience and also systems neuroscience community have come to the conclusions that larger sample sizes are needed for future studies. Unfortunately, the Cog Neuro budgets limit the current funding of high-impact projects with adequate statistical power. Therefore, it strongly recommends that the Cog Neuro program fund proposals that use existing large secondary datasets for projects, instead of collecting new data. An alternative funding strategy for a program such as Cog Neuro might also be to fund methods-related projects, whose budgets might be more within current Cog Neuro budget limits.

The Biological Anthropology and Cultural anthropology COV team were concerned that their current budgets were too low given the cost of research in the field (Biological Anthropology) and the large number of submissions (Cultural Anthropology).

Part II. Selection of Reviewers

Did the program use reviewers with appropriate expertise and/or qualifications?

Overall, the COV was impressed with POs’ selection of reviewers, both in terms of panelists and ad hoc reviewers as evident from e-Jackets. This was additionally evident in a discussion with POs. That said, we would like to see more in-depth quantitative information about panel composition and ad hoc reviewers: e.g. what is the geographic distribution of reviewers, institution type (private/public, R1/nonR1), rank, sub-discipline, gender, and race/ethnicity?

RECOMMENDATION 11: We request that programs collect and report to future COVs, aggregated data on panel characteristics – e.g., geographic location of reviewers, institution type (public/privates), principal investigator rank, sub-discipline, gender, and race/ethnicity. For self-reported demographics

where there tends to be missing data, we believe response rates will improve if, before asking for self-reports, prospective reviewers are offered a rationale for why NSF requests demographic information from potential reviewers, and how this information is utilized to ensure equity in reviewer selection on multiple dimensions.

The COV observed that selection of reviewers was mostly top-down, executed by POs based on their own personally developed system. In one program there was a concern that reviewers may be chosen too narrowly making the system inertia prone (e.g., people who have been funded in a specific narrow area may be reviewing future proposals making it likely that they will replicate themselves). We particularly appreciated that some POs grow their list of potential reviewers by using conference presenters at professional meetings and by browsing authors of peer-reviewed journals. We also especially liked the process used by 1 or 2 BCS programs that provided a way for scientists to opt-in to review. We would like to see all programs in BCS supplement PO-driven reviewer selection with a bottom-up process of opting-in, which may yield more reviewers who are typically outside of the NSF-network and who may not have come to the PO's mind. As an example, POs could send out calls to the broad scientific community in a field (through professional society listservs, e-newsletters, program website etc.) inviting scientists in the community interested in serving as reviewers for BCS programs to sign up through a portal where they provide information about their area of expertise, institution, rank, gender, race/ethnicity and link to their CV and institutional website. During outreach activities, POs could invite scientists from institutions that are underrepresented institution types (4-year institutions, non-R1, tribal colleges and universities, MSIs, HBCUs, HSIs) to do the same. POs could sift through this bank of reviewers when they are looking for new panelists and ad hoc reviewers. Sampling from this bank of potential reviewers may help diversify future reviewer selection and compensate for any inadvertent blind spots POs might have. (Note that reviewers selected from this list will be less likely to have the 'missing data' problem for self-reported demographics.)

RECOMMENDATION 12: Ensure a more open process of reviewer selection by creating and maintaining a pool of scientists who have volunteered to review. Collect data on volunteers' expertise via access to their CV, institution, rank, geographic location, institution type, rank, sub-discipline, gender, and race/ethnicity, explaining in advance why these data are important and how they will be used. Report this bottom-up process and summary information annually to future Committees of Visitors.

RECOMMENDATION 13: We encourage each program to invite individuals onto review panels (perhaps for 1 year) who represent various underrepresented groups, to increase their exposure to the NSF review process, successful proposals, and further encourage them to submit proposals as PIs in the future (e.g., scientists from states, institutions, and demographic groups underrepresented in the BCS portfolio, including early career faculty). At least one program in BCS uses this strategy; we suggest that this be considered by other BCS programs.

Did the program recognize and resolve conflicts of interest when appropriate?

Overall, conflicts of interest (COIs) were not seen as being a problem across all the BCS programs we reviewed. That said, a common comment voiced by most COV members reviewing several programs was that little detail was provided to this COV explaining the specific processes followed by individual POs to resolve COIs.

RECOMMENDATION 14: Describe the process of resolving conflicts of interest used by each program for future Committees of Visitors.

Any additional comments about reviewer selection?

A number of POs reported that some reviewers consistently evaluate proposals more strictly than others. It was not clear to this COV how reviewer idiosyncrasies are adjusted (if they are). In addition, we wondered if there is any systematic effect of male/female reviewers evaluating proposals by male/female PIs. While some programs responded to this issue based on a similar question asked by the 2015 COV, there was no division-wide assessment of this question in the division report.

RECOMMENDATION 15: The Committee of Visitors encourages BCS to aggregate data across grant proposals and assess the extent to which ratings of “outlier” reviewers impact funding recommendations. We also recommend that BCS assess whether the gender of reviewers, gender of principal investigators, and their interaction have any systematic effects on funding recommendations.

Part III. Management of the Program Under Review

Management of the program; responsiveness of the program to emerging research and education opportunities; program planning and prioritization process (internal and external) that guided the development of the portfolio

The COV is interested in knowing how BCS programs fare in terms of the NSF Big Ideas initiative. How often do BCS scientists serve as PIs in applications and awards that are part of the Big Ideas mechanisms? What proportion of submissions and awards are led by BCS scientists? These are important measures of the division’s (and directorate’s) engagement with NSF-wide themes. The COV did not receive any information on this topic.

RECOMMENDATION 16: Provide subsequent Committees of Visitors with information regarding the participation of various BCS PIs in the NSF’s Big Ideas mechanisms and other large cross-directorate initiatives.

Across programs, one criterion for judging PIs’ competitiveness involves asking whether their institution will support the proposed research. By definition, that criterion favors PIs at research intensive universities (R1 institutions). One way to ameliorate this bias is to create collaborative research opportunities between PIs from different types of institutions (e.g., partnerships between PI from institutions that are underrepresented at NSF - Tribal Colleges and Universities, smaller institutions, 4-year institutions, MSIs, HSI, HBCUs) and Co-PIs from research intensive universities. Of course, these need to be genuine partnerships devoted to specific scientific and outreach activities where both institutions have something to contribute, and are not just convenient ‘agreements on paper’ constructed to attract external funding.

The COV believes that outreach to underrepresented institutions and administrators should be made a greater priority across all BCS programs to increase equity in PI and reviewer distribution. At the same time, we are concerned about POs’ workload—both in terms of the number of proposals they handle, cross-program and cross-directorate activities in which they are involved, and existing outreach work that many do. This was clearly evident in their description of activities and times spent on them when the COV met with POs at the NSF. One suggestion from the COV is to cultivate a set of “NSF ambassadors” consisting of former program officers and former awardees from smaller institutions who can help with outreach work if they have had some training and carry an NSF title (e.g., NSF Outreach Ambassador) that might gain them service credit from their home institutions.

RECOMMENDATION 17: We request that all BCS programs document program officers' outreach activities in program reports, the frequency with which they occurred during each Committee of Visitors period, their objectives, and some measured outcomes. This information would have been very useful to the current 2019 Committee of Visitors, and no doubt will be useful for future Committees of Visitors.

Comments specific to some programs:

Cog Neuro program: COV members reviewing the Cog Neuro program had the impression that their awarded PIs and reviewers were heavily skewed to be bicoastal. Outreach to scientists in other institutions appears to be poor, which may be a byproduct of not having continuity in POs across time in Cog Neuro. There have been many PO changes over the 4-year COV review period (2015-2018), potentially because the single PO for Cog Neuro has always been a rotator. We concur with the 2015 COV recommendation that the Cog Neuro program PO be changed from a rotator to a permanent PO. (We also note from the 2015 Report, that the 2012 COV made the same recommendation, and that this is yet to be acted upon.)

RECOMMENDATION 18: Change the current rotator program officer (PO) for the Cognitive Neuroscience program to that of a PO. Our recommendation is consistent with those of the 2015 and 2012 Committee of Visitors.

Given that DEL is being folded into Linguistics at the time of writing this report, and the DEL-specific PO is no longer at NSF, there is a major concern that the current diversified portfolio of proposals and PIs that currently exist in DEL will be hard to maintain because proactive nurturing of new PIs from smaller programs takes time, adds to workload, and there is no longer a DEL specific PO charged with doing that work. Given the time demand, it is not exactly clear to the COV how a PO who is performing work for both DEL and Linguistics can realistically perform this specialized outreach function for DEL.

RECOMMENDATION 19: We encourage SBE to ensure that the intensive pattern of outreach required for the success of the program on Documenting Endangered Languages (DEL) continues via the creation of a dedicated program officer position in Linguistics (the new home for DEL) charged with maintaining and expanding the previous DEL program officer's practices. This involves engaging with scholars of color, especially indigenous scholars, and creating links with a diverse array of institutions.

Part IV Portfolio Review

The geographical distribution of NSF funding by individual BCS programs was not quite clear based on the state maps provided in individual program reports. Here are two examples that illustrate why the visualization maps might be misleading. Example 1: If examined at face value, maps provided by many programs suggest that awards show a coastal preference, plus Texas. But, if recalculated and examined as a ratio of applications-to-awards, then they suggest, based on reviews of a couple of programs, that Midwest proposals have higher likelihood of being funded than coastal ones (simply because there are more coastal applications). Example 2: State-level maps might not be the best representation of geographic diversity of DDRIG proposals (both application and success rates) because every state does not have institutions offering PhD programs in sub-disciplines associated with DDRIGs. For programs like Biological Anthropology it is important to create a map of PhD granting programs in Biological Anthropology by state and then to superimpose NSF applications and award rates on that map. The COV

is interested in understanding *why* some states are consistently missing from proposal submissions and awards. Does the apparent low number of proposals from some states mean that: (1) these states have fewer research-intensive institutions? (2) these states have a lower number of PhD programs in specific fields? (3) there is less contact between NSF staff and faculty in these states? Or something else?

RECOMMENDATION 20: We request that BCS calculate and assess if the above-mentioned metrics per state (and potentially other metrics) are associated with the number of applications and/or the number of awards to clarify possible reasons for geographical variations in funding rates at BCS.

Demographic diversity of PIs in applicant pool and award pool: The COV noted that the proportion of applications and awards from underrepresented racial minority (URM) PIs compared to the whole pool was often 10% or less. Data from a few programs indicate that the proportion of awardees who are female PIs was lower than the proportion of PhDs awarded to women in the field (a caveat: some programs reported a large proportion of missing data for PIs' gender and race).

RECOMMENDATION 21: We recommend that BCS Division determine whether there is alignment (or not) between the proportional demographics of PhDs in BCS disciplines and the demographics of the applicant pool and award pool in BCS programs. One way to assess this is to leverage NSF's own data—use the NCSES survey data on earned doctorates which provides demographics for PhDs earned in disciplines and sub-disciplines that correspond nicely to most, if not all, BCS programs.

RECOMMENDATION 22: Prior to collecting self-reported demographics from principal investigators (PIs) we recommend that NSF explain the rationale for asking PIs to provide their demographics, and how these analytics will be used to make equitable reviewing and funding decisions. For the gender question, we suggest adding a non-binary checkbox, a write-in response option for gender identity, and a personal pronoun option, to be more inclusive.

The COV was surprised to learn that the NSF does not track the demographics of students applying for, and receiving, DDRIG grants, because the system is constrained to record the demographics of PIs only (students are recorded as Co-PIs; faculty advisors are PIs). Graduate students are the next generation of scientists and not collecting their demographic data, especially for awardees of prestigious NSF grants, is a missed opportunity to track and analyze the demographics of future BCS scientists.

RECOMMENDATION 23: We strongly recommend that the demographics of students participating as Co-Principal Investigators on DDRIG grants be tracked, allowing data on future young investigators in BCS to be available for strategic planning of future NSF initiatives.

The COV has already noted that the number of URM PIs performing BCS-funded research is low. We suggest that URM participation may be increased using strategies developed by two successful programs that are already funded by NSF: (1) Increasing Diversity in Evolutionary Anthropological Sciences (IDEAS), which is facilitated by the Biological Anthropology Program [<https://physanth.org/about/committees/diversity/cod-ideas-increasing-diversity-evolutionary-anthropological-sciences>] (see the 2018 article in the *AJPA Yearbook of Physical Anthropology* which is accessible from the above weblink); and (2) Summer Internship for Indigenous Peoples in Genomics (SING) [<https://sing.igb.illinois.edu>], featured in this 2018 article in *Nature Communications*, <https://www.nature.com/articles/s41467-018-05188-3>.

RECOMMENDATION 24: We recommend that funds be made available to encourage all BCS programs to invite proposals for multi-year workshops and programs aimed at training, mentoring, and supporting URM scientists to write competitive NSF proposals.

Length of awards: BCS leans heavily toward short-term projects over long-term projects because of continuing funding constraints. This issue came up in a number of programs, but was relevant especially for Archeology, Developmental Science, Linguistics, and GSS. These programs, in particular, have scientific lines of inquiry that span decades e.g. large excavations in archeology, tracking of language development across the lifespan, monitoring changing geography as a function of climate change.

Large costs of doing certain types of research: We appreciate that BCS has been an extremely strong steward of its overall budget. That said, we noticed that some programs are particularly underfunded relative to the size of their research communities and funding needs. For example, Biological Anthropology and Cognitive Neuroscience require expensive methodologies for even modest investigations (cutting-edge genetic and neuroimaging methods are routinely used in both disciplines). Both these programs have small budgets relative to their methodological costs. This has resulted in restricted sampling and/or analyses in proposed projects (as already discussed earlier for Cognitive Neuroscience). Another imbalance is evident in Cultural Anthropology, a program that receives many more applications than most other programs and yet has among the smallest budgets of all.

RECOMMENDATION 25: We ask that BCS assess the ratio of the total number of proposals submitted to each program relative to its total annual budget, as well as the cost of doing that type of research. We ask that BCS use these criteria to rank all programs accordingly and redress any imbalances.

Transformative vs. incremental science: A few programs noted that their portfolios lean heavily toward incremental science over transformative science (Cognitive Neuroscience, Science of Learning, and Developmental Science). Developmental Science thought the emphasis on incremental science was acceptable, as they reasoned that it is important to fund short-term studies for proof of concept and initial hypothesis testing before progressing to large longitudinal studies. In contrast, Cognitive Neuroscience were of the opinion that there needs to be more attention paid to transformative science.

Additional comments about program portfolios of a few specific programs

The Cognitive Neuroscience portfolio revealed that the current list of grants was dominated by psychology (with neuroimaging) and few PIs came from other disciplines. Transformative Cognitive Neuroscience projects usually involve collaboration with other disciplines e.g. computer science and engineering, and may not need large budgets if they involve analyses of large existing datasets.

RECOMMENDATION 26: The Cognitive Neuroscience program might consider refocusing its portfolio, making it more multidisciplinary, focusing on mechanistic studies and analyses of secondary datasets that include very large samples (e.g. Human Connectome Project, Adolescent Brain Cognitive Development, Oxford Brain Biobank).

COV members reviewing the Developmental Science program highlighted the need for a shared resource of infants from diverse backgrounds to ensure that developmental research findings funded by this program are not limited in their conclusions to White middle- and upper middle-class children in university adjacent communities.

RECOMMENDATION 27: We ask the Developmental Science program to fund infrastructure projects such as the creation of a large shared database of prescreened infants from diverse backgrounds whose parents are willing to participate in research studies. Such a database should be accessible by many investigators for many studies. Smaller infrastructure projects might involve making financial supplements available for PIs to recruit diverse samples by setting up research labs in the community. Science of Learning is a young program that is currently receiving few proposals. This is likely to be an artifact of the transition from large Science of Learning Centers to individual investigator grants.

RECOMMENDATION 28: Science of Learning should conduct a portfolio analysis to assess the boundaries of the program. In parallel, we also recommend evaluating the impacts of former Science of Learning Centers. Both analyses can be used to help define and brand the Science of Learning program, encouraging more proposal submissions.

The recent decision to fold in Documenting Endangered Languages (DEL) into Linguistics is anticipated to create several challenges – as already noted earlier. DEL is a multidisciplinary field, not strictly a subfield of linguistics, that it sits uncomfortably within the Linguistics Program. Its former PO was very active in forming and nurturing relationships with underserved institutions and investigators and growing a pool of future applicants and awardees. The loss of that PO to carry out functions specific to DEL will place extra responsibility on linguistics POs who may not necessarily have expertise specific to DEL. We have made an explicit recommendation about DEL and a dedicated PO above (see Recommendations 5 and 19).

Part V: Emerging Questions, Open Science, and Communication

1. In the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS?

The following emerging topics were suggested by COV members from multiple BCS programs and that we believe have significant promise. We have grouped these into thematic areas below:

Topics that touch on societal change

- Climate change and human behavior, including migration, across time and scale, with a focus on coastlines.
- Changes in scientific literacy and science communication as it relates to cognition, behavior, persuasion, and social norms.
- National and global demographic shifts, including aging trends, identity, intergroup processes, community structures, and their impact on human variations in behavior and cognitive processes.
- Social media and its impact on social influence, cognition, behavior, and social mobilization; also the language of social media.
- The societal impacts of big data and artificial intelligence on human cognition and behavior.
- How big data are constructed, for whom, and for what purpose.
- Ancestral languages as indicators of how humans interface with the environment and ecologies.

Topics related to big data and artificial intelligence

- Harnessing and using existing large datasets in neuroscience, genomics and microbiomics to answer social science questions.

- Comparing human intelligence and artificial intelligence. Applying principles of human learning and development to AI.
- Funding the creation and maintenance of very large data sharing, or data access, infrastructure for disciplines in BCS programs (this would require new funding streams, not the re-direction of existing funds for awards).
- Advancing knowledge about the actual mechanisms and processes that convert dynamic information patterns in the brain to actual behavior e.g. “Putting the brain back into the body.”

Capacity building

- Developing, testing, and scaling interventions that increase the participation of URM and first-generation scientists, in addition to scientists from institutions underrepresented in the BCS programs.

2. Issues related to open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

The COV had an animated and lengthy discussion about issues in open science during which many perspectives and concerns were expressed. We defined open science in terms of open access to data, meta-data, research materials, and publications/products.

We ask that NSF facilitate ways to have the behavioral and cognitive science community connect with, and learn from, other organizations and disciplines that have already been engaging this topic so that we do not reinvent the wheel. There are existing NSF-initiatives that might be drawn on as examples, to further elucidate concerns and also identify solutions to various open science problems. (For example, the NSF-funded LIGO Gravitational Wave Open Science Center, which also has arrangements with scientific funding organizations in France, Italy, Netherlands and other EU countries might be a source of some ideas. See: <https://www.gw-openscience.org>).

In addition, below are some concrete ideas about open science from members of this COV:

- Develop infrastructure for shared access to human subjects for research, outside of WEIRD populations (Western Educated Industrialized Rich Democratic) and university adjacent populations.
- Fund investigators who will formalize data structure, metadata, and workflow so that it is easy to analyze by different investigators in the science community.
- Host workshops at the divisional level or program level to assist PIs to develop systems of storage and data sharing that include virtual and/or material data in compliance with their data management plans. Lots of open questions remain about what parameters of open access make sense, and how to ensure that PIs who made their data publicly available get recognition for their work. One strategy might be to create guidelines asking secondary users to explicitly cite curated databases as valid intellectual contributions.
- Consider a “Dear Colleague Letter” aimed at funding an initiative to archive complex research material (e.g., virtual reality materials). There is also a need to consider how to best deal with licensing concerns related to archiving stimulus materials coming from online sources.
- NSF (BCS) might ensure that in the final report of grants, PIs are prompted to indicate whether they fulfilled their original data management plans. Are their study materials and data organized with metadata and archived in an easily accessible place? It is suggested that PIs be asked to provide a URL and instructions as to how to access those archived materials.

- NSF (BCS) might assist in developing a comprehensive data archive to facilitate re-analysis and meta-analyses.
- We believe that more outreach is needed to make our BCS community aware of MIDSCALE I and II as funding mechanisms for large infrastructure projects that could support some of the above-mentioned ideas.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

Communication with the public

1. Expand information dissemination of deliverables from BCS research on social media platforms (Twitter, Facebook) to engage larger public involvement and provide access to scientific facts in a form that is understood by the general public and school children, to foster science literacy. The BCS community of scientists using social media could act as influencers and help the general public access scientific information in ways that are understandable to them.
2. Create informative science-application “nuggets” curated and disseminated through SBE and amplified by the BCS community. The “nuggets” could be written so as to be understandable by the general public.
3. Coordinate communication efforts between institutional news offices and SBE news office, so that institutional news offices also act as amplifiers for scientific findings.

Communication with the scientific community at large

4. Share information with scientific community through social media, with particular attention to scientists at smaller institutions that are underrepresented in the NSF funding profile.
5. Cultivate a group of scientists who can serve as “NSF ambassadors” and also informal mentors to scientists at underrepresented institutions. We already have examples some of which were funded by NSF (e.g. IDEAS, SPARK, SING), and discussed earlier in this report.
6. Start NSF (and BCS) sanctioned blogs or e-newsletters from programs sharing new funding opportunities and common grant-writing questions (What are good broader impacts? What constitutes a good data management plan? What are the most important issues related to open science in a particular research sub-field? etc.)
7. Can POs be available via virtual “NSF office hours”? This could be limited to one hour/week.
8. Provide more guidance at the preproposal stage to prospective early career PIs and other new PIs from institutions that do not have a funding history. Normalize feedback seeking from prospective PIs through social media posts and other communications.
9. Offer more online programming involving POs to promote and disseminate best practices related to successful grant writing.

Appendix 1. Members of the 2019 Committee of Visitors NSF Division of Behavioral & Cognitive Sciences (BCS)

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Appendix 2. Compilation of Individual Program COV Reports

FY2019 Report Template for NSF Committees of Visitors (COVs)

Date of COV: September 10-13, 2019
Division: Behavioral & Cognitive Sciences (BCS)
Directorate: Social, Behavioral & Economic Sciences (SBE)
Number of actions reviewed: 1130 Awards: 557 Declinations: 564 Other: 9 (includes proposals withdrawn and funded elsewhere—DEL awards funded by NSF)
Total number of actions within the Division during period under review: 7230 Awards: 1696 Declinations: 5534 Other: 927 (includes supplement award actions, as well as continuing grant increments on previous awards, PI or institutional transfers, withdrawn proposals and proposals returned without review)
Manner in which reviewed actions were selected: <p>Sample Pool: The initial pool of actions sampled for each program included all competitive awarded and declined proposals for FYs 2015-2018. To prevent oversampling of collaborative projects, lead proposals were included but sub-proposals were not (although the non-lead collaboratives are linked to the leads and made available within the eJacket module). Non-competitive actions, such as continuing grant increments of multi-year awards, and transfers between PIs or Institutions were excluded.</p> <p>Random Sampling Method: Using a random integer function, all proposals in the sample pool were randomly assigned a number. Lists were then sorted, and the first 45 awards/ 45 declines were selected, for a total of 90 actions per program. <u>Exceptions:</u> Geography and Spatial Sciences and Cultural Anthropology programs have much higher proposal loads than other BCS programs, so their samples are larger.</p> <p>For programs that consider large numbers of doctoral dissertation research improvement proposals (DDRIs), those actions were sampled separately from the regular/ senior proposals. The relative percentages of DDRIs included in the sample are in proportion to the number of DDRIs handled by those programs, on average.</p> <p>COIs: For sampled actions in which a relevant committee member had been a PI, panelist, or had an institutional conflict of interest, the action was removed and replaced with the proposal assigned the next highest random number.</p>

Archaeology & Archaeometry Programs – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments: The Archaeology Program uses three review methods: 1. For Senior Archaeology proposals, the Program Officer solicits both ad hoc and panel reviews with a face to face panel meeting. The panel places proposals in categories ranked for funding priority. 2. For Archaeometry proposals, the Program Officer solicits both ad hoc and panel reviews with a virtual panel meeting. 3. For DDRI proposals and High-Risk proposals, the Program Officer solicits ad hoc reviews, with a minimum of three reviews. Recommendations are made by the Program Officer.</p> <p>All these review methods are appropriate and effective. While an in-person meeting would be preferable for the Archaeometry program, this issue was raised at the last COV and the Program Officer’s rationale for using a virtual panel for this small program makes fiscal sense.</p> <p>Recommendation: The average number of Archaeometry proposals per year was 16 for the 2015 COV; now it is 12 proposals per year. Given the small number of proposals currently received by the Archaeometry program (6-16 in each of the last four years), consider meeting in conjunction with the annual Society for American Archaeology meetings to make a face to face meeting possible.</p>	YES
<p>2. Are both merit review criteria addressed</p> <ul style="list-style-type: none"> a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? <p>Comments: Individual reviewers vary in their attention to the merit review criteria, most often giving less attention to Broader Impacts than Intellectual Merit. This is often true in the panel summaries as well. The Program Officer’s Review Analysis consistently</p>	YES

<p>addresses both merit review criteria. For Archaeology, Broader Impacts are important, incorporating aspects of training, participation, partnerships, public engagement, and infrastructure improvement. About 80% of all the proposals involve projects conducted outside the US. Finding international reviewers is often necessary. This makes it even more important to clarify the nature of “Broader Impacts” in the review process for reviewers from outside the U.S.</p> <p>Recommendation: Could the review process include specific questions or prompts for reviewers to address so that they discuss these more consistently? For instance,</p> <ul style="list-style-type: none"> • “Does the proposal include training of undergraduate or graduate students?”, • “Does the proposal include plans that will increase participation of women, persons with disabilities, and underrepresented minorities?”, • “Will the proposed activities increase scientific literacy and public engagement with science and technology?” • “Will the proposed activities lead to partnerships between academia, industry, and others?” • “Does the proposed activity enhance the infrastructure for research and education?” <p>AND/OR could the program provide additional guidance on the review process for Broader Impacts, perhaps providing examples of useful reviews?</p>	
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments: Individual reviewers vary in giving substantive comments with constructive suggestions for improving the proposal and explanations of their ratings/assessments. However, the vast majority of reviewers do provide substantive comments.</p> <p>Recommendation: Could a question for reviewers be added that would explicitly state what changes to the proposal would be necessary for the reviewer to provide a higher rating?</p>	YES
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: The panel summaries were not nearly as helpful or complete as the Program Officer’s Review Analysis. Some panel summaries were quite short/superficial and lacked sufficient detail. The Review Analysis consistently provided stronger rationale for decisions.</p> <p>Recommendation: Would it be possible to provide panel members with sample panel summaries (or better yet, sample Review Analyses), so that they have a better idea of</p>	YES

what should go in them? We recommend that the PO Review Analysis be shared with the PI as a Program Officer Comment.	
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: The documentation in the jacket does provide the rationale for the award/decline decision. All elements are present. The Panel Summary and the Program Officer Review Analysis provide the clearest rationale for the award/decline decision.</p>	YES
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments: The documentation provided to the PI provides a rationale based on the reviews and panel summaries. In some cases, emails and phone calls are documented as evidence of additional discussion with the PIs.</p> <p>Recommendation: Provide the Program Officer's Review Analysis as a Program Officer Comment in FastLane to provide the PI with additional information on the discussion and outcome.</p>	YES
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>The NSF review process is complex, transparent, and fair.</p>	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments:</p>	YES

<p>Yes, the PO contacts a wide variety of reviewers, selecting from names provided by the PI (if provided), names cited in the proposal, and names from his list of reviewers and funded PIs. He does an excellent job of finding reviewers who have appropriate expertise for the particular theory/methods/case studies presented in the proposals. It is surprising how many reviewers do not respond to requests to review or decline to review.</p>	
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: The program resolves conflicts of interest in a variety of ways. Individuals with known COI are not asked to serve as ad hoc reviewers. Reviews from individuals later identified as having COI are not considered by the panel. COI within the panel members are handled by excusing the individual with the COI, including the PO, from the room during deliberations. All of these are effective methods of resolving COI.</p>	<p>YES</p>
<p>3. Additional comments on reviewer selection:</p> <p>A previous study identified issues with females applying for funding in archaeology. Females submit grant proposals to NSF in Archaeology at a much lower rate than their male counterparts, although their rates of successful funding are equivalent. To monitor possible bias in reviews, we considered the sex of the PI, co-PI, and reviewers within the sample of proposals that were provided. The data do not show any clear patterns relating outcome to female versus male reviewers, or same sex PI/Reviewer. There are consistently more male reviewers than female reviewers, although this is likely to change as the demographics of the profession have undergone a shift to many more female graduate students than male graduate students.</p> <p>A question also arose in the COV concerning whether having more reviewers reduced the chances of an award. To examine this for Archaeology, we used the sample provided for two competitions: Senior Archaeology and DDRI. While declined proposals do have slightly more reviewers on average than awarded proposals, the differences are small and not significant, at least for the sample of proposals provided.</p> <p>Recommendation: The program should collect data on DDRI co-PI demographics, both because training is an important part of Broader Impacts and because it makes it possible to monitor possible bias.</p>	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW

1. Management of the program.

Comments:

The PO manages this program effectively. Panel composition (topical slots and people filling them), selection of reviewers, management of both real and virtual panel meetings, analysis of reviews and panel deliberation results, communication of results to PIs all seem well organized and executed.

Recommendation: The PO for Archaeology has handled 1069 proposals in the last four years. We recommend that NSF hire a second Program Officer. John Yellen cannot stay in this position forever, and it is critical that he train a replacement to follow his excellent practices and carry them into the future. We recommend a permanent person in that position instead of a rotator, because the other anthropology programs have permanent POs, and the program needs someone who would bring the same stability to the program that John Yellen has.

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

The program is responsive to emerging research and educational opportunities. The turnover in panel members helps keep the research directions emergent as the profession evolves.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

There are four competitions in the Archaeology Program: Senior Archaeology, Archaeometry, DDRI, and High Risk. This is a diverse portfolio. We feel that the emphasis on dissertation improvement grants is particularly important because graduate students in archaeology must conduct field or laboratory research independent of their PIs and the DDRI budget is a relatively small portion of the total budget with significant positive payoff. Reviewing DDRIs costs less than reviewing a senior grant, because there is no panel involved. The DDRI funding is also effective in number of publications for dollar spent, getting the most from dissertations, and the co-PIs learn how to become senior PIs through the process. It thus impacts the students as well as the profession. The Archaeology Program approach of reviewing using ad hoc reviewers without a panel for DDRIs is appropriate in a profession in which so many proposals are highly specialized.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

The PO responded appropriately to the recommendations and comments of the previous COV.

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: The program portfolio appropriately reflects the global scope and deep timeframe of archaeology. Research is conducted internationally and in the US. The majority of projects fit well within the core of archaeological research. Some cross interdisciplinary boundaries and are co-funded by two programs.</p>	YES
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: Generally speaking, PIs engaged in field work will often want longer-term financial commitments than the archaeology program can offer. But this is not a critical constraint. More money would allow more projects to be funded at higher levels, but those concerns must trade-off against constraints at the program and division levels.</p>	YES
<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments: It would have been helpful to break down the geographical data by state populations and number of R1 institutions. But overall, it appears that the geographical distribution of PIs and types of institutions reflects the distribution of archaeological expertise in the U.S.</p>	DATA NOT FULLY AVAILABLE

<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments: The portfolio reflects the diversity of the profession, which is not currently very diverse. The profession is undergoing a change and should become more diverse over the next decade. The Archaeology program has made investments in increasing diversity in the profession, including supporting scholarships for Native American students through the Society for American Archaeology. New investigators have lower success rates compared to those who have previous NSF-funded projects. Graduate students and junior faculty often lack equal access to information on grant-writing strategies. For instance, many R1 universities have proposal writing courses geared toward writing dissertation proposals in NSF format. The Society for American Archaeology is trying to provide mentoring and guidance for graduate students from universities that lack courses in proposal writing or where faculty lack experience in DDRI proposal preparation.</p> <p>Recommendation: Create a website bank for course materials from Proposal Writing courses, perhaps in collaboration with the Society for American Archaeology (SAA), to make these materials accessible to faculty and graduate students at institutions that lack Proposal Writing courses. Encourage workshops (and perhaps have PO attend) at the SAA meetings for faculty writing their first NSF proposals.</p> <p>Also: collect data on the outcomes of Native American students who have received the NSF-funded awards from the Society for American Archaeology over the past decade.</p>	<p>YES</p>
<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <p>Technical advances in genetics, isotope chemistry, remote sensing and other areas offer significant opportunities to enhance research outcomes in archaeology, but archaeologists often lack sufficient familiarity with these developments or their proponents in other disciplines to explore and apply them effectively.</p> <p>Recommendation: NSF Archaeology might be alert to ways of improving this situation, say by facilitating/funding the organization of cross-disciplinary workshops, conference presentations, seminars, or extended laboratory visits designed to improve communication across different lines of inquiry. We recommend that the Archaeometry competition serve as the venue for such facilitation.</p>	<p>YES</p>

V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

DIVISION LEVEL DISCUSSION

1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?

BCS covers a variety of disciplines. It is critical that the balance and significance of these disciplines continue to be respected. Surprising results emerge through interdisciplinary research; for instance, recent isotopic analysis of archaeological faunal collections provide strong (and unexpected) evidence of changing riverine ecology over centuries in the U.S. Southwest of importance to biologists. Our point is that every discipline in BCS is important. In collaboration with other disciplines, archaeology could make a difference in how policies regarding land and habitat are implemented, including fire management, land management, and water management. Archaeology offers a view of the long-term for virtually any issues of interest at NSF.

At a broader scale, the human story is one of migration (as shown by aDNA research) and response to climate change. Understanding and recognizing long-term change and the socially-significant processes that prompt change are critical to a deep appreciation of fundamental processes that continue today. Cross-disciplinary initiatives, both within the BCS Division and across multiple Directorates (such as Biology) within NSF, would permit research that provides insights into the interactions between human behavior and the environmental contexts within which they occur.

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

The Archaeology program has been pro-active in supporting open access, particularly through supporting tDAR (The Digital Archaeological Record, an open access repository for archaeological materials). The required data management plan has forced applicants to make plans to curate their data. The Society for American Archaeology provides strong guidance on data management. We do not have any further recommendations. Not all archaeological data should be made public; for instance, the National Park Service does not allow information on site locations to be put in publications or maps in order to protect the resources from looting. So, NSF should consider open access carefully, evaluating level of data access for projects on a case-by-case basis.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

NSF provides updates on funding opportunities for any investigator who signs up for alerts. Unless BCS had a separate web presence explaining funding opportunities, it seems that information on programs is already

available. Having material similar to that described by the DEL (Documenting Endangered Languages) program would be useful (video modules and other outreach materials).

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

We provide some suggestions for improvement above. We reiterate the necessity of providing a second program officer for Archaeology to ensure the maintenance of institutional knowledge and a seamless transition. Archaeology is a complex program run with great care and insight by John Yellen for the last four decades. While John Yellen has no plans to retire, a period of overlap and training for a new PO will provide continuity for his procedures.

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

We have not identified any additional performance issues.

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

We provide some suggestions above.

4. Please provide comments on any other issues the COV feels are relevant.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

The Committee of Visitors is part of a Federal advisory committee. The function of Federal advisory committees is advisory only. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the Advisory Committee, and do not necessarily reflect the views of the National Science Foundation.

SIGNATURE BLOCK:

/s/ Patricia L. Crown

/s/ James O'Connell

For the Archaeology Program

Biological Anthropology Program – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>N.B. In the following, the COV highlights recommendations in <i>bold and italic</i> font. We do the same for policies currently in place that we endorse and deem important for the continued success of the Biological Anthropology Program.</p> <p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments: The Biological Anthropology program employs a panel, whose members use their reviews and those by ad hoc reviewers to evaluate proposals submitted by senior researchers. This panel also reviews proposals submitted for: 1) CAREER; 2) Research Experience for Undergraduates (REU); 3) Research in Undergraduate Institutions (RUI); 4) SBE-UKRI Lead Agency Agreement; and 5) SBE Robust and Reliable Research grants. A separate panel of reviewers is convened to assess Doctoral Dissertation Research Improvement grants (DDRIG) submitted by graduate students. Panelists assembled to review Senior or DDRIG proposals also review Forensic Science proposals.</p> <p>During FY 2015 - 2018, the Biological Anthropology program also considered several other types of proposals reviewed in different ways. The Program Officer (hereafter PO) alone reviewed four types of proposals, including: 1) Rapid Response Research Grants (RAPID); 2) Early-concept Grants for Exploratory Research (EAGER); 3) Conferences (Workshops); 4) Research Advanced by Interdisciplinary Science and Engineering (RAISE). Finally, the PO solicited ad hoc reviewers to assess High Risk Research in Biological Anthropology and Archaeology (HRRBAA) proposals and convened a separate one-time panel to evaluate Integrative Paleoanthropology Grants (IPG).</p> <p>Convening a panel of experts, who consider their reviews and those submitted by ad hoc reviewers to evaluate proposals, has been employed by the Biological Anthropology program for many years. The COV is aware that other programs in BCS have implemented other ways to assess proposals, including conducting them virtually. Our discussions with the PO in Biological Anthropology indicate that there are several advantages to virtual panels. First, it is sometimes difficult to obtain individuals to</p>	<p>YES</p>

agree to travel to attend panel meetings. Virtual panels increase the pool of qualified reviewers who can serve, which in turn gives the PO the ability to acquire the best possible reviews for a given set of proposals. Second, the COV notes that reviews submitted by panelists and ad hoc reviewers are generally concordant. Most proposals that warrant funding are easy to identify in the sample that has been made available, and discussions between panelists regarding how to resolve funding decisions for proposals that receive conflicting reviews can be accomplished online as well as during face-to-face meetings. Third, the COV takes seriously a recommendation made later in this report (see Part V. Questions for Division Level Discussion. Question 1) that the Division of BCS needs to prioritize research on climate change. In this context, virtual panels will decrease the environmental impact that panelist travel creates. Finally, there is an automatic cost savings associated with conducting panels online.

Recommendation: The preceding considerations lead the COV to suggest that the PO carefully weigh the pros and cons of holding virtual panel meetings instead of panel meetings at the NSF in Virginia.

The Biological Anthropology Program employs a panel of 12 - 17 individuals to evaluate Doctoral Dissertation Research Improvement Grants. Members of the panel provide three reviews for each proposal and then meet in person or in some rare cases virtually to determine awards. The PO solicits ad hoc reviews from individuals when panelists do not have the requisite expertise to evaluate applications, but this seldom occurs. ***While some members of the research community have voiced concerns in the past regarding the efficacy of panelists alone to evaluate DDRIGs, the COV supports the system currently in place.*** Based on our review of the proposals made available to us, panelists furnish reviews that permit them to make informed decisions on awards.

During FY 2015 – 2018 the PO instituted a limit on the number of times students can submit a proposal for consideration. This too has generated some unease in the biological anthropology research community. The restriction, however, has resulted in fewer and more carefully crafted proposals. ***As a consequence, the COV supports the PO's policy of limiting the number of times students can submit proposals.***

As noted above, the PO alone evaluates some types of proposals, such as RAPIDs and Workshops. The COV was given access to a small sample of awards made to these types of proposals during the past four years. Our review indicates that the PO assesses the proposals thoroughly, and we do not question her ability or judgement to make award decisions on these.

The PO solicited ad hoc reviews and used those by themselves to assess some types of proposals, e.g., HRRBAA proposals. The COV reviewed a few of these types of proposals and found that the submitted reviews were complete and contained enough details for the PO to award or decline funding.

The COV was provided several senior and DDRIG proposals that were funded and declined. In contrast, there were some types of proposals, e.g., REUs, RUIs, and IPGs,

<p>that were not included in the furnished sample. The COV is unable to comment on the review process for these types of proposals.</p>	
<p>2. Are both merit review criteria addressed</p> <ul style="list-style-type: none"> a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? <p>Comments:</p> <p>Individual reviews Panelists and ad hoc reviewers address both merit review criteria in their individual reviews. Assessments of the Intellectual Merit of proposals tend to dominate most reviews, with reviewers typically providing comments on conceptual issues and critiquing proposed methods. How research projects promise to advance knowledge in their own and other fields, however, is not always addressed. Evaluations of the Broader Impacts of projects are consistently furnished, but they tend to be succinct. Sometimes comments regarding Broader Impacts only mention that the project is adequate or inadequate in this regard.</p> <p>a) Panel summaries The panel summaries address both merit criteria. They contain separate sections summarizing the strengths and weaknesses of the Intellectual Merit and Broader Impacts of each proposal. Panel summaries vary in the breadth and level of detail provided, but in general, the summaries furnish an adequate synthesis of the panels' decisions.</p> <p>b) Program Officer Review Analyses Most review analyses address both merit criteria in a substantial and constructive way. The review analyses faithfully reflected the panel summaries, and also furnish a synthetic overview of how projects were evaluated according to the Intellectual Merit and Broader Impacts criteria. The COV notes that there was variation in the sample of review analyses. Some written at the start of the four-year period under review by the previous rotating PO did not always comment on how projects addressed the NSF's merit criteria.</p>	<p>YES, mostly</p>
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments:</p> <p>As noted in response to the previous question, there is variation in the level of detail provided by reviewers in the sample of proposals that was made available to the COV. While some panelists and ad hoc reviewers furnish detailed comments and constructive feedback and criticism to PIs, others submit short statements that lack such details. Despite this variation, taken together the reviews typically provide sufficient information for panelists and the PO to make informed decisions whether to fund or decline proposals.</p>	<p>YES/ NO</p>

<p>Recommendation: The PO can monitor reviews as they are submitted as one possible means to reduce the variation in their quality. Here the COV suggests that if short and uninformative reviews are submitted, the PO should contact the reviewer and ask them to elaborate, specifically highlighting the strengths and weaknesses of the proposal with respect to the two merit criteria.</p>	
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: Panel summaries start with a context statement prepared by the PO providing details about the number of proposals considered by panelists, the review process, and how proposals fared with respect to 3 categories: Competitive A; Competitive B; and Not Competitive. Panel summaries continue with additional information about how proposals address the NSF’s two merit criteria, Intellectual Merit and Broader Impacts. Comments on the strengths, weaknesses, and transformative potential of proposals are typically furnished. Summaries conclude with an assessment of the Data Management Plan and a synthesis of the panel’s evaluation.</p> <p>Some proposals provided to the COV received conflicting reviews. These obtained high or low evaluations that represented outliers departing from the general consensus reached by the other reviews. Some of the proposals were funded while others were declined. Despite the detail provided in the panel summaries, they do not always make clear how panels made decisions on proposals that obtained mixed reviews. The PO sometimes addressed how “outlier” reviews, either positive or negative, were taken into consideration when making her final recommendations in her review analyses, but this was not always done.</p> <p>Recommendation: PIs whose proposals receive conflicting reviews and are subsequently not funded require information regarding how these reviews were reconciled and why a negative decision was reached. The COV recommends that this issue be explicitly addressed in future panel summaries.</p>	<p>YES/NO</p>
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: The documentation provided in eJacket is complete, making it easy to follow how decisions were made to award or decline funding proposals. The history of the review process for each proposal is clear, with individual reviews, the PO’s review analysis, and communication regarding proposals before and after recommendations to award or decline funding. The COV commends the transparent nature of the process and the information made available via eJacket.</p>	<p>YES</p>

<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments: As noted above in response to question 4 [Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached?)], panel summaries provide detailed information, reviewing the panel’s assessment of the strengths and weaknesses of proposals. Thus, for the most part, PIs are given a clear indication of why their proposals were awarded or declined. But as we note above in response to the same question, a few proposals received conflicting reviews from panelists and ad hoc reviewers. How these conflicting reviews were ultimately resolved is not obvious.</p>	<p>YES, mostly</p>
<p>7. Additional comments on the quality and effectiveness of the program’s use of merit review process:</p> <p>During general conversations with other COV members, who were reviewing other BCS programs, considerable discussion ensued regarding the nature of the Broader Impacts criterion and how to review this component of NSF proposals.</p> <p>Biological anthropologists have a long and successful history of conducting research that contributes to society, thus fulfilling the Broader Impacts criterion. Many biological anthropologists conduct research overseas in low- and middle-income countries, which provide additional opportunities to contribute abroad as well as domestically. PIs who submit proposals to the Biological Anthropology Program consistently address this NSF criterion in substantive ways, and as noted above, panelists and ad hoc reviewers typically furnish comments in their reviews about this aspect of projects.</p> <p>To ensure that the NSF and the Division of BCS are aware of the array of activities biological anthropologists perform to fulfill the Broader Impacts criterion, we provide a non-exhaustive list below.</p> <p><u>Scientific communication and outreach</u></p> <ul style="list-style-type: none"> • Public and K-12 outreach activities domestically and abroad in host countries where field research is conducted, e.g., school talks, museum talks, participating in school science fairs, developing curricula for local schools. • Communicate scientific findings through blogs and podcasts • Present scientific results in formats useful to broad audiences, e.g., via television documentaries and radio interviews <p><u>Broaden Participation of Underrepresented Groups</u></p> <ul style="list-style-type: none"> • Train students from underrepresented groups, including foreign students at field research sites • Train and collaborate with postdoctoral researchers in foreign countries 	

<ul style="list-style-type: none"> • The IDEAS program: Increasing Diversity in Evolutionary Anthropological Sciences, an NSF-funded program of the American Association of Physical Anthropologists, is an initiative that addresses training, mentoring, and public outreach to increase the involvement of underrepresented groups in biological anthropology. <p><u>Enhance infrastructure for research and education</u></p> <ul style="list-style-type: none"> • Partnerships between the academy and other organizations, e.g., industry and foundations • Building schools in remote areas overseas where educational opportunities are limited • Maintain, operate, and modernize shared research infrastructure at foreign research sites and host countries <p><u>Direct contributions to the local economies of low- and middle-income countries</u></p> <ul style="list-style-type: none"> • Hiring local research assistants to conduct overseas fieldwork • Training undergraduate and graduate students at foreign research sites bringing hard currency into the local economy through spending at local markets and retail outlets <p><u>Conservation</u></p> <ul style="list-style-type: none"> • Developing conservation management plans for endangered primates and helping to implement the plans to ensure that the animals are preserved <p><u>Outcomes of research that have clear public health implications</u></p> <ul style="list-style-type: none"> • Findings that contribute to our understanding of human bone, physiology, and genetics. • Sharing research results with medical professionals overseas to help improve human health and public health practices in local communities. 	
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II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: The PO selects panelists to consider senior proposals and solicits additional ad hoc reviewers to evaluate them. The PO also assembles a panel of experts to evaluate Doctoral Dissertation Research Improvement grants. These tasks are difficult because research in biological anthropology covers several different areas of study. The</p>	YES

<p>collaborative nature of the field also creates many Conflicts of Interest between individuals and reduces the pool of potential panelists and reviewers. Despite these difficulties, the new permanent PO of the Biological Anthropology program has done an excellent job bringing together panelists with relevant expertise across the entire field of inquiry to assess senior and DDRIG proposals. The PO also solicits ad hoc reviews from others in the research community to aid panelists. Ad hoc reviewers are selected with the same care as panelists and typically have sufficient experience to furnish informed and critical reviews.</p> <p><i>While we do not question the qualifications of panelists or ad hoc reviewers, we note a few concerns regarding the selection of reviewers in question 3 below.</i></p> <p>The PO considers the selection of panelists and ad hoc reviewers to be one of the most important parts of her job. She works hard to keep abreast of recent developments in the field to identify individuals capable of providing rigorous reviews. The PO, however, indicates that it has been difficult sometimes to obtain reviews in a timely fashion. The COV recognizes this is a problem that plagues the peer-review process, but does not have a recommendation to solve this problem.</p>	
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: The new permanent PO clearly flagged conflicts of interest that arose for panelists, reviewers, and the PO herself in the sample of proposals provided to the COV. Such conflicts were resolved in the appropriate manner following NSF guidelines. Individuals with conflicts of interest did not play any role in evaluating proposals. The degree to which similar steps were taken before the current PO assumed her position is not clear as relevant information is not provided in review analyses nor panel summaries.</p>	<p>YES</p>
<p>3. Additional comments on reviewer selection:</p> <p>The COV is concerned about the crisis in peer review that has plagued the research community for many years. Because of this, the COV conducted an analysis of the senior research proposals that were made available.</p> <p>The senior research proposals were reviewed by an average of 3.86 reviewers (SD = 1.67, median 3, range 3 – 10). The number of reviewers of proposals that were funded (mean = 4.21; SD = 1.56) did not differ from the number of reviewers of proposals that were declined (mean = 4.25; SD = 0.80). Because two panelists typically review each proposal, the number of ad hoc reviewers for proposals that were funded and declined did not differ.</p> <p>The PO has indicated that obtaining ad hoc reviewers has not generally been a problem, and our review confirms this. Two to eight individuals were solicited to review each proposal, and these solicitations resulted in over half responding positively and providing reviews (64%). The number who did so for funded proposals (63%) did not</p>	

<p>differ from the response rate of individuals who reviewed proposals that were declined (66%).</p> <p>While the preceding analysis indicates a lack of bias, a non-trivial number of proposals (25%) were reviewed by the minimum number of reviewers (3) required by the NSF. Many proposals that were funded (41%) had only 1 ad hoc review. In contrast, the proposals that failed to obtain funding were more likely to have more reviews, with only 14% reviewed by a single ad hoc reviewer in addition to 2 panelists.</p> <p><i>Recommendation: The findings outlined here lead the COV to recommend that steps be taken in the future to ensure that a similar number of ad hoc reviews are obtained for all proposals. This will reduce potential bias due to some proposals evaluated by more reviewers than others. We suggest that, for senior research proposals, a minimum of two ad hoc reviews in addition to the two provided by panelists be acquired if possible.</i></p>	
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III. Questions concerning the management of the program under review. Please comment on the following:

<p>MANAGEMENT OF THE PROGRAM UNDER REVIEW</p>
<p>1. Management of the program.</p> <p>Comments:</p> <p>The Biological Anthropology program has been led in the past by a series of temporary program officers serving as rotators. In response to a recommendation made by the 2015 COV, the NSF appointed a permanent PO to direct the program in April 2016. The COV believes that this has been a positive step that has helped to improve the Biological Anthropology program at the NSF.</p> <p>The new permanent PO has done an excellent job managing the program with very limited resources. During FY 2015 – 2018, the number of proposals submitted by senior researchers considered by the program was less than the average number of proposals reviewed by 9 other programs in BCS during the same 4-year period, but the success rate of proposals in Biological Anthropology did not differ from the success rate of proposals considered by other BCS programs.</p> <p>Biological Anthropology continues to be poorly funded with expenditures that fall in the bottom fifth or 20th percentile of 10 programs in BCS (Science and Learning excluded because of only 2 years of data). Despite this constraint, the PO has continued to make a sufficient number of awards by reducing the budgets of projects. Limiting requests for summer salary has been one mechanism employed to fund projects at rates on par with other programs in BCS.</p>

The COV believes that researchers require enough funds so that they can carry out their work successfully. The average size of awards in Biological Anthropology is not excessive (mean = \$89,191 / year), and in fact, is low compared to other programs in BCS (average = \$103,745 / year, n = 10 programs). In sum, the PO has achieved a balance between award size and number of awards.

Recommendation: Based on the preceding considerations, the COV recommends that the PO continue to award grants at their current, if not higher, levels if funds become available to do so.

Some other programs in BCS and other Divisions at the NSF operate with more than one individual serving as Co-PO's. The current PO of the Biological Anthropology Program works alone in her position and has limited time to pursue some matters that require attention. Two issues concern how to connect with the biological anthropology research community to keep informed about recent developments in the discipline and how to articulate the value of research in biological anthropology effectively to the public as well as to the NSF.

Recommendation: The PO has considered inviting visiting experts for short periods to help with these matters, and the COV endorses this suggestion. Specifically, a visiting expert could assist the PO liaise with the biological anthropology community to ensure that she is aware of emerging areas of research. A visitor could also support media and outreach efforts to help inform the public about recent research in biological anthropology.

The COV notes that the PO attends the annual meetings of the American Association of Physical Anthropologists (AAPA) every year. This is the primary professional organization of biological anthropologists in the nation. The PO maintains an active presence at these meetings, where she participates in a workshop with other funding agencies to provide advice for researchers about how to apply for NSF funds and meets with individual researchers to discuss potential funding opportunities. The PO has also organized workshops to address issues of concern to members of the AAPA. For example, she led a workshop to explain the Broader Impacts criterion of the NSF in 2019.

Recommendation: The COV commends the work the PO performs at the AAPA meetings and encourages her to continue doing so. The COV also urges the PO to engage the AAPA leadership and members and seek their help with the two matters discussed above. For example, the AAPA is in the process of forming a Media and Communication committee, and this committee can be used to help the PO engage the public and highlight research in biological anthropology.

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

Biological anthropology covers many different types of research and is a rapidly changing field as novel technologies provide new ways to examine old problems. This makes it challenging for a single person to keep informed of emerging areas of research. The problem is exacerbated for POs, who are siloed at NSF headquarters, and not typically surrounded by colleagues at an R1 institution. The same can be said of keeping track of new education opportunities because NSF POs, for the most part, do not teach.

The new permanent PO for Biological Anthropology recognizes these problems and works hard to keep abreast of emerging research and education opportunities.

Recommendation: To facilitate her ability to do so, the COV recommends that the PO hold regularly scheduled virtual "office hours," say once every two weeks or as frequently as possible, with members of

the biological anthropology research community. These would involve times that she makes herself available for web-based video conference meetings with individuals interested in learning more about research funding possibilities at the NSF. While this will provide a valuable service to researchers interested in applying for funding, an added benefit is that these sessions can be used by the PO as an opportunity to learn about new research and education initiatives.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

Three features characterize the Biological Anthropology Program portfolio. First, the program supports many different types of projects, including: a) research by senior investigators, pre-tenure faculty (CAREER), and undergraduate students (REU); b) high risk research (HRRBAA); c) work that is time-sensitive (RAPID); and d) workshops, to name a few. Second, the program provides funds for projects that span a diversity of topics, a fact acknowledged by other POs at the NSF. Third, the program continues to fund graduate student research by making awards through its Doctoral Dissertation Research Improvement Grants. The Biological Anthropology PO remains committed to supporting an array of proposal types, the different kinds of research conducted in the field, as well as research conducted by graduate students. ***The COV endorses the PO's efforts in these regards, but singles out the program's abiding commitment to graduate student research. Biological anthropologists have a long tradition of training graduate students to conduct their own independent research, and the DDRIG program has provided the mechanism to carry this out for many years. Leaders in the discipline can often trace the start of their research careers back to the receipt of a DDRIG, and the program has contributed in a singularly important way to the development of the field.***

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

The 2015 COV made several recommendations, and the PO has carefully considered and responded to each one, addressing concerns that were raised to the extent possible. The 2015 COV made 19 specific recommendations on the four parts of the review: Quality and effectiveness of the merit review process (7); Selection of reviewers (4); Management of the program (2); and Questions about the portfolio (6). We refrain from commenting on how the PO has addressed all 19 recommendations, and instead limit our comments to some of most important issues raised by the prior COV and the PO's response.

Quality and effectiveness of the merit review process and selection of reviewers

The 2015 COV noted that the prior 8-month review cycle for considering proposals created many problems for the biological anthropology scientific community and recommended that the program revert back to a 6-month cycle. This recommendation was implemented in 2016. The biological anthropology research community has responded positively. With consistent due dates, the number of submitted proposals has increased.

The prior COV was especially concerned with implicit bias in the review process. The PO has addressed this matter. She discusses the issue of implicit bias with panel members before each meeting, has added information on the topic to the ad hoc review system, and is making a concerted effort to recruit female, minority, and junior researchers to senior and DDRIG panels and as ad hoc reviewers.

Management of the program under review

The 2015 COV raised concerns about the Biological Anthropology program budget. The PO has worked hard to increase the budget and was able to obtain a significant increase in funding for the core budget in 2017. The PO continues to fund projects at a relatively high rate given limited funds and has done an admirable job managing the program given fiscal constraints.

Questions about portfolio

The 2015 COV made several recommendations, including urging the PO to invite researchers from underrepresented groups, EPSCoR states, non R1 institutions, and women. The current COV understands the motivations underlying these past recommendations, and we too make relevant comments regarding these issues in Part IV of this report (see Questions 3 and 4). Here we note that any recommendations that are made must be based on good data. As noted below in Part IV, these data do not always exist.

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: The discipline of biological anthropology is extremely broad, as research includes all aspects of the biology of humans past and present, including studies of our closest living relatives, the nonhuman primates. During FY 2015 – 2018, the number of submissions and awards did not vary dramatically across the subfields of inquiry in biological anthropology, with some exceptions. The number of primate behavior DDRIG submissions was high, but the number of primate behavior proposals that were funded did not deviate from the number of awards in other subfields.</p> <p>As was the case in the prior 2015 COV review, bioarchaeology proposals have continued to fare poorly. The PO notes that these applications are frequently descriptive and not hypothesis driven. The PO and her counterpart in Archaeology are taking steps to reach out to the bioarchaeology research community to address and rectify this issue. These are welcome actions and the COV commends the POs for their work in this regard. Proposals focusing on the human brain have also received relatively low funding rates in both senior and DDRIG competitions. The COV finds this curious, especially in light of the cutting-edge nature of neuroscience research.</p>	<p>YES but DATA NOT AVAILABLE FOR SOME QUESTIONS</p>

<p>Research conducted on human and primate genetics have been funded at relatively high rates. The PO suggests that this may be due to rapid advances in the field, which have allowed PIs to address old questions in new ways.</p> <p>While the preceding summary provides an overview of the kinds of research supported by the Biological Anthropology Program during FY 2015 – 2018, it is impossible to evaluate whether the awards represent an “appropriate balance” across the discipline because we lack good data on the number of researchers who conduct research in different subfields of investigation.</p>	
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments:</p> <p>The average annual award size of the projects funded by the Biological Anthropology program during FY 2015 – 2018 was \$89,191. These projects were funded for 2.78 years on average. These figures do not differ appreciably from the average award size (\$103,745) and duration of awards (3 years) in the other programs in BCS. Despite these similar figures between the Biological Anthropology Program and other Programs in BCS, research in biological anthropology increasingly utilizes emerging scientific technologies, including ancient DNA, high-throughput genome sequencing, computer tomography scans, assays to profile the microbiome, and cutting-edge neurobiological procedures, such as culturing organoids. These technologies are expensive and seldom can be accommodated in the budgets of projects submitted to the Biological Anthropology Program with its limited funds.</p> <p>One way to meet this challenge is to have more proposals submitted to the Biological Anthropology Program co-reviewed by other Programs in BCS and the Directorate of Biological Sciences at the NSF. The latter is appropriate because research in biological anthropology seeks to understand humans as a biological animal in much the same way biologists seek answers to questions about other animals. We note that the Biological Anthropology Program contributed substantial funds to projects in other programs via co-review and co-funding during FY 2015 -2018, but that incoming funds to Biological Anthropology through co-review and co-funding did not come close to matching this amount.</p> <p><i>Recommendation: These considerations lead the COV to recommend that the PO needs to work harder with other programs to co-review proposals submitted to the Biological Anthropology Program and to achieve a better balance between the amount of funds coming in and going out via co-review and co-funding.</i></p> <p>As noted above, the Biological Anthropology Program budget is not commensurate with other programs in BCS, a fact underscored in the PO’s updated response to the 2015 COV report:</p> <p>“The Biological Anthropology core budget continues to lag behind most other programs in the Division, including Archaeology. There are many factors to consider in terms of overall funding levels, including but not limited to: the size of</p>	<p>YES</p>

<p>the research community, the output of that community, <i>and the relative importance of that research area to NSF and the public.</i>" (emphasis added)</p> <p>The COV concurs with the PO that research recognized as important by scientists and the public deserves to be prioritized by the NSF. We note, however, that the budget of the Biological Anthropology program does not reflect scientific and public interest in the discipline and how this interest results in improving scientific literacy, fulfilling the Broader Impacts criterion of the NSF.</p> <p>As one measure of that interest, the COV conducted a review of all stories published by <i>Science News</i>, the popular media outlet of <i>Science</i> magazine and the American Association for the Advancement of Science, in July 2019. This month was selected because it was the first full month of stories published by <i>Science News</i> after materials for this review were made available to the COV by the NSF. We counted 94 stories, excluding podcasts, published during July 2019, 9 of which or about 10% cover research in biological anthropology.</p> <p>As the preceding data indicate, research in biological anthropology generates considerable interest. Scientists and non-scientists alike find enduring questions in the study of biological anthropology, including who we are and how we came to be the way we are, fascinating, compelling, and significant.</p> <p><i>Recommendation: The COV acknowledges that funds are not likely to be available to increase the Biological Anthropology core budget. The COV nonetheless urges the NSF to consider seriously the issue raised here as it plans for the future.</i></p>	
<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments: Grants are primarily submitted from PIs in states that support institutions that have large and active research programs in biological anthropology. During FY 2015 – 2018, awards were made to states in proportion to the number of submissions. In the Biological Anthropology State of the Program document, the PO indicates that an attempt is made to prioritize meritorious proposals from states with a low number of awards and EPSCoR states, but the number of proposals involved is not specified, so it is difficult to evaluate these efforts. Most awards have been made to R1 and PhD institutions. This is expected, but again, the lack of data regarding the number of submissions from different types of institutions makes it impossible to assess whether bias exists.</p> <p><i>Recommendation: Based on these findings, the COV recommends that specific data regarding awards made to EPSCoR states and the number of submissions from R1 and other types of institutions be made available to future COV members.</i></p>	<p>Data Not Available</p>

<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments: New investigators submitted 40% of all proposals to the Biological Anthropology program during the period under review. A 2014 survey of the American Association of Physical Anthropologists (AAPA), the leading professional organization of biological anthropologists in the United States, revealed that Assistant Professors composed 30% of the respondents who held tenure-track positions (n = 169 respondents). Assuming that PIs submit their first proposals to the NSF as an Assistant Professor, these data indicate that the Biological Anthropology program has done a good job soliciting applications from new investigators. During FY 2015 – 2018, the success rate for new investigators was slightly lower than that of PIs who had submitted proposals before. Despite this difference, the success rates of new and prior investigators did not deviate appreciably from the overall success rates of submissions during FY 2015 – 2018.</p> <p>The same 2014 AAPA survey, mentioned above, indicated that most AAPA members are female (62% = 236 of 379 respondents). However, although there are more women than men working professionally in the field of biological anthropology, during the period under COV review, women and men submitted a similar number of proposals. Women were funded at slightly higher rates than men, but the overall funding rates for women and men did not differ substantially.</p> <p>Underrepresented groups are poorly represented in biological anthropology. The 2014 AAPA survey, which may provide the best information about this matter, found that only 1% of AAPA members self-identified as African American, while 4% identified as Hispanic. Given these figures, the extremely low number of submissions by and awards made to African American and Hispanic researchers in biological anthropology are not surprising. Nevertheless, proposals submitted by African Americans had a relatively low success rate.</p> <p><i>Recommendation: Based on these findings, the COV recommends that steps be taken to encourage more grant applications from women to match their representation in the field, and to address the low funding rates of proposals submitted by African Americans.</i></p>	<p>YES/ NO</p>
<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <p>Research in biological anthropology often involves questions that can only be answered through longitudinal, long-term research. Because the human and nonhuman primate subjects of biological anthropological research live a very long time, projects that explore biological, behavioral, and demographic changes in</p>	

populations typically require following individuals over many years, if not decades. Such long-term research requires long-term investment and funds.

The Biological Anthropology Program has supported long-term research projects for many years, but not in a consistent fashion similar to the NSF's Division of Environmental Biology's Long-term Research in Environmental Biology (LTREB) program.

Recommendation: As more long-term research sites in biological anthropology are starting to reveal unique and surprising insights into the human condition the value of such research has become abundantly clear. As a consequence, the COV reiterates a recommendation made by the 2015 COV and urges the Biological Anthropology Program to seriously consider establishing a separate funding mechanism to support longitudinal research in the discipline.

V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

DIVISION LEVEL DISCUSSION

1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?

One important issue that cuts across SBE disciplines is the mining of big data, i.e. the analysis of datasets that are too large to be managed by traditional software. Data science has become a field of its own, and it is likely to continue to grow rapidly. Examples of this are machine learning and coding strategies that are applied to predict human behavior, e.g. related to consumers, politics, and health.

Research conducted in BCS programs typically deal with much smaller datasets, and it may seem that this data revolution is beyond the purview of the Division. We suggest, however, that research in BCS disciplines is uniquely equipped to complement work in data science in synergistic ways. BCS disciplines can provide the "thick" data for the data revolution. Sociocultural anthropology and social psychology, for example, can provide a much-needed contextual framework to understand results produced through the analysis of big data. A program/initiative that fosters a productive dialog between these two levels of inquiry has the potential to be transformative.

Two other major issues that require attention from BCS as well as the entire NSF relate to climate change and scientific illiteracy in the United States. Climate change represents an existential threat to humanity and the entire planet. Very little, if anything, is being done to address it. Despite the NSF's motto that it represents a place "where discoveries begin," those discoveries are falling on deaf ears because we as scientists have not communicated effectively about what we do, its significance, and why. This has led to the rise of a large

segment of the population failing to believe in science. There are climate change deniers, anti-vaxxers, and those who do not believe in evolution. Dealing with climate change and science deniers will involve making behavioral changes in humans that programs in BCS are well-suited to investigate. We urge the Division to consider this seriously.

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

The COV believes that data sharing and open access are important issues to address. The Biological Anthropology Program has been proactive in initiating a discussion about these topics among members of its research community. The PO recently awarded funds for a workshop that specifically tackled the issue of data sharing. For this, a panel of experts covering all subdisciplines was convened to discuss the matter. The workshop organizers followed up by synthesizing the results of the discussions and prepared a set of guidelines that were recently published in the flagship journal of the discipline, the *American Journal of Physical Anthropology*. This was an important first step in starting a dialogue that will continue into the future. In fact, the publication of the guidelines sparked discussions in departments at many institutions.

The COV suggests that the BCS Division consider the possibility of funding its own free repository and data management site to promote free and open access to data. Other initiatives might include workshops for graduate students and pre-tenure faculty to help them share their data.

Biological anthropologists do not typically publish in open access journals because most journals devoted to the publication of research in the field are not open access. Some researchers occasionally publish results of their research in general science journals that are open access, e.g. PLoS, or can be made open access for a fee. Such journals, of course, are not free. If NSF is committed to open access publication, then it must commit resources in the form of publication costs to be included regularly as line items in budgets of proposals.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

We live in a digital age where people are increasingly relying on social media to communicate and learn about the news and other matters important to their lives. We recognize that the NSF participates in various forms of social media, but its participation on these platforms is variable. For example, the NSF's Facebook page on September 12, 2019 had 484,780 followers. In contrast, NASA has 48 million followers. The Foundation has posted only 1,139 photos on its Instagram page and has 77,100 followers. The NSF's SBE twitter feed has less than 4,000 followers. These numbers tell a story. Another story is told by the fact that the NSF's Division of BCS has no visible social media presence that we can find.

In response to question 2 in Part III of this report, the COV recommended that the Biological Anthropology PO schedule virtual "office hours" with members of the research community to help connect with them. This could be implemented by other POs in the Division.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.
2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

As should be abundantly clear from this report, the COV believes that the new permanent PO of the Biological Anthropology Program has done a superb job during the period under review. She has been responsive to the research community in biological anthropology and makes herself easily accessible to individuals at all stages of their careers to talk about funding opportunities at the NSF. The PO has worked hard for biological anthropology and obtained increased funding for the program. Other members of the research community furnish consistent praise for the work the PO has done at the NSF's Biological Anthropology Program.

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

The National Science Foundation is an independent federal agency whose mission is to promote and support the scientific process, including robust research design and interpretation of data. As such, all steps in this process should be conducted at the highest standards. One worrisome problem concerns an issue central to the scientific method, causal inference. Increasing emphasis is placed on statistical analyses themselves instead of interpretation of results.

"Good statistical practice, as an essential component of good scientific practice, emphasizes principles of good study design and conduct, a variety of numerical and graphical summaries of data, understanding of the phenomenon under study, interpretation of results in context, complete reporting and proper logical and quantitative understanding of what data summaries mean. No single index should substitute for scientific reasoning." So reads the conclusion of the American Statistical Association's Statement on p-values (Wasserstein & Lazar, 2016). Unfortunately, several scientific disciplines (Amrhein, Greenland, & McShane, 2019), including many BCS disciplines, place exaggerated attention on matters related to statistical inference and statistical significance.

There is an overreliance, and sometimes frank abuse, of the frequentists approaches to inference. Statistically significant results are overrepresented in our published work, and statistical significance frequently conflated with scientific (i.e., biological, social) significance or relevance. Results are often presented as tables with model coefficients without context, making interpretation difficult. Alternative models or hypotheses are not presented and all results are deemed significant in a binary and uncontextualized way.

The ASA statement triggered what some hope will eventually be thought of as a "perfect storm," a storm that will finally bring much needed change to our scientific practice (Wasserstein, 2019). A 2019 special issue of *The American Statistician*, including 43 articles

contributed by an impressive range of researchers spanning an equally impressive spread of disciplines, provides help so that we can give statistical inference the attention it deserves in the process of scientific inference (Hubbard, Haig, & Parsa, 2019).

Change will require time and work at different levels. The ASA Special Volume has several articles that suggest changes that will help with “*Reforming Institutions: Changing Publication Policies and Statistical Education*” (section 7.5, Wasserstein, 2019). BCS disciplines must take note of this. We need programs that will train undergraduate and graduate students and editors and reviewers of journals and funding agencies on these issues.

Amrhein, V., Greenland, S., & McShane, B. (2019). Retire Statistical Significance. *Nature*.

Hubbard, R., Haig, B. D., & Parsa, R. A. (2019). The Limited Role of Formal Statistical Inference in Scientific Inference. *The American Statistician*, 73.

Wasserstein, R. L. (2019). Moving to a World Beyond “ $p < 0.05$ ”. *The American Statistician*, 73, 1-19.

Wasserstein, R. L., & Lazar, N. A. (2016). The ASA's Statement on p-Values: Context, Process, and Purpose. *The American Statistician*, 70(2), 129-133. doi:10.1080/00031305.2016.1154108

4. Please provide comments on any other issues the COV feels are relevant.
5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

Many questions that the COV has been asked require data to answer properly. Sometimes the data are available to the NSF and have not been provided. Other times the data exist and the COV must ferret them out. Still other times, the data simply don't exist. We allude to each of these kinds of questions in our report. We hope that the NSF takes this matter into consideration for the next COV and as it considers revising the questions it asks COV members to address.

The Committee of Visitors is part of a Federal advisory committee. The function of Federal advisory committees is advisory only. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the Advisory Committee, and do not necessarily reflect the views of the National Science Foundation.

SIGNATURE BLOCK:

/s/ John C. Mitani

/s/ Claudia Valeggia

For the Biological Anthropology Program

Cognitive Neuroscience Program – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review

process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments:</p> <ul style="list-style-type: none"> - Variable number of reviews, not standard, and not clear that it is not biasing outcomes (3 reviews is probably too few) - Ad Hoc Reviewer – should be at the request of the review panel, should be brought in to answer specific question in the proposal (not necessarily another review), this is particularly important when they are not part of the discussion. - Need more education for the panels on exactly how they should be reviewing the awards. Probably should happen twice, prior to receiving documents, and directly before the review. The website information is not enough. These issues were also brought up in the 2012 COV report. <p>Data Needed for COV and program:</p> <ol style="list-style-type: none"> 1. Funding decisions as a function of number of reviews and number of panels, and presence of ad hoc. 2. Merit ranking across the panel relative to the primary reviewers 3. Ranking/experience of review panels 	YES, but...
<p>2. Are both merit review criteria addressed</p> <ol style="list-style-type: none"> a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? <p>Comments: Yes, all layers of review are properly addressing merit review criteria per se, but more guidance is needed for the panels and program about what these criteria (e.g., ‘broader impacts’) actually mean.</p> <p>Typically, the ‘broader impacts’ are very generic and not very informative. There needs to be better definitions and more training for the panels. What is not</p>	YES

<p>always clear is how these criteria are being weighted for the decision, or how they should be weighted. Also, the panel summaries should have consistent formats.</p> <p>Data for COV and program needed:</p> <p>4. How many proposals do not get funded b/c they do not have broader impacts?</p>	
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments: There seems to be quite a bit of variability for a single proposal application and across applications within a panel. The variance increases even more when multiple panels are considered. This particular dynamic is likely leading to very 'little light' between approved and rejected proposals.</p> <p>There also seems to be group think to some extent by the panels where the same comments continuously are being repeated across grants.</p>	YES/ NO
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: Many times, the panel summary seems 'thin,' but in general they do provide rationale. It is not clear exactly how 'consensus' is reached or what happens when there is no consensus. If it is just boilerplate text that occurs with every grant, why do we do it?</p> <p>Data for COV and program: - The number of times consensus is not reached.</p>	YES
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: It does provide the rationale, the only major issue is that the review analysis by the PO that is critical information regarding funding decisions is not provided back to the PIs. <i>We believe this is a major limitation to the process.</i> The review analysis should be provided back to the PIs.</p>	YES
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments: The documentation to the PI is informative with regard to the panel recommendation, but not regarding the final funding decision. PO comments are given</p>	NO

to those rejected; however, we often found these limited. The PIs should have the review analysis to complete the documentation for the PI.	
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>There needs to be sufficient expertise and diversity on these panels. There is very little information available on this front, and pictorials that describes the distributions of committee makeup will be helpful.</p>	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: Very little condensed information available on this front. A) the COV needs this information more readily available, and B) the selection process should be more transparent to PIs. As noted above, pictorials of the distributions regarding expertise, experience, demographics, location, type of institution, etc. should be provided for the public regarding the panels.</p>	Data not available
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: We don't know the full scope of the processes; however, this seems to be handled sufficiently.</p>	YES
<p>3. Additional comments on reviewer selection:</p> <p><i>None provided</i></p>	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW
<p>1. Management of the program.</p> <p>Comments: Too much turnover of program management. It's causing instability and 'lurching' of program direction. As recommended in 2012 & 2015 COV reports we strongly suggest full time POs be a staple at NSF.</p>
<p>2. Responsiveness of the program to emerging research and education opportunities.</p> <p>Comments: We don't actually know how the program is setting priorities. For future COV it will be important for program to break down for the COV and for themselves exactly how they are 1) 'internalizing' new emerging research, and 2) how they are integrating that information in to their own priorities.</p>
<p>3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.</p> <p>Comments: <i>None provided</i></p>
<p>4. Responsiveness of program to previous COV comments and recommendations.</p> <p>Comments: The responsiveness to prior COV for the Cognitive Neuroscience program was inadequate. Many of the recommendations from 2015 were either not directly answered or dismissed whole cloth.</p> <p>Requests from COV in the above category include:</p> <ul style="list-style-type: none">• Better reviewer training• Streamline panel review by a program screen prior to review• Adoption of a 3-point checklist regarding resubmission (also requested in 2012)• Assemble a 'college of reviewers'• Implement a permanent program officer• Disseminate more information regarding broader impacts statements• concerted effort be made to "improve the performance" of "non-coastal" institutions• On the inclusion of grant supplements• Cognitive Neuroscience program consider convening a panel of experts to consider the most effective and practicable way to meet the NSF's Public Access Plan

Many of these issues were brought up in the 2012 COV as well. Not surprisingly, the same issues seem to be persistent and will likely be a part of the current recommendations as well.

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: There was not a whole lot of condensed information that would allow us to answer this question. The ‘word’ map was not grossly informative on this front.</p> <p>Our impression is that the cog neuro program is representing a small bit of the overall cog neuro ecosystem.</p> <p>There is very little variance in discipline of awarded grants. Cognitive neuroscience, by its nature, is very multi-disciplinary and as such this is problematic. It’s on old model of cognitive neuroscience.</p>	Data Not Available
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: The funding is appropriate size and scope depending on the goals. The total dollar amount available for each year for new grants is relatively low. In addition, the award average of \$145,000/year for 3 years is also a modest dollar amount to make large discoveries. In this context, the direction and focus, regarding the types of questions that can be answered in this context, is critical but seems to be missing. One area that might fit in this context would be to focus scientific questions that utilize large-scale existing datasets, for example. In fact, we would recommend that NSF consider whether small-scale studies with limited data acquisition is worth the investment. Considering recent reports highlighting the need for either ‘deep phenotyping’ with small numbers of subjects or very large samples to ensure signal reliability (of many commonly used measurements) there needs to be a serious evaluation of what is being funded by this program.</p>	YES/ NO

<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments: The large majority of funded projects are on the coasts. This is problematic. This point was brought up in the 2015 review; however, very little has been done to address it, and the responses and follow-up were insufficient. More information is needed to properly evaluate why this is occurring. The figures provided can be misleading due to how the numbers are scaled on the maps.</p> <p>How is NSF addressing this problem?</p> <p>Data Needed:</p> <ul style="list-style-type: none"> • Are the awards proportional to the submissions? • NSF staff travel? How are the opportunities being distributed? • Population as a function the awards • What institutions have the program officers come from over the last 4 years? • What is the distribution of backgrounds of who gets funded? 	<p>NO</p>
<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments: There was a surprisingly low number of proposal applications from 4-year institutions. This lack of funding here is particularly problematic considering the goals of NSF to build STEM pipelines.</p> <p>The reduced number of proposal applications by underrepresented groups was concerning. Again, how information at NSF is being disseminated would be of interest. Also, demographics on Co-Is and other staff on these grants would be helpful. Same with male/female numbers with regard to applications. There is a decrease in applications from female PIs, why? There is also somewhat of a concern with regard to Native American and Hispanic funding rates. With that said, there simply are not enough applications from underrepresented backgrounds. Outreach to these PIs is critical to advance the mission of NSF.</p>	
<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <p><i>None Provided</i></p>	

V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

DIVISION LEVEL DISCUSSION
<p>1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?</p> <p>1. Themes:</p> <ul style="list-style-type: none"> • Characterizing the commonly measured signals across all levels of scale – what is <i>actually</i> doable? What is reliable? • Understanding the transformation of multivariate complex behavior with multivariate complex brain systems – i.e., reduce the amount of correlative research, leave that to the NIH <p>2. How do you accomplish these via the program?</p> <ul style="list-style-type: none"> • In favor of supporting small scale studies, NSF should encourage utilizing existing datasets to describe the ‘baseline’ of what can be accomplished (and what can be expected) with standard measurements (i.e., MRI, EEG, psychometrics, etc.) • In favor of supporting small scale studies, NSF should encourage utilizing large existing datasets for the basic research questions (i.e., either small N deep phenotyping or large N datasets) • In favor of supporting correlative research, NSF should encourage proposals that build approaches for integrating/bridging levels of scale • In favor of simple group averaging or traditional population statistics, NSF should encourage proposals that build approaches to precisely map brain systems and behavior within individuals. • Encourage proposals that utilize AI/machine learning/deep learning that attempt to unfold the basic principles of the transforms from brain to behavior.
<p>2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?</p> <ul style="list-style-type: none"> • Funding investigations attempting to standardize or normalize the process, ease of use, and the coalescing of open science principles. • No need to generate a new database or anything like that
<p>3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?</p> <ul style="list-style-type: none"> • More information on exactly what is done is needed on this front for the COV • There seems to be a lot of reliance on the website and webinars. These are very low yield. • New techniques to work with Universities on distribution of funding announcement – utilizing non-academic networks • Absolutely need a permanent program officers to develop this...

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

Broader:

The direction and purpose of the Cognitive Neuroscience Program is not well defined. As a function of this, many of the interdisciplinary and cross-cutting activities appear to be primary to the main mission of the Cog Neuro Program. That would include NCS, CRCNS, and CompCog. These all seem to be more primary to the main mission and where the field is going. It should be represented as part of the main program.

One additional mission of this program or maybe it's primary mission should be setting the standards for the field. What are the minimal requirements to have a successful, reliable study in this domain?

There needs to be better clarity on how program, reviewers, etc. are evaluated. i.e. what makes a grant successful? What makes a PO successful? What makes a reviewer successful?

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

None Provided

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

Many of the 'borders' around the brain-behavior programs at NSF in general seem arbitrary and are leading to silos or clustering of expertise within programs that really should be interacting.

Need to protect program officers time so they can stay at the leading edge of the field. Need to build more efficiencies in the system to free up program officers' time to read, travel, and disseminate NSF opportunities.

4. Please provide comments on any other issues the COV feels are relevant.

None Provided

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

- The Chair and Co-Chairs conducted a great meeting; well organized, and very thoughtful.
- Our program officer Kurt Thoroughman has been extremely responsive and very helpful in walking us through NSF island.
- Should have two-pronged review processes. One review with PIs funded by NSF, and an independent review with reviewers with experience that have no stake in NSF. Reviews in this context are likely to be much more informative with regard to the evaluation process

- NSF COV process should be just as cutting edge as the science. There needs to be more hard data and data visualizations for the COV. Much of the evaluation is unnecessarily qualitative.
- The COV meeting could be much more efficient if some ground work with the teams was done prior to the meeting. Meetings with the teams to go over the Report templates prior to arrival would at minimum cut the onsite meeting in half, significantly reducing costs.
- The materials for the COV should be sent early and all at once so that reviewers can look over the material more efficiently and on their own time (instead of the 'staggered' release).

The Committee of Visitors is part of a Federal advisory committee. The function of Federal advisory committees is advisory only. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the Advisory Committee, and do not necessarily reflect the views of the National Science Foundation.

SIGNATURE BLOCK:

/s/ Damien Fair

/s/ Susan Fitzpatrick

For the Cognitive Neuroscience Program

Cultural Anthropology Program – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review

process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments: The Cultural Anthropology (CA) Program relies on panel and ad hoc reviewers to evaluate proposal submissions. The program, through the diligent efforts of the POs, has developed a systematic, thorough and judicious process of review that relies upon a large body of reviewers who generously provide their time and expertise. The reviewers represent a spectrum of fields within Cultural Anthropology.</p> <p>The twice-year panels are efficiently organized, permitting a robust discussion that focuses on proposals deemed competitive while offering space for panelists to flag and open discussion on proposals that may not make this initial cut. We find that the face-to-face nature of the panels is vital for a rigorous review.</p> <p>The curation of the review process by the CA Program Officers (POs), working in conjunction with POs from other programs, divisions and directorates, is another important element. This enables CA to maximize support to worthy projects (on one of the smallest program budgets within the BCS Division) and foster interdisciplinarity. Senior panels, for example, benefit from the presence of non-CA POs when considering co-funding.</p>	YES
<p>2. Are both merit review criteria addressed</p> <ul style="list-style-type: none"> a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? <p>Comments: In discussing merit review criteria, it is important to emphasize that CA is a discipline particularly reliant upon relationships and rapport with diverse populations. Thus, accountability to and benefits for these groups should be a paramount concern. What this signifies is the close interconnection between our data and knowledge (Intellectual Merit) and the implications of our research in translating into tangible benefit, action, and policy (Broader Impacts).</p>	YES

<p>a) For individual reviews, the degree to which both merit review criteria are covered is often variable. The emphasis tends to heavily gravitate to the proposals' Intellectual Merit (e.g., theoretical framework, lit review, research design, data analysis). However, we noticed that coverage of Broader Impacts can sometimes be cursory, inconsistent and uneven. We recognize that the salience of Broader Impacts varies by project goals and design, and that senior scholars should be held to a higher standard of articulating and implementing BI than doctoral students. However, we feel that Broader Impacts should be more clearly operationalized and addressed across-the-board, especially for projects that rely on research in collaboration with a local community and/or address policy-relevant issues.</p> <p>b) For panel summaries, the POs instruct and follow up with reviewers to facilitate a more holistic discussion of all criteria. As we highlight below, the panel review is often written under time constraints and, as a result, can often be uneven. It is less valuable when it summarizes the individual reviews, and more illuminating when it captures the conversation and how the funding determination was made. We acknowledge the important role of the POs in pushing panelists to write more thorough panel summaries.</p> <p>c) The POs do a very good job in expanding and elaborating the decision review process, going way beyond the panel reviews. They identify key problems that were discussed, and often provide suggestions to PIs for potential resubmissions. This highlights the value of having permanent, consistent POs who have honed best practices.</p>	
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments: Yes, to varying degrees, but for the most part reviews often good if not excellent. CA proposals receive many individual reviews (a minimum of three but up to eight depending on ad hoc reviewers and co-funding). One could argue that proposals that have three reviews may suffer disproportionately from one bad review—however, this is where the ability of panel members to advocate for a discussion of a proposal not initially considered competitive is valuable. Reviews are most helpful when they provide concrete suggestions (about bodies of literature, research design, methodological improvements, etc.).</p>	YES
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: Generally, yes. When there is no consensus, panel summaries often identify and elaborate on areas of disagreement. They signal to unsuccessful proposals the key shortcomings that need to be addressed; for successful proposals, they help to provide</p>	somewhat

<p>a rationale for funding. However, because of the limited time during panel, summaries are often brief and do not elaborate details, limiting their utility for the PI. However, again the role of the POs is critical here—from their analysis statements and communication with PIs, they fill in the gaps. In CA, the POs have extensive knowledge, not just of the field, but pay close attention to the panel discussion and dynamics. There were examples of proposals that might not have been highly ranked, but were funded—in these cases, the POs provide substantive rationale for why this was the case.</p>	
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: The POs provide a strong rationale for the decision that draws on the individual reviews and panel discussion. Especially when there is inconsistency between the panel recommendation and the award decision, the PO review analysis is vital and can reveal factors to which reviewers are not privy.</p>	<p>YES</p>
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments: Yes, especially when the proposal is declined for funding, the documentation provides extensive comments, including individual reviews, panel summaries, and PO communication, context and analysis. POs make themselves readily available to proposal authors for any further elaboration or context not in the documentation.</p>	<p>YES</p>
<p>7. Additional comments on the quality and effectiveness of the program’s use of merit review process:</p> <p>We are impressed with the expansiveness and detail of the intellectual work that goes into this endeavor, often written with a constructive spirit of a collective pursuit of knowledge. The POs do an excellent job of keeping reviewers to task in assessing merit criteria, supporting work that builds theory and furthers science, and fostering a community of scholars/reviewers. We appreciate the manner in which CA POs cultivate a solid relationship with reviewers, acknowledge and recognize service, and thus increase the likelihood of contributions and service in the future.</p>	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: In addition to the two panel reviewers, the POs send out review requests to about five ad hoc reviewers. Ad hoc reviewers are invaluable for their specific areas of expertise, but there are challenges in their acceptance rates and it often takes more time and effort to recruit them (as there is less of an incentive structure than for panelists).</p> <p>One key benefit of having such experienced POs is that they have detailed knowledge about the community of scholars in CA, their expertise, and even how their research agenda has changed in terms of topic areas and geographic regions. This allows for a quality of reviewers' qualifications and bringing together reviewers (especially panelists) from a range of backgrounds, institutions, and regions.</p>	YES
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: Reviewers seemed really transparent and forthcoming about ways in which they knew/intersected with proposal authors. For the most part, they consulted with POs to clarify COI. In addition, POs were very helpful in identifying potential COI ahead of time.</p>	YES
<p>3. Additional comments on reviewer selection:</p> <p>The experience of serving the NSF CA review, either as an ad hoc reviewer or panelist, offers a tremendous opportunity for professionalization, learning and networking. The opportunity should be extended to an ever-increasing circle of scholars, especially people from under-represented groups and institutions. However, diversifying the pool needs to be cognizant of the high level of service done by people of color and other under-represented groups in academia in their home institutions.</p>	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW

1. Management of the program.

Comments:

The CA program is managed with a high degree of commitment, efficiency and competence. Despite the high number of proposals received, POs provide good comments to all solicitations, excellent communication with PIs and reviewers. The program has benefitted significantly from having two permanent POs. This is seen in a variety of best practices that amplify in the scholarly impact of a relatively small program in SBE. POs have been proactive and successful in partnering with other programs in co-funding proposals; they have designed and overseen a rigorous and streamlined review process; distinguished themselves by a high level of outreach and support to potential PIs; exhibited a consistent commitment to diversity and inclusion; and cultivated a large pool of reviewers with expertise, dedication and culture of collegiality. The CA program has been well-managed fiscally as well. Between 2015-2018, the mortgage rate was consistently below the recommended 20%, and in 2018, it was 0%.

However, across all of BCS, Cultural Anthropology has the lowest per year average expenditure levels and a high number of applications. The discipline, topical areas covered, and high degree of relevance of the work being conducted for society all highlight the importance of Broader Impacts to CA. It is a program uniquely positioned to exemplify the ethical and moral obligations and contributions of scholars to their study communities and to informing and benefitting the public. As articulated in the Program Information for COV, "NSF is unique in the United States in supporting an independent program of major grants charged with advancing scientific research in cultural anthropology." For many applicants in this discipline, CA is the main funding source. Unlike other fields, doctoral students often undertake dissertation projects that are different than their faculty advisors, and we see significant impact of the low rates of funding in CA DDRI. We recognize the infusion of \$500K in funds in 2017 to CA and advocate for additional funding. If CA is a top program, in terms of diversity of recipients and reviewers, continuing with such a low level of funding does a disservice to the division.

In addition, PO Deborah Winslow retired earlier this year and we consider important for her position to be replaced to maintain two permanent POs and the best practices the program has developed over time.

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

The CA program has two mechanisms to nimbly respond to emerging, innovative and fleeting research and education opportunities: Early-concept Grants for Exploratory Research (EAGER) and Rapid Response Research Grants (RAPID) opportunities. Both opportunities provide a dynamic response that is not onerous in terms of the proposal, does not require external reviews, and provides discretion to the POs who can act swiftly in a manner aligned with disciplinary and divisional priorities. There is a good rate of PIs effectively

addressing issues with these small grants and flipping these awards into larger proposals, an indicator of success.

We advocate for the expanded use of CA's conference-funding mechanism to contribute to pushing the agenda on emerging research. Scholars can convene interdisciplinary conversations about high priority, emergent areas of research and ideally will seek to include a diverse group of participants. This opportunity should be more broadly conveyed to the anthropological community.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

The portfolio reflects the applications submitted, which is also curated to an extent by the POs who work to promote distributional equity among field areas, reduce redundancy, and best realize the scientific vision of the NSF.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

The CA program was responsive to the 2015 COV comments, which largely commended the CA program for doing remarkably well in terms of program management despite its low funding. The 2015 COV noted that the POs took seriously the 2012 COV suggestions and made exploratory changes (e.g., with virtual panels).

What we have not seen in terms of responsiveness is not at the level of the program, but at the level of the division and directorate. Both the 2012 COV and the 2015 COV have documented and argued repeatedly that the funding situation is untenable. Cultural Anthropology is faced with the lowest annual budget in the Division (except for the DEL Program) and has the lowest divisional success rates at the Senior and DDRIG levels. Faced with this challenge, CA has had to lower both award sizes and the percentage of submitted proposals that are funded. While the CA base budget was expanded in FY17, it remains one of the lowest in the Division. In fact, the total expenditures of CA for Senior awards in 2018 was less than the prior two years. The discrepancy between interest, need and funding is neither fair nor sustainable, and we entreat the NSF administrators to address this situation.

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: For the Senior Proposals, 17 topical areas are addressed in the portfolio, from Human Behavioral Ecology to Legal Anthropology. Political Anthropology represents about 30% of grants awarded during the review period. It reflects the dynamics and trends in the discipline, including emerging themes such as disasters, resilience, migration, energy and climate change. Additionally, the portfolio reflects the diversity of conceptual, theoretical and methodological approaches to the study of human experience in its complexity that characterizes the discipline.</p>	<p>YES</p>
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: The duration of grants for both senior and graduate proposals has been consistently declining since 2015. This is concerning given that ethnographic approaches, a quintessential element of CA, requires sustained and deep engagement with study populations to produce robust data and findings.</p> <p>On the other hand, the average award size has tended to grow, with 2016 being an outlier. For Senior awards, the average grew from \$62,027 in 2015 to \$79,928 (with a sharp jump between 2017 to 2018) and for DDRI these figures were \$11,900 to \$15,140. However, we should note that often the awards received are lower than the original submitted budgets.</p> <p>We recommend further examination of this question to explore longitudinal and cross-sectional trends in project funding and duration.</p>	<p>MIXED</p>

<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments: The CA program has made a concerted effort to widen the geographical distribution of awards to enhance the inclusiveness of both type of institutions and geographical distribution. While research-intensive PhD institutions will constitute the most awards by institution type, data show that there is a trend during the review period of increasing parity with other institutional types (e.g., Masters, 4-year, state and local) except 2-year institutions.</p> <p>Regarding the geographic distribution of proposals received and awarded, even though the East and West coasts still heavily predominate, we note that states in other regions such as Texas, Illinois, North Carolina, and Colorado are fairly well represented, which partially reflects outreach efforts by the POs. Despite this trend, the geographical diversity of states submitting proposals is higher than those being awarded, particularly for the DDRI category. This potentially points to the need for further institutional support and communication with higher administration about barriers to faculty working on and submitting proposals, including first-time submitters and minority scholars. CA POs utilize mechanisms such as EPSCOR to promote equity in award allocations to under-represented institutions and regions.</p>	<p>MIXED</p>
<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments: Despite ongoing efforts of POs to outreach to under-represented groups to encourage proposal applications, we find persistent and significant gaps in terms of both actions and awards.</p> <p>Awards to new investigators: Prior PIs still are significantly more successful in receiving awards compared to new investigators, with a disparity averaging 20%.</p> <p>Demographics of PIs: We find significant differences that affect scholars of color. Specifically, rates of Native American and African American PI submissions and success were very low. An important caveat is that for 19% of actions, we had no data about the racial demographics of the PI (“unknown”) so we omitted these from our analysis—if there are ways to remedy this lack of information, it would help to develop a more refined analysis of demographics.</p>	<p>MIXED</p>

<p>During the review period, less than half of all actions involved a PI of color, and the award rate was even lower. White PIs tend to submit more proposals and tend to be more successful, too.</p> <p>For gender, we see an interesting shift during the review period. In 2015, male senior PIs submitted more proposals than females and received funding at a higher rate. In 2018, the pattern flipped, with females submitting more proposals than males, and females having a higher funding rate. While the trend towards more female PIs submitting proposals is consistent over the 4 years, their higher funding rate is only seen in 2018, which may (or not) be a trend.</p> <p>Demographics of Panelists: Generally, male panelists are overrepresented. At the senior level, there are more significantly male panelists than female, with a slight narrowing of this difference in 2018. Under-represented minorities (URM) have constituted a small percentage of panelists in the past three years, down from slightly higher numbers in 2015. Patterns are more encouraging for DDRIG panelists, which tend towards more female representation over time (such that in 2018 a large majority of DDRIG panelists were female). URMs constitute between about a quarter of panelists, much higher than the Senior panelists.</p> <p>The CA POs have demonstrated a conscious and sustained effort to diversify the reviewer and submission pool. For example, PO Mantz undertakes between 12-20 video conferences a year to outreach to university programs to navigate the funding process and also participates in “NSF Days” as the SBE representative. Clearly more can and should be done. The diversity and inclusion work should not solely fall on the shoulders of POs. One suggestion is the creation of a collective of faculty members (especially URM) who have been successful in obtaining CA support. These scholars would be available to mentor and support URM and new PIs with the proposal process. Former POs could also be used as NSF ambassadors to increase pool diversity by reaching out to minority scholars and administrators in their home institutions. In short, Broader Impacts encompass not just the dissemination of research knowledge, but a sharing of the insights about the investigative process to be more inclusive, demographically and geographically.</p>	
<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <p>We encourage data collection and support for other elements of diversity and inclusion, such as LGBTQ+, (dis)ability, etc.</p>	

V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

DIVISION LEVEL DISCUSSION

1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?

Looking forward, there are some key areas of research that deserve special attention. These include, among others:

- Dynamics of climate change and environmental degradation: societal impacts and local responses;
- Population movements across geopolitical borders (migration, refugees, displaced populations);
- Gathering and usages of "big data" and AI: social impacts along class, ethnic and gender lines;
- Aging and demographic change; impacts on social system of care, kinship, and welfare;
- Water infrastructures, inequity, and conflict over water resources;
- Emerging infectious diseases and differential access to health care;
- Urban-rural inequities in industrialized and developing countries;
- Human/nonhuman interface (other species);
- Land and water grabs and effects on indigenous communities.

The complex nature of many of these themes can be best addressed by interdisciplinary research teams and collaboration. Given the overlap with other disciplines interested in similar areas of inquiry, the BCS division could convene interdisciplinary clusters of researchers to foster innovative projects in design, mixed methodologies, and data analysis. There is also potential for interdisciplinary collaboration with disciplines across the directorate, including in the social sciences that could be leveraged to optimize the use of funding and other resources. Convening a few key workshops centered on some emerging issues that bring together scholars across different disciplines could be a good first step.

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

NSF policies and a general trend in the large scientific community for more consistent and standardized data management systems have contributed to a culture of data sharing and more open access. However, there are important differences across disciplines that BCS and NSF should consider and reflect in their stated expectations. For instance, In CA as well as DEL and other programs that often work with vulnerable populations, the nature and sensitivity of the data requires robust checks and procedures that preclude open access and public availability in the short term. In addition, data collection and sharing generally does not carry the same recognition for scholars in many BCS fields, who invest long time and effort to gather field data and need time for data-coding, analysis, and write-up before data can be made available.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

There is considerable room within BCS to improve the dissemination of information of research and funding opportunities. In addition to ongoing general initiatives, there are other ways to leverage the material and human resources garnered by the division's POs including:

- Capitalizing and mobilizing the extensive network of contacts with former panelists, PIs with NSF award record, specialists in sub-disciplines, and other stakeholders in the academic and scientific community to better promote and encourage investigators to apply for NSF programs and funding opportunities. There is a reservoir of good will and talent that can be tapped.
- Outreach to underrepresented groups (both demographically and geographically) to disseminate information and seek the participation of these groups in NSF funding initiatives (i.e., site visits, presentations in regional conferences, outreach to professional associations of minority scholars).
- Make a more creative use of social media tools and outlets to promote both the opportunities and contributions of NSF-funded research, particularly among new and young scholars. Connecting these social media initiatives with undergraduates could have a multiplying effect.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

The most pressing need by far in CA is addressing the low level of funding, a critical issue that has not been addressed since the last COV Report and, if anything, has become even worse.

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

None Provided

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

Gathering data on the results of funded research and outcomes, including scientific findings and broad impacts, could help to educate the public at large of the value of basic government-funded research. While the COV is tasked to assess the decision-making process and management systems of each discipline, there is little information about the results of funded projects (what comes out of the tunnel). Data on the outcomes could help to develop better tools to assess the potential of funding opportunities, and better disseminate the results of NSF-funded research. The BCS Division could also expand the ways in which findings and contributions (both scientific and broad societal) are publicized in a variety of traditional media as well as social media outlets. As the previous CA report noticed, we find that there is limited information on the BCS report regarding progress made in the dissemination of research findings.

4. Please provide comments on any other issues the COV feels are relevant.

None Provided

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

While the format is fine, we feel that the data needed to address each of the report sections and subsections is rather uneven. Some data is made available in the division and discipline reports, while other is either absent or incomplete (i.e., demographics of panelists, demographics of PIs, etc.). This makes completing the report a somewhat challenging task. Looking for missing and additional information by COV members produces interesting and often valuable leads, but does not render for comparable and consistent reporting across the disciplines in the division.

The Committee of Visitors is part of a Federal advisory committee. The function of Federal advisory committees is advisory only. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the Advisory Committee, and do not necessarily reflect the views of the National Science Foundation.

SIGNATURE BLOCK:

X Aloia Lu

X Christian Zolniski

For the Cultural Anthropology Program

Developmental Sciences Program – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review

process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments:</p> <ul style="list-style-type: none"> • The combination of ad hoc and panel reviews generally yields a fair and wide-ranging evaluation of the proposals we examined. We had no proposals that involved site visits. • The current two-phase review process seems to be working, especially with the safeguard of any panelist raising a triaged review for discussion. • Although it is good to have experienced ad hoc reviewers (e.g., college of reviewers), the paramount criterion must remain scientific expertise. This criterion appears to be satisfied. • Although it is important to have sufficient detail in reviews, the length of the review is not indicative of its validity. It might be good to point that out to panelists. • Reviews that focus on lack of methodological detail need to be weighed against the track record of the proposer and whether the details are trivial. • Panelists and ad hoc reviewers need to recognize the continued importance of basic science and experimental methods. 	YES
<p>2. Are both merit review criteria addressed</p> <p>a) In individual reviews?</p> <p>b) In panel summaries?</p> <p>c) In Program Officer review analyses?</p> <p>Comments:</p> <ul style="list-style-type: none"> • Although Intellectual Merit and Broader Impacts are always addressed, comments about the latter focus on a much wider range of possible impacts. • RUI proposals seem to have very high Broader Impacts "points" built in. • Intellectual Merit must remain the core criterion for proposals. Broader Impact depends crucially on Intellectual Merit. 	YES

<ul style="list-style-type: none"> • We concur with the prior COVs that large and elaborate Broader Impact activities are not necessary, especially if they aren't directly linked to the research. • We support Broader Impacts as a matter of principle but not at the expense of scientific quality. • Training of students using the apprenticeship method <i>is</i> a vital Broader Impact and should be counted in the reviews. • Mentorship plans for post-doctoral fellowships should continue to focus on research activities (as opposed to all but very necessary course work). 	
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments:</p> <p>Generally, reviews are written to justify the scores given, although all reviewers should be encouraged to keep in mind that scores and verbal evaluations should cohere.</p> <p>Occasionally, verbal evaluations will focus on details that appear more negative than the score given. Reviewers should be encouraged to say how they weight the negative details that they raise. In addition, the overall quality and innovation should trump the role of trivial details. Indeed, the overall score may be more indicative of quality.</p>	YES
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: The panel summaries are generally excellent and provide a highly useable rationale for the scores. The information provided to proposers has increased in quality during both of our (COV members') careers.</p> <p>Program officers are also very helpful in providing feedback.</p>	YES
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: The information in the jacket generally provides a convincing rationale. However, for proposals ranked at Moderate Priority, it would be hard to guess which ones would be funded and which ones would be declined. Perhaps more written feedback might be provided for Moderate and some Not Competitive proposals indicating whether revision and resubmission is encouraged or not.</p>	YES

<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments: The documentation that goes to the PI is generally of excellent quality, however, it would be very helpful if the PI could receive the program officer review analysis.</p> <p>Some other program panels use a 5-score range, with one score being Non-Competitive but resubmission encouraged. DS uses a 4-score range and doesn't differentiate between NC and NC resubmission encouraged. We think that the latter differentiation is helpful for PI's.</p>	<p>YES</p>
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>The NSF review mechanism remains the gold standard throughout government.</p> <p>We concur with the previous COV report that Intellectual Merit is critical and only when outstanding Intellectual Merit has been established should Broader Impacts be reviewed. We also concur with the previous report that Broader Impacts should only be rated as "adequate" or "inadequate."</p> <p>The previous COV report asked that the Data Management Plan be eliminated and left to the oversight of local institutional review boards. We concur and add that reviewers should not take the DMP into account in their reviews. We see the possibility for researchers who never collect data making their careers on data collected by others without crediting or collaborating. Researchers should always have the full opportunity of publishing their own data before sharing with others.</p> <p>The values of individual scientific freedom, autonomy and creativity are vital for the economy and security of the nation.</p> <p>The previous COV report encouraged the balance of incremental and transformative science, and we concur. Continuation of ongoing research in which new explanatory hypotheses and theories are explored as a part of cumulative science should not be viewed as less valuable than de novo research. Although the latter type of research is also necessary, it may not be as replicable as cumulative science, hence a balance is necessary.</p> <p>More generally, the burden of extra-scientific requirements and bureaucracy have become overwhelming and threaten the morale and progress of science and indeed may prevent some investigators from apply for NSF funding.</p>	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: The reviewer expertise was generally highly appropriate and of excellent quality. However, the type of institution the reviewer came from may have influenced scores (perhaps with people from smaller and non-R1 institutions being too harsh). Note that we didn't perform any statistical analysis of this impression.</p>	YES
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: Panelists with COI's were identified and not present during discussions.</p> <p>We didn't notice any COI problems involving ad hoc reviewers.</p> <p>NSF generally sets appropriate criteria for determining if a potential reviewer has a COI, however, NSF should be cautious about over-interpreting COIs to the point that expert knowledge is devalued.</p>	YES
<p>3. Additional comments on reviewer selection:</p> <p>Senior researchers who publish original research on the topic that they are being asked to review continue to be the bedrock of the review process.</p>	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW

1. Management of the program.

Comments:

The DS program has had 3 program directors in the window under review. The management appears to be consistent and of high quality.

Despite the fact that the rotator program seems to be working, much of the continuity has come through the fact that many/most of the panel members have remained the same over multiple meetings. The Program would benefit in several ways from a permanent PD: A permanent PD would increase continuity across submissions. S/he would have greater power to negotiate cross-program, cross-directorate, cross-agency initiatives and funding. A permanent PD would allow for greater balance of shorter- and longer-term goals, the latter of which are highly desirable.

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

The DS State of the Program document provided to the COV members listed several emerging research opportunities: developmental neuroscience approaches, exploration of a wider range of populations and developmental experiences, and increasing interest in secondary data analysis. The SotP states "Among the most impactful and potentially transformative research are longitudinal studies that capitalize on natural variability in experiences to inform mechanisms of change, and those that employ interdisciplinary cognitive science." One concern with many of the emerging areas listed is that they lend themselves to descriptive or correlational methods, to the exclusion of hypothesis driven methods. Therefore, we see the next step as an integration of more traditional laboratory and hypothesis driven research with research that focuses on more diverse populations and natural variability.

In addition, we applaud the possibility of more longitudinal research, but it too needs to be hypothesis driven and importantly, be performed by more senior researchers who have already laid the groundwork with cross-sectional research. Longitudinal research is expensive, difficult, and risky, which poses challenges for inexperienced investigators.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

We agree with the stated goals of the DS Program, particularly the last phrase: Maintaining a balanced portfolio with respect to PI/Institutional demographics, topic areas, developmental time points, and methodological approaches is an overarching goal for DS, **although providing funding for the strongest science is always the main priority.**

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

The DS Program's written responses to the previous COV revealed an excellent understanding of the challenges (which include the content and weighting of Broader Impacts, the over-emphasis on Data Management, and variability in the helpfulness of the summary statements from ad hoc and panel reviews). However, as noted in the responses, many of these challenges are not under the control of the PO. Therefore, we recommend that the DS Program participate in a larger Directorate or NSF wide discussion of these issues, particularly questioning the role of Broader Impacts and Data Management, which should be distinct in the evaluation of science.

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: An analysis of the award rate for various sub-disciplines of developmental science revealed a funding rate close to the overall average for BCS proposals. Awards also seem to be well distributed across age ranges, methods, and sub-disciplines. The only exception is adult or life-span development, which should be viewed as within the purview of the Program.</p>	<p>YES</p>

<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: We didn't notice any obvious problems with size and duration. We also applaud the PO's for reducing the size of some awards to reflect aspects of proposals that the panel thought more highly of vs. those that were less strong.</p> <p>If there were more resources, longer grants would be preferable for many types of developmental research. For example, it's virtually impossible to conduct longitudinal research in 2-3 years.</p>	<p>YES</p>
<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments: The award rate (awards per number of submissions) is quite similar across geographic regions, however, there are large differences in overall submission rates for different states.</p> <p>We were impressed by the number of RUIs received and funded by the DS Program and would encourage NSF, if additional funds were available, to expand funding specifically for the RUI initiative. Such an expansion would not only increase the number of PIs from underrepresented groups but also potentially allow for the broadening of the research participant pool.</p>	<p>YES</p>
<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments:</p> <ul style="list-style-type: none"> • The award numbers to "new" and "prior" investigators is comparable. Unfortunately, faculty rank data are not readily available. We advise that there should be a balance between junior (assistant) and senior (associate/full) funded investigators. • The DS Program is noteworthy in BCS for its funding rate of investigators from underrepresented groups. Although there are many fewer proposals from African American and Hispanic PIs, the funding rates for these proposals was higher in the last year of the report compared to proposals from white non-Hispanic PIs. We also noted a trend toward higher success rates for underrepresented proposers over the years of review. 	<p>YES</p>

<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <p>In general, we found a good balance in project types and investigator representation.</p> <p>One recommendation is that some types of information we would have liked were not readily available. These include whether a proposal was reviewed by more than one Program (we would like this to be a sort feature, not something that has to be ferreted out from a deeper look into the proposal), the academic rank of proposal submitters and PIs, and the institutional status (R1, 4 year, etc.) of the proposers' institutions (again, that could be used as a sort feature).</p>	<p>YES</p>
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V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

<p>DIVISION LEVEL DISCUSSION</p>
<p>1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?</p> <p>With regard to emergent areas, we suggest the following:</p> <ul style="list-style-type: none"> • We need to apply high quality theory-driven research to questions about how particular environmental properties affect developmental outcomes. • We need to understand the cognitive mechanisms by which social media and science literacy affect the beliefs, reasoning processes, attitudes and opinions of young people. • We need greater interaction between cognitive development researchers and AI researchers so that advances in our understanding of very broad human intelligence can be used to create more generally intelligent machines. • We need to better understand empirically supported differences between human and machine intelligence and how that affects human-machine interaction. • Developmental behavioral economics is an important and intellectually exciting intersection of work on psychology, development, neuroeconomics, and behavioral economics that is relevant to massive social and economic problems (crime, addiction, vehicular deaths etc.). Issues such as age variations in impulsivity (what economists call delay discounting), ambiguity-seeking, reward sensitivity, and risky decision making are investigated in multiple disciplines, but these boundaries are just beginning to become permeable. These intellectual cross-fertilizations are essential to move the science of human behavior forward.

Infrastructure investments are greatly needed to help with the recruitment of human subjects. Human subjects recruitment has become a major stumbling block for developmental science research. IRB procedures, parent concerns about privacy, and documentation requirements have greatly reduced the number of research participants recruited and tested. Ideas we discussed are:

- the creation of (regional) prescreened sets of participants that multiple investigators could test
- additional funds for testing centers in communities of participants from underrepresented groups
- an NSF-sponsored website with "nuggets" highlighting developmental research to encourage parent participation and allay unfounded concerns
- brief media blurbs that encourage the public to consider participating in behavioral research

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

BCS needs to tread very lightly regarding open science. Indeed, the best contribution BCS might make is to create forums for the discussion of the pros and cons of open science.

We think that forcing investigators to make their data public is a mistake. Incentives, encouragement, and facilitation can be provided, but the intellectual work of investigators is their own. Pressure and coercion to make data public are unethical, and the right to publish one's own data before providing to others should be respected.

Moreover, there are potentially unconscious bias effects in who makes their data public. For example, previously created large public databases contain labor-intensively collected and coded data that were contributed by women that are used by large numbers of publications by men. At most, making data publicly available should be voluntary and perhaps be treated as a Broader Impact (not a separate Data Management) category. The latter was recommended by the previous COV.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

Sharing information with professional organizations and foundations about NSF programs, and importantly, upcoming deadlines when those deadlines are still several months away, would be helpful. Greater targeting of 4-year institutions for RUI proposals would also be good.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

None Provided

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

The DS Program appears to be functioning well, especially in soliciting and funding proposals from underrepresented groups.

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

NSF needs to decide what to do with Broader Impacts. One approach we strongly recommend would be to completely separate Intellectual Merit from Broader Impacts and rate proposals solely based on Intellectual Merit and only for borderline funding decisions (and when proposals are otherwise equally meritorious) take into account Broader Impacts. However, Broader Impacts should be communicated by science communicators, and we encourage NSF to feature more projects on the web site and disseminate scientific advances, in collaboration with partners, such as The National Academies of Sciences to government, public, and academic associations. Further, NSF-wide funding could be used to augment funded proposals to both facilitate and communicate Broader Impacts of funded proposals.

Once Broader Impacts are considered, not all proposals can realistically address each kind of Broader Impact, because of the nature of the research, the characteristics of the institution where the research would occur, or financial and time limitations. Reviewers and program officers should evaluate Broader Impacts sections with a focus on what is possible and relevant for the particular proposal and applicant. Additional resources to assist investigators in meeting Broader Impact goals (once projects were deemed meritorious and funded), such as recruitment of diverse students and subject populations, would be a far more successful route to increasing the quality, visibility, and real-world significance of Broader Impacts.

4. Please provide comments on any other issues the COV feels are relevant.

None Provided

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

It would be good if we could have targeted proposals that were reviewed by more than one panel in the jacket search. Other data that would have been helpful are faculty rank and PI institution.

The word maps used to indicate sub-disciplines funded were unhelpful.

The Committee of Visitors is part of a Federal advisory committee. The function of Federal advisory committees is advisory only. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the Advisory Committee, and do not necessarily reflect the views of the National Science Foundation.

SIGNATURE BLOCK:

/s/ LouAnn Gerkin

/s/ Valerie Reyna

For the Developmental Sciences Program

Documenting Endangered Languages (DEL) Program – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review

process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments: The review process continues to function very smoothly, with every proposal able to receive at least 3 reviews before going to the panel. We would like to highlight here (as well as in Section III) that for DEL, ad hoc reviews are especially important to the success of this process, given the diversity of methodological, geographic, and interdisciplinary expertise required to adequately evaluate the merits of the proposals.</p>	YES
<p>2. Are both merit review criteria addressed</p> <p style="margin-left: 20px;">a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses?</p> <p>Comments: We are uniformly impressed by the careful attention to the merit review criteria at all three levels. We did find a number of cases in which the reviewers and the panel did a better job than the original proposal of expositing one or both types of merit. In some specific cases, these proposals were submitted by relatively inexperienced PIs with little institutional support (e.g., minority-serving colleges/universities or tribal institutions, which often have not previously hosted NSF projects and which do not have Sponsored Research Offices to support PIs). Both the individual reviewers and the PO often put extra effort into providing constructive suggestions for how the proposals could have better articulated merit of both kinds. We attribute some of the consistency in Panel reviews to PO’s work preparing panelists prior to the task. She presented Panel members with anonymized prior reviews that exemplified differences in the categories used for overall assessment (Good, Very Good, and Excellent).</p>	YES, to all three

<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments: Of all the reviews we read, only one was not substantive. All the proposals we looked at had received at least three reviews that gave substantive, detailed comments to explain their assessment, and many proposals had 5-7 such reviews. We found the details of the comments particularly useful in helping to assess individual variation across reviewers in how they assigned summary ratings (E, V, G, F, or P). In several cases, the summary ratings were G or V, but then the detailed comments revealed important problems with the proposal that needed to be addressed before it could be funded.</p> <p>We recommend that the POs discuss the relative importance of summary ratings (the “GPA” of each proposal) vs. the details in the comments. We also recommend that the division consider developing an exercise (see II.2 above) to help train panelists in the review process and establish a baseline for evaluation.</p>	<p>YES</p>
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: Yes. The panel summaries clearly articulate the strengths and weaknesses of the proposals as well as their transformative potential (in terms of broader impact and/or intellectual merit).</p>	<p>YES</p>
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: Yes. We observed that the documentation provided consistently excellent justification for the final funding decisions.</p>	<p>YES</p>
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments: Yes. We also observed that the PO offered substantive suggestions to PIs, especially from institutions without SROs, orienting them to the kinds of changes that would be necessary to improve their proposals for future submission.</p>	<p>YES</p>

<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p><i>None Provided</i></p>	
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II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: The ad hoc reviewers and the panelists had appropriate expertise for evaluating the merits of the proposals in the majority cases.</p> <p>Recommendation: The one area that could be strengthened is in the documentation and analysis of conversation. With the growing demand for research on speech styles within endangered language contexts, and conversations in particular, more proposals included some documentation of speech. Assessment requires knowledge and expertise in the documentation of language use. The majority of this research has been conducted outside of or at the margins of disciplinary linguistics. As a result, it is unclear whether all reviewers had sufficient background to assess projects that were primarily concerned with indigenous ways of speaking. In line with the PO's successful attention to broadening participation geographically, demographically, and intellectually, we recommend that the PO continue to diversify participation by recruiting reviewers whose expertise lies in the areas of conversation analysis, discourse analysis, sociolinguistics, and/or linguistic anthropology and whose research involves fine-grained discourse transcription. There were several instances in the sample where reviewers requested additional information from the PI regarding recording and transcription, but without offering any specific instruction or directions to indicate what sort of information the reviewer thought was still needed.</p>	YES
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: COIs were appropriately resolved and documented in the Review Analysis.</p>	YES

<p>3. Additional comments on reviewer selection:</p> <p>The PO has given special attention to the demographic make-up of the review panels. During these four years, the panels have become more diverse. For example, in 2015, only one Native American linguist served on the panel. In 2016 and 2017, two Native American linguists participated on the review panels. The PO also recruited panelists from a range of departments - Anthropology, Linguistics, American Indian Studies – with only 1/3 of scholars coming from Linguistics departments.</p> <p>With respect to ad hoc reviewers, the PO invited and received reviews from international and national scholars.</p> <p>Recommendation: We recommend soliciting reviews (or a panelist) from faculty at tribal colleges/universities, community colleges, and/or other community-based scholars and indigenous language advocates committed to research on endangered languages.</p>	
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III. Questions concerning the management of the program under review. Please comment on the following:

<p>MANAGEMENT OF THE PROGRAM UNDER REVIEW</p>
<p>1. Management of the program.</p> <p>Comments:</p> <p>We are now the third consecutive COV to begin this section with the observation that DEL and Linguistics should absolutely be separate programs. The 2012 COV observed that the specializations, urgencies, methods, and criteria for funding differ between DEL and Linguistics. The 2015 COV endorsed these observations, then added that the two have distinct inherent connections to other disciplines (more on this below), that the results of the two have different roles in the long-term (with the corpora created by DEL likely to be the major record for posterity of many individual languages), and that DEL projects have quite distinct (and compelling) broader impacts from those in Linguistics. We endorse all of these observations, to which we add that, during the review period, the DEL PO embraced the recommendations of the 2015 COV (more on this in III.4 below) in order to further enhance these distinctions in the service of broader BCS priorities, such as broadening participation in science and increasing cross-disciplinary research. In particular, we point out the following components of program management, which relate both to intellectual merit and to broader impacts:</p> <ul style="list-style-type: none"> • The results of DEL projects contribute to the intellectual profile of BCS by creating enduring records of ways of thinking and living that are not represented in mainstream social science research. This concern has been articulated persuasively in a series of recent studies (summarized briefly in <i>Science</i> 365 (6449), 110), which suggests that the vast majority of social science research documents the

WEIRD demographic (Western, Educated, Industrialized, Rich, and Democratic), a population that is outside of the norm for most people alive today, and even farther outside the norm for most of human history. Given that a universal characteristic of endangered languages is that they are spoken by communities who are both minoritized and (at least historically) socio-economically disadvantaged in their home countries, it is safe to say that all work with endangered languages represents work with populations outside of the WEIRD demographic. In this context, we point out that the great majority of research funded through the Linguistics Program studies populations that fall squarely within the WEIRD demographic.

- One of the strengths of the PO during the review period is that she was able to help PIs develop more appropriate data management plans. These efforts represent a response to a suggestion of the 2015 COV, but also tie into larger discussions happening across the division.
- DEL has a remarkable record of supporting projects that combine documentation of endangered minority languages with scientific questions that originate in other disciplines. Over the review period, over three-quarters of the project awards that originated with DEL proposals have received joint funding from other NSF programs; in the same period, DEL has contributed funding to other projects that originated with proposals received by other Programs.
 - Beyond the intrinsic intellectual merit of supporting this innovative interdisciplinary work, there is a financial implication as well: by engaging whole-heartedly in seeking out inter-program support for cross-disciplinary collaborations, the POs of DEL managed to increase the effective operating budget for funding proposals by nearly 50%, with the vast majority of the increase coming from outside the BCS division. The DEL PO was especially effective in pursuit of such collaboration during 2017, surely a crucial contributor to the remarkable increase of proposal funding rate that year. Contrary to what one might assume by casual inspection, this increase does not represent a significant drop in proposals, which perhaps stimulates a relaxation of Program standards — it represents significant legwork on the part of a PO who was seeking ways to fund proposals that broaden participation, as detailed in the next point.
- In a domain where intellectual merit and broader impacts are interconnected, DEL plays a crucial role in broadening the pool of scientists who engage with the scientific process, using study of language as a gateway to engagement with multiple programs in the National Science Foundation (recall that more than three-quarters of funded DEL projects are cross-program). DEL's contribution to the diversity of the larger BCS profile can be seen in four distinct domains:
 - Increasing participation of PIs from diverse demographic groups, especially Native American, Hispanic, and Multiracial.
 - Increasing participation of PIs from institutions beyond the top 100 research intensive PhD institutions, especially TCUs and Native American tribes and tribal institutions. This is discussed in greater detail in Section IV.3.
 - Increasing geographic participation in research, by funding projects affiliated with institutions in states that otherwise receive less than 1% of BCS grants, such as SD, ASK, MT, OK, HI, and MN. This, also, is discussed in greater detail in IV.3.
 - While demographic data on reviewers and panelists is not well-documented by NSF, as noted in II.3, based on personal knowledge we have about our colleagues, we can see that the ad hoc reviewers and review panels have shown increased participation of scholars belonging to demographics that have historically not participated extensively in the process, especially Native American scholars, but also Latinx and Asian. This is critical not only to integrating a broader set of perspectives and priorities into the process that results in funding decisions, but also to providing an increased proportion of researchers from these demographics with access to the insights panelists gain from their participation: demystification of the decision-

making process and exposure to both the elements common to successful proposals and a range of ways in which those elements can be presented successfully.

- Coinciding with the period of greatest outreach efforts made by the PO, both the overall number and the proportion of new investigators who submitted proposals and who were funded increased steadily from 2015 through 2017. See IV.4 for additional detail.

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

Education opportunities are a strong component of the DEL portfolio, both education about endangered languages (<https://www.youtube.com/watch?v=DERu2aAqqWM>) and education to potential PIs and their institutions about how to write a DEL proposal that will contain the appropriate intellectual merit and broader impact. See, for example, https://www.youtube.com/watch?v=NvkKHfoQzaU&list=PLx12labZqbzGbA0rQU0xg5cMzz9rp_dqY&index=1

Emerging research opportunities:

- data processing, transcription, and archiving
- child language and language development
- documentation of a wider range of language practices (genres, speech styles, conversation)

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

From our perspective, the development of the DEL portfolio is a smashing success. It is intentional, guided by the recommendations of the 2012 and 2015 COVs and then implemented by a PO who was willing to create a lot of extra work for herself beyond organizing the review of incoming proposals and administering projects that are already funded. As described in III.1, she embraced the role of becoming a very active interface between NSF and communities from which there had historically been very few PIs, especially Native American communities; she also recognized and pursued opportunities for increased collaborative funding of DEL proposals and served as something of a “matchmaker,” proposing connections between academics from R1 institutions to (potential) PIs from TCUs and tribal organizations.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

The 2015 COV made 13 substantive recommendations, two of which (to make the PO position permanent and to loosen/change proposal deadlines) were not within the authority of the PO to act on. She successfully addressed all 11 of the recommendations that were within her power to act on, and from our perspective, her performance on nine of these recommendations really went above and beyond what anybody could have expected. We divide these into three categories. Three were on process: expanding institutional variety of reviewers (with the results already applauded above), adding another deadline for DDRIG submissions (instead, she removed DDRIG deadlines altogether), and insisting that final reports include a statement about

the results of data management plans and to track these outcomes as a part of determining merit for funding decisions on subsequent proposals (impressive list of actions taken, with the outcome that PIs are forced to engage with their earlier promises and that more DEL projects have, in fact, archived their data). Two were on broadening representation, with results that have already been cited above as strengths of the program: targeting outreach to potential PIs and host institutions who have not previously been awarded grants and setting aside funds for non-PhD granting institutions. Five were on enhancing Intellectual Merit (and funding opportunities): already applauded above were creating collaborative seed grants and encouraging interdisciplinarity, publicizing/prioritizing cross-program and cross-agency funding, and encouraging interdisciplinary fieldwork. The fourth recommendation, to maintain the balance of reviewers with different institutional affiliations, as recognized in II.3, the PO actually increased both institutional balance and demographic balance of reviewers and panel members. The fifth suggestion was to invest in infrastructure that might better meet the need for “sustainable, accessible archiving of field data in secure, long-term repositories.” Within the scope of the DEL program, the PO recommended that all new senior proposals explicitly include archival costs as a line-item, and in the form of direct grant support, DEL funded infrastructure grants to archival facilities and workshops aimed at creating tools that would facilitate the conversion of raw data into useful archival records.

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: DEL is unique because it is defined by its interdisciplinarity and relatively recent emergence as a field such that there are no traditional subfields or subdisciplines. Instead, awards are made in relation to urgency of documentation need, training and development (capacity-building), and innovativeness. On the one hand, this means that DEL’s portfolio reflects an incredible diversity of fields/subfields, such as anthropological linguistics, linguistic anthropology, ethnobotany, documentary linguistics, morphology, phonetics/phonology, typology, indigenous studies, ethnopoetics, historical linguistics, language contact, language development, etc. On the other hand, it means that the results of the research are wide-ranging, from reference grammars, lexical and textual databases, online dictionaries, geographic documentation (placename projects), and multimedia to the development of new methodological approaches for documenting endangered languages, innovative pedagogical techniques for revitalizing indigenous languages, strategies for assessment of indigenous language vitalities (and</p>	<p>YES</p>

<p>interventions), and training workshops for expanding/enhancing individual and institutional knowledge and resources relevant to (indigenous) language research. While such a range might appear unmoored from traditional theoretical and disciplinary concerns, this research by and large is breaking new ground for understanding processes of language change and patterns of variation (as situations of contact, which all situations are) as well as communicative/interactional diversity within and across communities. Finally, the portfolio reflects a range of endangered indigenous languages, such as Ojibwe/Anishinaabegmowin in Midwest United States, Inuit dialects in the circumpolar, Tarahumara in Mexico, Lamkang, Walman, Eho, Yazgulyami, Seenku in Burkina Faso, and Western Apache in the southwestern U.S. (largely indigenous languages of the Americas).</p> <p>We agree with the two previous COV reports that DEL has been responsive to the need to build larger language corpora. The language corpora produced during the timeframe under review include languages with vastly different grammatical structures, especially in comparison to the most widely used and documented languages. These differences are critical for pushing/challenging models and theories of language processing, language learning, cognition, and grammatical structure.</p>	
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: This is not a simple question. It is difficult to assess appropriateness because over 50% of awards involved in cost-sharing/co-funding with other units/programs/divisions.</p> <p>In terms of DEL-only funding, the awards seem modest overall. For the projects shared across divisions, the funding is more substantial. We have concluded from this that:</p> <ul style="list-style-type: none"> • the PO has done an incredible job funding as many projects as she has within DEL’s budget. • The PO has found funding outside of DEL in order to be able to achieve this success rate (see III.1 above). • a small but effective percentage of funding went toward supporting training and/or project planning, in both academic and indigenous settings. • incremental funding, but without long-term commitment to follow up with additional funding for later stages of a project, is a challenge that can’t be met with a part-time, rotating PO position. <p>In the current climate of PhD programs where there has been increased emphasis on reducing the number of students admitted and reducing time to degree, the result has been a reduction in numbers of students planning, and training, to conduct field research. However, many programs remain committed to fieldwork. DDRIG funding is critical for the realization of these commitments.</p>	<p style="text-align: center;">YES</p>

<p>DDRIG also contributes to capacity-building and the diversification of the academy, two goals that go hand-in-hand for DEL. While the number of DDRIG awards remains small, the impact of these awards is huge. Several of the scholars who are defining/leading the way in the fields of documentary linguistics, language endangerment and revitalization were supported by DDRIG awards/grants.</p>	
<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments: The DEL portfolio shows both geographical and institutional diversity. The one gap in geographic coverage is the southeastern U.S. However, we see evidence that DEL is responsible for a substantial portion of the overall BCS funding to several states: SD, AK, MT, OK, HI, MN.</p> <p>Regarding types of institutions, DEL funding follows a consistent distribution pattern where the percentage of funding going to non-R1 research institutions approaches 50% in 2016 and 2018. From 2015-2018, the funding is more distributed across the range of institution types than from 2012-2014.</p>	<p>YES</p>
<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments: The portfolio is exemplary in this regard, especially years 2016 and 2017. We especially appreciate the commitment to building a pipeline for recruitment and retention of indigenous scholars as well as building capacity in multiple domains (within indigenous communities, within academic institutions, across disciplinary fields and international boundaries).</p> <p>During the review period, the proportion of all proposals that came from new investigators increased substantially; the corresponding proportion of all funded projects that were awarded to new investigators also doubled. Focusing on 2017, we attribute the increase in proposals from new investigators to the outreach efforts initiated by the PO (responding to a suggestion from the 2015 COV). We attribute the increasing number of awards to and success rates for these new investigators to the concentrated efforts of the PO in securing cross-program funding, which made it possible for more of these proposals to be funded (again, responding to a suggestion from the 2015 COV). The increase in new investigator submissions and awards also accompanies an increase in the demographic diversity of PIs and in the participation of underrepresented groups.</p> <p>As a partial test of the hypothesis that boots on the ground make a difference, we asked for comparable data from the DEL State of the Program report prepared for</p>	<p>YES</p>

<p>the 2015 COV — we discovered that proposals from new PIs were in the majority all three years, but that actual awards were far more likely to go to prior PIs. This suggests that the rates of proposal submission by new PIs can vary substantially from year to year, so these numbers do not necessarily reflect the PO’s efforts to solicit new proposals. In contrast, the high rates of success for new PIs in 2016 and 2017 are unprecedented (at least in the data available to us), which better allows us to attribute this effect to changes made by the PO, most notable of which were the diversification of the community of reviewers and the more active solicitation of cross-program funding. (See “other suggestions” for possible ways to allow future COV members to more rigorously test such hypotheses.)</p> <p>Regarding PI demographics, DEL has a strong representation of American Indian/Alaskan Native, African American, Hispanic, and Multi-racial PIs, but awards to African American PIs was weak and (surprisingly) no Native Hawaiian PIs received a DEL award during the study period.</p> <p>Regarding gender, fairly similar numbers of projects were submitted by men and women, but women were funded at higher rates. PIs of “unknown” gender represent a small proportion of submissions every year, and are funded at lower levels than either declared gender. We do not see substantive issues with the gender distribution of awards.</p>	
<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <p>It would be nice to have demographic information about non-PI personnel whose research activity is supported by NSF grants.</p> <p>As with previous reports, the field of language documentation (of which many of these proposals are a part) would benefit from more explicit engagement with theoretical questions relevant to the disciplinary foci of the projects, including questions emerging within the field of language documentation itself. One area that we noticed in particular is speech, a growing concern with expanding DEL’s focus to include a greater range of genres, especially conversation and other styles of speech. The theoretical questions that pertain to this domain of research are largely underspecified, theoretically and methodologically, in the samples reviewed. To address this challenge, we recommend that the PO expand the pool of scholars involved in the review process to match the range reflected in the proposals.</p> <p>We encourage DEL to continue to develop collaborations with divisions outside of SBE in order to maintain the breadth of research funded and its success in funding proposals.</p> <p>We also think that additional synergistic activities/relationships could be developed around three key areas: language acquisition, learning, and cognitive development.</p>	

Recommendation: It would be useful to have a world map of languages documented; the word map provided was not terribly helpful for our purposes.

Recommendation: Collect data on departmental affiliations of PIs who submit proposals as compared to departmental affiliations of PIs who receive awards.

V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

DIVISION LEVEL DISCUSSION

1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?

Emerging areas of inquiry that specifically relate to endangered languages:

- Correlations between use of ancestral languages and community wellness
- Combining studies of language and toponymy (place names) and ethnobotany (correlations between culture-specific labels for flora).

We have seen the emergence of Language Documentation as a distinct interdisciplinary field, combining elements of Linguistics, Anthropology, American Indian Studies, Archiving/Information Studies, and thus standing apart from them all. Language Documentation efforts primarily originated in Linguistics, and from this origin, it retains its focus on language; however, practitioners of Language Documentation all do field work, often making long-term commitments to specific speech communities, and in this their work activities have more in common with those of anthropology than those of mainstream linguistics. The growing distinctiveness makes it quite difficult to fully fold DEL into the Linguistics program:

- While there are both linguists and anthropologists on DEL panels, there is almost no overlap between the individuals who serve on panels for DEL, Linguistics, and anthropology. The Linguistics PO asserts that, while perhaps some of the linguists who serve on DEL panels might be appropriate to serve on Linguistics panels, the reverse is not true, as most of the Linguistics panelists are not field workers and so are largely unaware of the issues central to assessing DEL proposals. As such, if the DEL panel were to be folded into a Linguistics panel, that panel would either have to become quite large or else would have to accept that many fewer panelists would be qualified to review proposals from each field.
- In a related vein, we cannot readily identify a pool of scholars who could actually speak to the issues and needs of a combined DEL + Linguistics, and who could therefore compose a viable and balanced two-member Committee of Visitors.

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

Balance between openness and privacy on recordings of natural speech, especially of unscripted conversations.

Primary data is becoming more and more accessible for “mining” and analysis by scholars who did not participate in the collection or the preparation of the data for consumption. There seems to be a general sense that it is unfair to those who collect and curate primary data when unrelated outsiders swoop in afterwards and “mine” these data for well-rewarded theoretical publications, and even though they (usually) thank the data collectors in the acknowledgments, little tangible reward accrues to the original source of the data. Rather than restrict access to primary data to allow greater opportunities for the original data collector to create academic products, we advocate creating mechanisms for increasing recognition for the value of creating archived collections. In this regard, we echo the 2015 DEL COV in their call for treating archived, open-access primary data as citable, reviewable data resources, such that they are cited alongside citations of citations to the theoretical literature. Among other things, this would facilitate the ability of academic departments to better assess and reward those who create “mere” data (see III.1 for discussion of efforts that the DEL PO made to implement these suggestions).

Our PO solicited proposals for such workshops.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

The recent PO did the following, which we recommend as best practices for reaching a wider public:

- Video series on how to prepare better proposals, all the things you need to consider (8 modules, with various speakers)
- Outreach to under-represented communities and institutions, which often happen to be located in geographic areas that are severely under-represented in BCS awards (cf. III.1)
- Presentations and posters at national and international conferences and workshops

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

None provided

2. Please provide comments as appropriate on the program’s performance in meeting program-specific goals and objectives that are not covered by the above questions.

During this four-year period, DEL has done an exceptional job meeting program-specific and division-specific goals, especially in terms of broadening participation and diverse minds. These achievements have resulted not only from how the PO managed the program in relation to points above, but also in

relation to her **outreach** efforts – working with new PIs on proposals and encouraging their participation in grant-writing workshops, supporting opportunities for basic training in linguistics and documentation (CoLang), and mentoring new reviewers into standards for proposal evaluation. Furthermore, her ability to build **partnerships** was critical to the success of the program – establishing relationships with other divisions within NSF and with other government programs, encouraging partnerships between PIs at R1 institutions and tribal colleges, building trust with indigenous communities.

From our study of the program over this review period, it is clear that the PO for DEL requires a unique expertise compatible with DEL’s interdisciplinary foci, diverse research, and breadth of participants. Additionally, the PO must have specialized knowledge of the different standards of compliance in archiving documentary corpora, of differences across communities (indigenous, institutional, international), of the range of challenges facing new vs prior applicants, and of the differences in capacity across institutions and across stakeholders involved in endangered language research (PIs, elders, community language advocates, tribal governments, etc.). Especially with indigenous communities, it has been our experiences that relationships of trust require time to build up and they are neither transactional nor fungible — the next PO to rotate in does not inherit relationships of trust from the prior PO, but must build them anew from scratch. Given the unusually high number of relationships that must be maintained in order for this particular program to function well, it is clear that the program needs not only a full-time PO, but a permanent PO.

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

In trying to tease apart some of the data on proposal success provided to the COV, we were forced to infer a relationship between (i) the description of PO efforts to increase proposal submission from and funding awarded to a broader demographic of PIs, (ii) increases in the number and overall proportion of awards to new PIs, (iii) increases in the number of submissions from and awards to institutions other than top 100 research-intensive universities and (iv) increases in the number of BCS awards to states that otherwise might be absent altogether from the list of states receiving BCS awards. We suggest that NSF data services create two-dimensional tables (a) correlating demographic information about PIs with the categories of new PI vs. PI with prior NSF support; (b) demographic information with category of their home institutions, and (c) all three of the prior categories with distribution of PIs by state.

Another suggestion is that the BCS Division collect demographic information about all employees who are paid to work on each grant. We suspect that the true breadth of participation in DEL projects is understated because a disproportionate number of PIs are white academics, whereas many of the participants who are doing the actual work belong to more diverse demographics.

4. Please provide comments on any other issues the COV feels are relevant.

Upon arrival here for the COV, we learned about some important management decisions regarding the “repositioning” of SBE which has serious implications for the future of the DEL Program: (i) the name is about to change from Documenting Endangered Languages (DEL) to Dynamic Language Infrastructure (DLI); (ii) the new DLI is to be merged with the Linguistics Program; (iii) the PO position for DEL has been discontinued, with the expectation being that the work formerly done by the DEL PO can be done by the

two Linguistics POs with the assistance of a remote half-time position to facilitate the review of DLI proposals. We discuss these three changes in order.

Regarding the change to DLI, our initial reaction was somewhat shocked and unhappy and we expect a similarly negative initial reaction from most of the Language Documentation community. However, in the two and a half days of the COV, the new name has grown on us. We see benefits in losing the label “Endangered”, which some speech communities see as reducing the complexity of minority language situations to a negative label, a kind of threat. We also recognize that, to the uninitiated, the images associated with the term “documentation” are not automatically associated with the kind of rigorous scientific methods and outcomes that the NSF is known for. In the new label, the phrase “Dynamic Language” is evocative of the variation and change that is ubiquitous in all human languages, suggesting studies of both the socially conditioned variation in speech at any point in time as well as of change in language over time, both of which are more expansive than, but absolutely germane to, the kinds of language shift that are associated with the phrase “Endangered Languages”. The term “infrastructure” also contains both continuity and more expansive boundaries: Infrastructure associated with Dynamic Language evokes contributions to the development of archival hardware and software, both foci of the DEL program to date, but it also opens the door to studies of the cognitive and social infrastructure that characterizes (i) non-WEIRD populations, (ii) situations where speakers are decreasing their use of an ancestral language in favor of a national language, or (iii) the situations in communities and in the brains of individuals when some are actually moving towards (re)gaining fluency in a language that has become less widely used (or even altogether unused), i.e., situations of adult and child language learning associated with active programs of language revitalization. While we expect the call for proposals to continue to specify that collection, annotation, curation, and archiving of a reasonably substantial documentary corpus remains the core mission, we think it could be exciting to expand the range of research supported under the new DLI Program.

Regarding the merge with Linguistics, this forces together two quite different programs and we think it is a mistake. As articulated in the 2012 COV report, the 2015 COV report, and in this COV report (III.1), the field of Language Documentation has diverged substantially from Linguistics, and in its focus on field work in non-WEIRD communities, in some ways it has more affinities with Cultural Anthropology than with Linguistics. In fact, when we learned that there are different arms of BCS loosely characterized as “psych” and “anthro”, we realized that Linguistics clearly belongs with the psych branch, while DEL just as clearly belongs with the anthropology branch. As a practical matter, we are concerned that it would be difficult for a future COV to find two members who could effectively assess both the Linguistics and the DEL portfolios. Aside from these comments, we acknowledge it is not within our charge to assess the grounds for this management decision, but we want to underscore the centrality of human behavior and society to DEL’s research program. The research not only investigates languages, but how people and networks of people use – and don’t use – language(s).

Regarding the reduction in FTE, as publicized in posts on both the LSA website and LinguistList, we think such a change would be devastating for this program’s continued success. As administrators we have also been called to make decisions in which individual areas of our departments were reduced in order to open up opportunities for the larger unit; as such, we accept that our disciplinary concerns cannot be the driving force behind management decisions at the BCS or SBE level. However, we believe that this move will hurt the larger BCS goals of broadening participation and expanding interdisciplinary research. In response to specific suggestions in the 2015 COV report, the DEL PO invested significant time and energy into developing programmatic innovations aimed at broadening participation by PIs and institutions associated with previously underrepresented demographics; she also expanded

collaborative research with other disciplines and stimulated DEL proposals that would be of interest for cross-Program funding. As described elsewhere in the report, those investments were remarkably successful in both domains. In fact, it would be fair to say the success of the entire BCS division in securing participation by Native American PIs (and the institutions and geographic regions associated with those PIs) is almost exclusively owed to the DEL program.

Our management concern is that these successes are the result of significant work, work which is clearly beyond that reflected in the raw numbers of proposals submitted, evaluated and funded. In some ways, this is the stereotypical “invisible work” — we want the accomplishments in broadening participation and expanding cross-program research to be acknowledged, and the work that forms the foundation for such accomplishments to be recognized as a crucial part of a PO’s job. More to the point, we believe that the profile of the BCS Division needs the continued contributions provided by the demographic diversity of DEL PIs, the diversity in institution type and geographic distribution of the institutions that receive DEL funding, and the continued growth of interdisciplinary research involving the languages and peoples from non-WEIRD communities. We submit that without dedicated FTE for a full-time PO, the new DLI will struggle to establish and maintain relationships of trust with diverse communities and institutions, and also with other NSF programs. A permanent, full-time PO could build on the successes of the existing program and continue to contribute this diverse and successful portfolio to the benefit of the overall BCS profile.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

- Re: COV process: downloading of individuals files vs. file dump
- Re: COV process: “maps” or tables with data regarding:
 - a. Geographic distribution of reviewers (panel & adhoc)
 - b. Demographic distribution of reviewers (panel & ad hoc)
 - c. Frequency of service: of individual panelists & ad hoc reviewers
 - d. Institutional distribution of reviewers (community college, R1, non-profit)
 - e. Languages/language families funded: by 3-year period and overall

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SIGNATURE BLOCK:

/s/ Spike Gildea

/s/ Barbra Meek

For the Documenting Endangered Languages Program

Geography & Spatial Sciences – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review

process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments:</p> <p>We specifically reviewed two changes that had been initiated through GSS, the One Plus program for senior proposals, and the change to rolling deadlines for the DDRI.</p> <p>The GSS program instituted the One Plus program as an innovation to balance Program Officer (PO) workload by reducing the ‘churning’ problem of having to get all proposal reviews back to PIs before the next solicitation, and help address the ‘moving target’ problem that besets proposals that review well and are of high significance but would benefit from revision. The Rapid Revision and Resubmission idea was that rather than going through the full review process once again under a different panel, a short period for revision and reconsideration by program officers and the same panel would expedite potential funding for proposals of merit. The 2015 COV report as well as GSS Program Officers specifically asked for a review of the One Plus program. Drawbacks appear to be that it reduced the number of solicitations from two to one, and potentially increased the acceptance rate of the reconsidered proposals, leading to a perception that in sum, the second review was less competitive.</p> <p>DDRI – The COV was also asked to review changes to the DDRI program, specifically the move to rolling deadlines. We only have one data point so far (2018) but note that the moving deadline reduced the number of DDRI applicants from an average of 161 per year to 52 in 2018. This is a significant decrease. An analysis of panel review ratings of proposals in 2018 vs. those prior to 2018 indicates that panel scores for funded proposals are comparable with those prior to moving to a deadline. This suggests to the COV that there has been no obvious decline in the quality of funded proposals although the number has been reduced. At the same time, the low number greatly reduces PO workload. If quality is not being sacrificed through lower submission rates, but workload is more balanced for Program Officers, then we judge the move to a rolling deadline as a positive change.</p> <p>Recommendation: We recommend that the One Plus program be changed and replaced with the following: Move to a two-solicitation model, one in fall (end of</p>	<p>YES</p>

<p>summer) and one in spring (at some point after the holidays). This will provide more opportunities for submissions. This will allow researchers who collect preliminary data over the summer a period of time to analyze these data and prepare a competitive proposal without waiting a full year. To alleviate the ‘churning’ problem, we recommend allowing each PI to submit only one proposal per year, so that there is not the deadline for Program Officers to complete the entire review process before the next solicitation. We also recommend that the Program Officers use the Addendum option for a limited number of highly significant proposals that are not funded, to request revisions to be submitted in time for the following panel. This should continue to address the ‘moving target’ problem for proposals that are potentially highly competitive with minor revisions. A two-solicitation model will also reduce any perception that the second panel review is less competitive.</p> <p>Recommendation: While concluding that the DDRI continues to be a valuable program within GSS, we have only one year of review, and recommend that the program be monitored each year for any potential erosion of proposal quality associated with fewer submissions and that the next COV revisit this question.</p>	
<p>2. Are both merit review criteria addressed</p> <p>a) In individual reviews?</p> <p>Yes, all reviewers, both ad-hoc and panelists addressed both review criteria.</p> <p>There continues to be a bias in reviews towards greater emphasis on intellectual merit and not broader impacts. The COV however thought that at one level this is appropriate given that the majority of all proposals reviewed focused on the intellectual merit of the research. In this regard, we were impressed with the level of attention given by reviewers to ensure that proposals are well grounded in theory and will advance theory – and also impressed with the reviewer’s efforts to examine methods.</p> <p>In a number of cases, reviewers simply repeated the stated broader impacts (BI) and indicated their opinion of the level of value they have. Critiques with suggestions for improvement, like was done with intellectual merit, are less robust for BI. This may be due to a continued uncertainty regarding what are appropriate broader impacts. The most common broader impacts were those that increase diversity in STEM education, such as the training of underrepresented student populations or inclusion of K-12 STEM education. Another common BI was to society through working directly with public agencies on management issues. These are both quite appropriate BI within GSS, and the primary critique from reviewers was that PIs did not provide sufficient detail of how they would achieve these goals.</p> <p>b) In panel summaries?</p> <p>Panel summaries always included statements of both review criteria. As with individual reviews, the section for intellectual merit was typically longer and more specific than</p>	<p>YES</p>

that for BI. On the whole, panel summaries were extremely short and often pointed the PI back to the individual reviews for details.

Recommendation: We recommend that panelists be urged to write more substantial summaries with more specific details, especially concerning weaknesses in a proposal. This seems to be particularly true for proposals that are competitive but might be declined funding.

c) In Program Officer review analyses?

The Program Officer review analysis was always more complete than panel summaries and often provided useful insight into why a proposal was declined for funding. The context statement clearly states that PIs are encouraged to reach out to program officers if they have any questions concerning the review, and this mechanism should allow program officers to help explain the context of their decisions to PIs who desire more information.

GSS includes two additional review criteria for reviewers that are not specified by NSF, a score (1-5) on both the long-term significance and likelihood of being conducted successfully. These two metrics appear to help clarify the relative strength of proposals and are an excellent contribution to the review process. This was formerly a 7-point Likert scale, and the shift to a 5-point scale appears to have improved the review process by simplifying the scoring.

Another positive change in the review process has been the shift from five funding categories (High, Med-High, Med, Med Low & Low) to simply High, Medium and Low for Competitive proposals. This change is also an improvement and appears to have clarified those proposals most worthy of funding. In addition, the Program Officers have moved the 'classification' of competitive proposals into these three categories to be the last task completed by the panel. This is also a great improvement because it allows all proposals to be reviewed first into simply Competitive or Not-Competitive, and then the position into the three groups is accomplished only after all proposals have been reviewed, thus removing the tendency to hold early projects back in a lower category under the expectation that there may be better proposals in the queue.

Through the COV Full Committee discussion it was requested to suggest BI most relevant to our programs. Considering both the focus of PIs and the problems they work on, the COV feel that the most relevant types of broader impacts are 'Building STEM talent' through funding graduate students, undergraduate students and engaging in K-12 education. GSS proposals also engage in 'Improving our Society' through the production of science products that benefit society by helping guide policy and management decisions. The third area of BI that is particularly important within GSS is 'Reaching Beyond Borders' since there are many proposals with an international component intended to better understand the culture of other people in relation to our own society. The other two categories of BI, 'Innovation for the Future' and 'Engaging a Wider Audience' also are part of proposals, if possibly to a lesser extent.

No Recommendation

<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments: Yes, however this is not universally true. Approximately 35% give extremely thorough reviews of several paragraphs or more that thoroughly critique multiple parts of the proposal and provide very specific and detailed suggestions for improvement, or examples of excellence. Another 50% or so provide more limited but very good comments and suggestions, often being a long paragraph or more on both criteria and substantive comments on BI. The final ~15% are so short and vague as to be virtually useless.</p> <p>While not being universally true, in general the most specific reviews came from ad-hoc reviewers rather than panelists.</p> <p>The Program Officers do an excellent job of trying to get more than the minimum number of three total reviews. We found that <10% of all proposals had only three reviews and about 20% had four reviews. This means that ~70% of all proposals have five or more reviews which demonstrates an exceptional effort by program officers to obtain robust reviews. Two reviews are always provided by panelists, meaning that in those cases with three total reviews only one was an ad-hoc review. We argue that three reviews, with only one ad-hoc review, is insufficient for a robust review.</p> <p>Recommendation: While we recognize that obtaining external reviews is one of the most labor-intensive activities of Program Officers, the vagaries of the process suggest that having only one external review is simply insufficient input for a robust decision. We urge a minimum of four reviews in all funding decisions if possible. There is a flip side to the multiple review issue. Some interdisciplinary proposals receive six or more reviews because the proposals have significant physical and social science component and reviewers with strengths in each sub-discipline are invited. The concern here is not with co-review, but for reviews within GSS. Multiple reviews are quite appropriate but can result in a wide range of scores. This range likely accurately indicates problems in the proposal, however there is also simply the variability among reviewers in their scoring, and more reviews introduces more variability. The COV does not have a specific recommendation on how to deal with these, but in the interest of encouraging more strong interdisciplinary proposals, simply raises this as a potential issue to monitor.</p>	<p>YES</p>
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: Yes – although see section 2 as to potentially strengthening panel summaries by providing more details to PIs, particularly those that are competitive though on the bubble for funding.</p> <p>No Recommendation</p>	<p>YES</p>

<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: Yes, the program officer review analysis, which is the element in the jacket that is not forwarded to PIs, nearly always included a clear rationale for the decision.</p> <p>No Recommendation</p>	<p>YES</p>
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments: The context statement goes a long way towards providing an explanation of the decision-making process of the panel as a whole, but not necessarily the actual process for the PIs proposal. There is a certain amount of panel discussion that is part of a decision that is not necessarily captured in the written explanations. Telephoning the PI in such cases, as noted above, is probably the best way that this type of information is communicated. As noted earlier, more substantial panel summaries would be beneficial to PIs in cases of a decline.</p> <p>No Recommendation</p>	<p>YES</p>
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>Review narratives are very inconsistent in their format. Although NSF provides five review criteria that are to be used for both Intellectual Merit and Broader Impacts, and asks for both strengths and weaknesses in each case, many reviewers do not address all five criteria, the strengths and weaknesses are not always clearly expressed, and some narratives are sufficiently confusing that the first challenge is to simply interpret the review.</p> <p>Recommendation: We feel that NSF needs to continue to encourage reviews that have a complete and consistent narrative structure so that panelists, program officers and PIs do not have to try to interpret the review. This might be accomplished in a number of ways. First, reduce the criteria from 5 to 4. There is sufficient overlap with criteria 1&2 that it might be best to revise these into one criteria for advancement of a potentially transformative concept. Second, there is an electronic format within Research.gov for filing annual award reports that enforces compliance for completeness. Possibly such a system could be emplaced for reviews. Third, a less invasive approach might be to specify 4 subheadings that reviewers use, and the narrative must use these subheadings. An alternative to this is that within a paragraph the numbers 1,2,3 & 4 are required to indicate which criteria that review is addressing. The only method above that could enforce compliance is the actual online form, which</p>	

<p>may be anathema to reviewers, but we strongly recommend a continued review of the process that better ensures complete reviews with an intelligible narrative.</p> <p>While we have provided what we hope is constructive feedback, we feel that the GSS review process is thorough, robust, and fair and has led to excellent decisions by the Program Officers. The adjustments they have made through time, in responding to needs within the discipline, streamlining reviewer and panel decision-making, and communicating with PIs have been effective and led to a continuously improving process. We commend their efforts to create an effective and efficient, high-quality review process.</p>	
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II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: The GSS Program Information for this COV documents the procedures used in selecting ad hoc reviewers and panel members for proposal review. For senior research proposals, a list of about 4-6 expert ad-hoc reviewers are invited for each proposal. These lists are selected from a variety of sources including reviewers suggested by the PI (when there are no conflicts of interest) and PO’s selection of reviewers based on their expertise. Attention is paid to include reviewers from diverse backgrounds, institutions (public or private), and career stages (junior or established scholars). For the senior panel which generally has about 25 members, panel members are selected also based on a balanced mix of expertise, backgrounds, and institutions. It is noted that the Program typically does not invite professors without tenure to its senior panel to avoid the “potential power dynamics” of a panel that might impact his/her tenure and promotion.</p> <p>For the GSS-DDRI competition, proposals are reviewed only by three panel members. Ad hoc reviewers are involved only when there are conflicts of interest between the PI and the panel. Similar to the senior panel member selection, the same attention is paid to maintain a balanced mix of expertise and background. One difference is that the program has recently started inviting junior scholars (assistant professor rank) to serve</p>	<p>YES</p>

<p>on the DDRI panel., in an effort to introduce them to the reviewing process and ideally strengthen their own ability to submit competitive proposals.</p> <p>Recommendation: The POs in the GSS program have been actively engaging in outreach such as conducting workshops in professional meetings, delivering talks at universities, and conducting one-to-one phone conversations with potential PIs. They have actively recruited volunteers from junior faculty and scholars to help conduct the review (as well as submit research proposals). While there is no quantitative measure on how effective all these activities are, they seem to be worthy practices to help cultivate the next generation and increase the quality and impacts of the proposals funded by the program. We recommend continuation of the practice.</p>	
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: The GSS program has explained the Conflicts of Interest guidelines clearly to panelists and ad hoc reviewers, and adequate procedures have been followed throughout the process to resolve a COI when it arises. By utilizing the COI information from the section of Collaborators and Other Affiliations in the proposal, most COIs are avoided. On the rare occasion when a COI is identified after a review is submitted, the review will not be considered or released to the PI.</p> <p>Recommendation: We did not see any issues regarding the handling of the Conflicts of Interest. We recommend continuation of the practice.</p>	<p>YES</p>
<p>3. Additional comments on reviewer selection:</p> <p>It seems that finding good ad hoc reviewers who would agree to conduct proposal review is increasingly difficult as faculty scholars nowadays seem to have more and more demand from other research activities such as reviewing manuscripts for a variety of journals. Recognizing the problem of obtaining sufficient ad-hoc reviewers from a limited potential pool, and recognizing that within GSS the vast majority of proposals get five or more total reviews, we simply reiterate the recommendation where at all possible to try to obtain a minimum of 2 ad-hoc reviews per proposal (four total reviews).</p>	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW

1. Management of the program.

Comments:

The GSS program is very well managed. GSS has had on average three program officers during the COV review period (2015-2018), but recently the number of POs is down to two. The reduction in number of POs is of concern and should be monitored. The program supports two types of solicitation – the senior and the DDRI proposals. During the COV review period, on average the program processed more than 200 senior proposals and 160 DDRI proposals each year (except in 2018 the number of DDRI proposals dropped after the implementation of no-deadline policy; issues concerning the DDRI competition have already been discussed in Section 1). In addition, the program has actively participated in co-reviews with many other programs at NSF, as well as assisted in a number of NSF-wide initiatives such as the Dynamics of Coupled Natural-Human Systems (CNH), Smart and Connected Communities, Coast and People, and others. These are laudable activities that would bring more synergy and collaboration across disciplines.

We discussed the One-Plus system and the DDRI no-deadline policies in Section 1 and have made recommendations regarding these two policies.

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

The GSS program has been very responsive to emerging research and education opportunities by actively participating in NSF-wide initiatives. The POs in this program have served as POs for cross-directorate programs such as the Dynamics of Coupled Natural and Human Systems, the Belmont Forum, Coast and People, and the ten Big Ideas initiatives.

Recommendation: Some of these emerging research and education opportunities are indeed good opportunities for the GSS research community to compete and contribute. However, many potential PIs are not familiar with these new initiatives. The program could consider more outreach to relevant communities to bring attention to these opportunities.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

After the completion of any panel, the GSS program makes funding recommendations based on the merit of the proposals, appropriateness of the proposal within GSS, demographics of PIs and institutions, and

portfolio balance. In addition, as mentioned above, POs have been actively participating in the development of NSF-wide emerging research and education initiatives. Funding priorities within the GSS program are also guided by these new initiatives, and when applicable, awarded proposals are coded with the appropriate program codes to reflect the type of research projects funded.

Recommendation: Given that the constantly changing science priorities and funding opportunities presented outside individual programs, the GSS program may wish to consider updating their solicitations for proposals by outlining their funding priorities as well as bringing attention to emerging research opportunities.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

The GSS program has responded thoroughly to the 2015 COV comments and recommendations. The 2015 COV made four recommendation. First, the 2015 COV recommended that the program should clarify the funding rates in resubmission, however, after the tightening of rules regarding public communication of specific success rates, GSS could not release the detailed information. The other three recommendations, including stressing the importance of both funding criteria to the ad hoc reviewers, shortening the review invitation letter, and encouraging proposers to make personal contact for additional information regarding funding decisions, have all been implemented.

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: The GSS program historically has been supporting a wide range of research areas. The program has responded to new research initiatives and has made great efforts to continuously cultivate a balanced portfolio. For this review, a tree map of portfolio research areas is provided in the document, which does not present a clear logic of sub-disciplines or sub-program areas. Instead, we tabulated the sample proposals into roughly three categories – biophysical, human, and methods. For the senior proposals presented in the sample provided to the COV, there were more biophysical proposals submitted (approximately 50%), and they also had a higher success rate. The other two categories had roughly the same</p>	<p>YES</p>

<p>percentage of proposals submitted (each 25%) and success rates that were similar to each other, though slightly less than those of biophysical submissions. For the group of awarded DDRI proposals within the sample provided the COV members, biophysical and human proposals each had about the same success rate, with only a small percentage funded in the methods area. These discrepancies have been observed in previous COV reviews and are largely due to the nature of the discipline. Overall, the program has a balanced portfolio.</p> <p>Recommendation: In Section 1 above, we recommended monitoring the effects of DDRI's no-deadline policy, which will include its effects on portfolio balance as well as quality of the research proposals.</p>	
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: From the tables provided to the COV members, the average award size of a senior proposal was about \$277,000, with an average duration of 3.42 years. The average award size has increased steadily over the review period. The award size and duration of the awarded project are appropriate. However, it is noted that the GSS program typically does not fund research projects that request funds over \$500,000, the average award size in this review period might have reflected "self-regulation."</p> <p>Recommendation: As is true in many programs in BCS, GSS is constrained by the budget and can seldom fund very large projects. Large projects often come from foundation-wide new initiatives that involve multidisciplinary expertise, which GSS researchers are more likely to engage in. Similar to the previous recommendation (Section 3), increasing awareness of other funding opportunities to the GSS communities might help generate more participation in the new initiatives.</p>	YES
<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments: The program is committed to maintaining a diversified portfolio and has done a good job in achieving it. With respect to the geographical distribution of principal investigators, the maps provided in the report will need to be interpreted carefully since the denominators were not used. However, by comparing the two maps to obtain the success rate by state, we observe that EPSCOR states in the mid-west generally had lower funding rates.</p> <p>The disparity in funding rate between research-intensive and non-research-intensive institutions continues to be large and is expected. POs have continued to conduct outreach to regional/local meetings to engage potential proposers from non-research-intensive institutions whenever opportunities present.</p>	YES

<p>Recommendation: The previous recommendation of producing short video modules about the GSS program, such as proposal writing tips, funding opportunities for non-research-intensive institutions, could help in increasing participation from these institutions.</p>	
<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments:</p> <p><u>New Investigators:</u> Among applicants, the majority of all senior proposals came from new investigators (those submitting to GSS for the first time) but the success rate of prior investigators is nearly double that of new investigators. However, relative to the average success rate for the program overall there is not a large disparity for new investigators and, considering lack of experience, suggests that whatever efforts are being made by POs to help new investigators prepare proposals is being successful.</p> <p><u>Demographics of Principal Investigators:</u> Of all applicants, 52% identified as male, 32% identified as female, and 16% identified as unknown. The membership of the AAG in 2017 was recorded as 62% male and 38% female. Given the large uncertainty with the 16% unknown, the proportion of applicants is proportional to the gender demographics of the AAG membership. Funding rates among those identifying as male or female are identical. We conclude that there appears to be no particular bias in the application and review process.</p> <p><u>Participation of Underrepresented Groups:</u> The number of applications from those identifying as Black/African American is low, representing only 1% of all applications during the period under review, 2015 – 2018. The success rate averages slightly less than the program’s funding rate average overall. To some extent, the lower funding rate could be a small ‘n’ problem. The data also do not distinguish whether there are multiple different applicants, or fewer people with multiple proposal submission attempts, however it points to a general problem across the discipline of the low number of African Americans within academia and the challenge of how to increase overall success among this population at NSF. Hispanic applications are slightly higher, with a success rate higher than the program’s average. For the period, 61% of all applicants identified as ‘white’, 14% identified as Asian. Only 2 proposals came in from Native Hawaiian/Pacific Islanders. “Unknown’ represented 19% of all applicants. In comparison with the AAG, 86.7% identified as white, 28% Asian, 7.5% Hispanic, 5% African American and 0.3% Pacific Islander. The number of applicants from underrepresented groups are lower proportionately than the professional membership, but not substantially different, suggesting that</p>	<p>YES</p>

<p>Program Officers are doing a good job of reaching out to underrepresented populations to submit proposals. They have developed a process whereby unsuccessful investigators are often invited to serve on a virtual DDRI panel to become more familiar with the proposal review process and develop a network of other research active faculty. They may also be invited to serve on the senior panel in Washington DC. This process, POs are trying to build a pathway towards granting success within these populations. We commend this positive approach and support its continued use.</p> <p>Seen overall, the rate of applicants and awardees is quite balanced within GSS and the program officers are to be commended for making the outreach efforts that are essential for such a result. Underrepresented groups are still not at full parity with the discipline, but the POs have developed a good strategy for bringing them into the NSF process and creating a pathway to lead to greater success.</p> <p>No Recommendation</p>	
<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <p>GSS formerly had three Program Officers but at this time is reduced to two. At the moment, neither is a permanent Program Officer. The reduction in personnel will undoubtedly place a greater burden on the ability to effectively process all solicitations and awards, serve on panels across NSF, and perform outreach activities. Due to the nature of the strong interdisciplinarity of the GSS program, and PO involvement in programs working on the environment across NSF, there is a very large demand on their time to remain involved with multiple programs within the agency. The capacity to further expand and track programs will become more challenging under these circumstances. This situation needs to be monitored.</p>	

V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

DIVISION LEVEL DISCUSSION

1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?

Researchers within BCS could proactively respond across the division to one or more of NSF's 10 Big Ideas by proposing a workshop or planning meeting that brings together a team to respond to one of these topic areas. Several seem appropriate, including 'Future of Work at the Human-Technology Frontier', 'Navigating the New Arctic', "NSF Includes" and 'Growing Convergence Research.'

Given that resources have already been earmarked for these research directions, and there is a great deal of potential collaboration between BCS programs in these areas, a workshop that develops a research agenda in response to this call seems appropriate.

Another research opportunity may be with 'Coastlines and People,' which should be relevant to multiple programs within BCS. Particularly with sea level rise, the assessment of potential for displacement and forced migration, ecological damage, and changes in climate/coastal interactions (hurricanes) this potential research focus seems rich with possibility.

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

The open access to data from NSF-funded research has been a huge issue. We recognize that some of the data are subject to IRB (e.g. personal interview) and/or propriety and copyright (e.g. purchased Twitter data). We recommend that there is a need to respond to the data management plan to help improve the data access and archiving issue. Two recommendations are: (1) the solicitation or the proposal preparation guide could require a statement regarding data management as an item of broader impact under the section of Prior Support. (2) the project report in Research.gov could add a required item regarding the report of the data management plan.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

One possible idea is that of 'ambassadors' or a 'committee of contacts' intended to leverage researchers with prior NSF experience, or former Program Officers, at various institutions that can make presentations or hold workshops at their institution or other institutions in their area that they have knowledge of, for the purpose of sharing information about opportunities and effective proposal preparation. This would require some formal structure from NSF, and some level of recognition to the individual as a legitimate NSF outreach service so that it could appear in their service commitments to the profession.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

The COV feels that GSS is very well managed and that the review process has been improved through time to meet the needs of the research community. The POs are also doing a very good job of reaching out to new PIs and in their efforts to serve underrepresented groups. The success rate of new investigators is not far behind the average success rate and we encourage the POs to continue to communicate this fact.

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

None Provided

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

None Provided

4. Please provide comments on any other issues the COV feels are relevant.

The webinar was extremely helpful in getting a sense of the process and what to expect.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.
 - In general, more data on each topic would be helpful for the COV process. If NSF and the programs carefully considered the data required to answer each specific question, it would facilitate a more informative review. In addition, for those programs with DDRI programs, separating DDRI data from Senior award data will be helpful.
 - If program managers were able to inform COV members of the representation of proposals received across the discipline and sub-disciplines, this would be much more valuable than the word tree received, which was very challenging to make meaningful.

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SIGNATURE BLOCK:

/s/ Nina Lam

/s/ Scott A. Mensing

For the Geography & Spatial Sciences Program

Linguistics Program – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review

process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments: The Linguistics program uses an on-site panel to review CAREER and regular research awards; a virtual panel is used to review dissertation grants. This dual approach appears to work well. The larger, senior submissions receive the attention they need; the smaller set of dissertation grant proposals, which are themselves small awards (average award of \$14,269), can be handled efficiently and cost-effectively by a virtual panel.</p> <p>The 2015 COV panel raised concerns that the split into two panels had led to the use of smaller panels by the Linguistics program. As a consequence, secondary panel reviewers might have limited knowledge of the research areas that they were reading proposals in. This concern has been addressed by increasing the size of both panels. The senior panel currently has 9 to 12 members and will be increased to 15 in FY 2020. This is a very satisfactory response to the concerns raised in the 2015 COV.</p> <p>In its review of submissions of all types, the Linguistics program makes extensive use of ad hoc reviews; in this approach to review, the Linguistics program operates differently than some of the other programs in BCS. We applaud the use of ad hoc review, because it greatly increases the likelihood that every proposal will be reviewed by individuals with genuine expertise in the area of research addressed by the proposal.</p> <p>We recommend that the Linguistics program continue using its current review methods, including the use of ad hoc reviewers and the larger panels.</p>	YES
<p>2. Are both merit review criteria addressed</p> <p style="margin-left: 20px;">a) In individual reviews?</p> <p style="margin-left: 20px;">b) In panel summaries?</p> <p style="margin-left: 20px;">c) In Program Officer review analyses?</p> <p>Comments:</p>	YES

<p>In our perusal of eJacket, we noted substantive discussion of intellectual merit and of broader impacts in reviews, panel summaries, and review analyses, essentially without fail. We noted serious discussion of broader impacts. From conversation with the PO, we learned that reviewers often suggest potential broader impacts that PIs might discuss in their revised proposals. The PO feels that PIs in the field of linguistics have improved in their treatment of broader impacts, especially regarding community and public outreach.</p> <p>We considered the review analyses of all the funded grants in our sample. We noted that the following broader impacts were mentioned:</p> <ul style="list-style-type: none"> • Real-world use of language. [An example could be the use of language in doctor-patient interactions.] • Language documentation and literacy • Data sharing, software sharing (and applications thereof) • Student opportunities for undergrads, graduate students, and postdocs • Implications for colleagues abroad (i.e., international cooperation); outreach to native speaker communities; outreach to special populations • STEM outreach to schools; women in STEM, URM/special populations in STEM (STEM workforce) • Possible clinical relevance • Education of general population, e.g. re social stigma <p>We recommend that the program consider disseminating examples of broader impacts from successful proposals to the research community.</p>	
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments: With few exceptions, reviews were substantive, whether from ad hoc reviewers or from panel members.</p> <p>Perhaps inevitably, we noted a few reviews that were somewhat skeletal. We doubt this observation has anything to do with Linguistics. We recommend that reviewers be reminded that, even if they are assigning a score of Excellent, they need to justify their scoring decision with substantive arguments.</p>	YES
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: As noted in the 2015 COV report, the panel summaries do in fact describe the rationale for the panel consensus and they report differences of opinion, when those differences exist.</p>	YES

<p>We note with approval that no proposals are triaged by the Linguistics program; all are discussed at panel meetings. Even if discussion is minimal, the panel summary directs the PI’s attention to key elements of the reviews that influenced the panel’s decision. The Program’s goal is that every panel summary should provide useful direction to PIs.</p> <p>The panel summaries offer helpful guidance with regards to resubmission. In discussion with the PO, we learned that resubmissions are often successful, suggesting that reviews and panel summaries are providing useful assistance to PIs.</p> <p>As COV panelists, who were attempting to evaluate NSF’s peer review process, we recommend that resubmissions be coded as such.</p>	
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: PO decisions were consistent with panel recommendations; we noticed just a single exception in the sample we examined. In that instance, the PO recommended that an award be made, whereas the panel had not recommended funding. Close examination of the jacket documentation (particularly the ad hoc reviews) and the review analysis made the rationale clear and fully defensible.</p>	YES
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments: The documentation provided to the PI by the Linguistics program does indeed provide the rationale for the award/decline decision.</p>	YES
<p>7. Additional comments on the quality and effectiveness of the program’s use of merit review process:</p> <p>The 2015 COV report suggested that the Linguistics program should consider establishing a “college of reviewers.” We do not agree with this recommendation. Rather we recommend that the Linguistics program continue with its practice of enlisting ad hoc proposals.</p>	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: The Linguistics program does an excellent job of getting expert reviews from both the panel and from ad-hoc reviewers. The newly-enlarged senior panel means that every application had 2 qualified panelist reviews; the way members rotate on and off the panel means that the panel always has some expertise in the review process. This is important since panel expertise is also key in discussion of ad-hoc reviews. In addition to the panelist reviews, proposals have as many as four ad-hoc, expert reviews obtained from a diverse pool of reviewers. The number of reviews seems to have no relation to funding outcome: in our sample of proposals, proposals funded only by Linguistics had an average of 4.8 reviews, while proposals declined after Linguistics review had 4.9.</p> <p>Linguistics makes very effective use of co-reviewing (and co-funding). In cases of co-reviewing, proposals typically have up to 7 reviews.</p>	YES
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: The Linguistics program seems to have recognized and resolved all COIs they encountered.</p>	YES
<p>3. Additional comments on reviewer selection:</p> <p>The Linguistics program is sensitive to the issue that revised proposals can run into unexpected trouble if a new roster of reviewers has very different reactions than reviewers on the first round. The program therefore tries to minimize changes in reviewers across rounds of reviewing, and the new panel sees the previous panel summary. We recommend that the program continue to make its best effort to minimize the use of new reviewers in the evaluation of resubmissions.</p>	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW

1. Management of the program.

Comments:

We find that the management of the Linguistics program continues to be excellent. The program has a very experienced PO, who is extremely well-regarded within the discipline. This is a big plus.

As noted above, the program previously split DDRIG and regular proposals into separate panels (the former virtual, the latter on-site), and this has worked well.

Overall funding rates for senior panel proposals, and (slightly higher) for DDRIG proposals, are good, especially relative to other programs. This translates into funding of Competitive-High and Competitive-Medium, and even the occasional Competitive-Low, proposals.

In the previous COV review, a concern was raised about the timeliness with which PIs were notified of the award/decline decision. We noticed that the “dwell time” for the Linguistics program tends to be somewhat longer than for many other programs. [Note, however, with the marginal exception of FY 18, Linguistics has met the foundation’s goal of reporting 75% of its funding decisions within 6 months of submission].

In accord with the 2015 COV discussion, the program prioritizes declines over awards (to give PIs the best shot at revising and resubmitting). One factor that may increase dwell time is the Program’s tendency to not make a final decision on proposals submitted to the Fall panel meeting that were judged “Competitive—Medium Priority” or less frequently “Competitive—Low Priority”. If such proposals cannot be immediately funded, they are often held over until the end of the FY, on the hope that there will be sufficient funding available at that time. This action is done with the assent of the PI, who is informed about his/her options with regard to the submitted proposal: either resubmit immediately or wait for a funding decision at the end of the FY. These delayed decisions are often to the PI’s advantage, inasmuch as the PI need not spend considerable time producing a revised submission that may be relatively little improved over the previous submission. Other sources of delay include co-reviewing, waiting for PIs to get IRB approval for approved projects, and funding new awardee institutions.

In our response to Question V. 1, we will address issues in the management of the Linguistics program that may arise with the merger of DEL into Linguistics.

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

The previous COV identified—as emerging areas of research in linguistics—research in which theory and experimentation are “blurred”; experimental/instrumental research outside the lab; evolution of language;

experimental semantics/pragmatics; other interdisciplinary collaborative work. The program does not solicit proposals and has not been able to make many awards in these areas, other than for collaborative experimental work. For example, according to the program, proposals on the evolution of language generally go to Biology, not Linguistics.

Linguistics has been very active in funding education efforts; it is supporting work on public education about African American English, a variety of conferences and workshops that benefit graduate student education, student travel to conferences, and the high-school-level International Linguistics Olympiad. Support of student attendance at professional conferences can be a mechanism for increasing the diversity of the field. **We recommend** that this practice be continued.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

We continue to **strongly recommend** the maintenance of the DDRIG awards within the Linguistics program. They are one important first step in the training of young researchers into the grant application process, including the review process, and are in general very likely to result in publications. They provide a big bang for the award buck; DDRIG awards are an excellent investment.

In general, DDRIG awards are the program's way of making small research grants; small grants on the senior panel are rare, with few such under \$200k. Most research awards are in the \$250k-\$550k. Other small grants are for conference/workshop support and educational efforts. While significant in numbers, conference grants and DDRIGs together account for a very small part of the annual budget of \$6.1m; almost all the money is directed to research awards.

Co-funding is a big part of the Linguistics program's orientation, but the claim in the COV document that it increases the Linguistics budget does not appear to be true. The table provided shows that while Linguistics received about \$2.1m, it sent out about \$3.8m, for a net deficit of about \$1.7m. Over \$1m of this outflow was to PAC. Linguistics also is a net donor (by approximately \$150K) to the CISE directorate.

This net outflow suggests that the Linguistics program may prioritize interdisciplinary work and bridge-building over strictly linguistic projects. The program documents emphasize the value of co-funding with these goals. We support this practice, though reasonable people could disagree. **We recommend** that the program continue to monitor its co-funding practices.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

The Linguistics Program has been responsive to previous suggestions, when possible within NSF's infrastructure. As previously noted, the program is successfully increasing panel sizes, even beyond what was originally recommended. They prioritize notifications of funding declines, especially for DDRIGs. The program does its best to informally track resubmissions. On the other hand, the program has decided that a "college of reviewers" would not be useful, since the existing large roster of potential ad-hoc reviewers allows expertise targeted at individual proposals. Finally, with respect to continuing calls for more guidance to PIs about Broader Impacts, the program points to panel summaries and "outreach" as addressing this need.

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: The balance, as assessed by the distribution of awards across the sub-areas 'tracked' by the program (sociolinguistics, descriptive & historical, phonology/phonetics, other formal (syntax, semantics, morphology), acquisition, psycholinguistics, computational, outreach/training), seems appropriate. We noted that the relatively few proposals on topics in theoretical linguistics are often fundable because they include a software or database component.</p>	YES
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: The program documentation notes that the average annual award size is \$68k (\$7k for dissertations), but this average is over a bimodal distribution of very small awards (conferences, education) and larger awards (research projects). Given that really large awards simply aren't possible, the size and scope is appropriate.</p> <p>The duration of awards has been fairly stable over the 4-year period: mostly a mix of 30 and 42 months.</p>	YES
<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments: Certain regions of the country appear to be underrepresented both with respect to proposals received and awards made (the Great Plains, the Northwest, and parts of the Southeast). However, this distribution largely reflects the distribution of strong linguistics programs in American universities. In the case of some universities in these regions, linguistics faculty are likely drawing from other NSF programs. In sum, the geographical distribution of NSF's Linguistics program awards is a problem for the discipline, but is not a problem that can be readily redressed by the Linguistics Program.</p>	YES

<p>Linguistics Program awards are overwhelmingly made to “Research Intensive PhD-Granting Institutions (Top 100).” The only potential concern is the lack of funding to four-year institutions. This likely reflects the fact that most four-year colleges do not have significant linguistics programs.</p>	
<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments: For 2015-18, 35% of Linguistics program awards were made to new investigators. Over these four years, PIs who had previously submitted were more likely to be funded than were new investigators. A track record and prior experience with grant submission and management are effective.</p> <p>In contrast to earlier years, the funding rate in 2018 was the same for men and women.</p> <p>While success rates vary across ethnic groups, awards were made to PIs in every demographic category of race & ethnicity. We note with some concern the low success rate for submissions from Hispanic PIs.</p>	<p>YES</p>
<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p>	<p>NO</p>

V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

<p>DIVISION LEVEL DISCUSSION</p>
<p>1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?</p> <p>Several areas were identified in the previous COV report (evolution of language, experimental semantics and pragmatics, experiments outside the lab, individual differences, “big data”) and we view these as of continuing relevance to linguistics as a field, though not necessarily central to the Linguistics program. We would add two more topics: one very specific, the use of language in social media, which falls under the Big Data rubric; and the other a more general focus that can apply in several areas, the diversity of the world’s languages.</p>

The current major issue for Linguistics within BCS is the ongoing changes to the Documenting Endangered Languages (DEL) program. Certainly, we are concerned about the effects of these changes on DEL's mission, since much of the work supported by DEL is not just a subset of linguistics, but instead is strongly grounded in anthropology. But we are also concerned about the effects on the Linguistics program, whose two POs are now expected to manage DEL proposals as well. This is a large increase in workload, beyond what would be estimated from sheer number of proposals. This is because the DEL PO works with a very diverse population of PIs and institutions, requiring specialized expertise and community connections that the Linguistics PO is unlikely to have. Finally, were the panels to be merged, the total number of proposals to be processed and reviewed would be unmanageable.

We strongly recommend that the DEL panel be maintained into the future and that a fulltime PO be dedicated to that panel. We cannot stress too much our concern about this issue; it is of great importance to the disciplines of linguistics, anthropology, and indigenous studies.

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

We support including funding for the cost of archiving data, where appropriate, in awards, though this is not generally a feature in Linguistics Data Management Plans. We support the idea that PIs be required to "close the loop" in their final reports (and Results of Prior Support sections of future proposals) by verifying that any promised archiving have been accomplished.

Re Open access to data and materials, we feel that this is desirable, and PIs should be supported for such efforts, but we would not want to require open access to any original recordings or data that run up against confidentiality requirements of some IRBs or language communities.

Re Open Access publishing, we would oppose any requirement that publications resulting from funded work be always and only published in Gold Open Access journals. The Linguistic Society of America has put out a position paper against such proposals, as they would endanger the missions of small professional societies like ours.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

We hesitate to make any suggestions that would add to the Program Officers' large and growing workload and endorse the idea that new outreach efforts be carried out by former rotator-POs on an ad-hoc basis. A possible way to reach new, and more diverse, prospective PIs would be to co-organize a special session at an LSA annual meeting, with the LSA's Committee on Diversity in Linguistics, about the process of preparing and submitting a proposal to the Linguistics program.

A program-specific email list for "Dear colleague" letters would also be welcome.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

We support a separate funding stream for RUI. This would help BCS to increase the number of awards going to four-year colleges.

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

None Provided

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

Please improve the way Fastlane handles special characters.

4. Please provide comments on any other issues the COV feels are relevant.

None Provided

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

None Provided

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SIGNATURE BLOCK:

/s/ Patricia Keating

/s/ Richard P. Meier

For the Linguistics Program

Perception, Action & Cognition (PAC) Program – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review

process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments:</p> <p>PAC has two deadlines per year. Incoming proposals are first reviewed by 3 ad hoc reviewers, and obvious misfits are triaged (about half). The remainder get about 5 reviews, unless co-review by another panel adds to the number of reviews. The discussion at panel then is informed by the ad hocs. The POs look further at the entire set of reviews, ad hoc and panel, before finalizing a decision. Even non-panel-reviewed PIs get all the written comments, summary, & comment.</p> <p>Care is taken in soliciting insightful reviews and in redirecting panelists to add detail or clarify ratings if necessary, particularly for proposals not brought to panel.</p>	YES
<p>2. Are both merit review criteria addressed</p> <p style="margin-left: 20px;">a) In individual reviews?</p> <p style="margin-left: 20px;">b) In panel summaries?</p> <p style="margin-left: 20px;">c) In Program Officer review analyses?</p> <p>Comments:</p> <p>The number and quality of reviews is impressive. With few exceptions in reviews we examined, both merit criteria were addressed. Reviews can sometimes be imbalanced, with a focus on intellectual merit. In rare occasions, the PO requests a reviewer to expand on a criterion addressed superficially.</p> <p>Panel summaries and review analyses always address both criteria. POs remind the panel about the need to achieve balance.</p> <p>POs also mention deviant reviews in materials sent to PIs, and provide the PIs the opportunity to respond to these.</p>	YES

<p>Broader Impacts important for this area:</p> <p>In PAC proposals, we observe a broad range of broader impacts. In all areas:</p> <ul style="list-style-type: none"> ● providing data sets or methods or documentation for future research ● involving students (including diverse students) in STEM and providing meaningful mentoring ● assessment tools (normative and deviant) ● implications for applied research ● dissemination to the public, to policy makers, and special-interest groups <p>PAC-specific impacts:</p> <ul style="list-style-type: none"> ● Perception & Action: assistive devices, human factors in design ● Cognition: educational practice and training technologies, modeling tools 	
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments:</p> <p>The reviews are generally detailed and substantive. POs intervene with reviews in the rare cases when a review is superficial. Panel summaries also acknowledge deviant reviews, and the PI can also be asked to address comments from reviews.</p>	<p>YES</p>
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments:</p> <p>Though sometimes brief, panel summaries provide the rationale and sometimes describe how consensus was reached, or why it may not have been reached.</p> <p>In cases where the panel consensus may differ from the advice provided by ad hoc reviewers, the PO has considerable leeway to advance a proposal that may not have been competitive at panel. (See also the next question: this can be a method used to advance access.)</p>	<p>YES</p>
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments:</p> <p>Examining the materials in the jacket makes one very aware of how much leeway there is in PO and panel recommendation. There were striking efforts to fund minority PIs, minority institutions, early career researchers, etc.</p>	<p>YES</p>

<p>The documentation is there, but it's not easy to dig through, since it appears in diary notes, correspondence, and other forms, without apparent systematicity. Some interactions (by phone) with PIs are not documented.</p>	
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments:</p> <p>Communication to (and from) the PI from PO is not always easy to find in the jacket, particularly for funded proposals.</p> <p>For non-funded proposals, the structure of the feedback is pro-forma if the proposal is triaged/rated low.</p> <p>For non-funded proposals, there's a sense that a conversation with the PI (especially a junior PI or a PI from an underrepresented group) can have an important impact on the success of a resubmission, since this is an opportunity to offer insights not easy to cull from the written reviews and panel summary, and to answer questions about process and relevant opportunities.</p>	<p>HARD TO FIND</p>
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>The merit review process seems to function very effectively. The use of PO comments is also a way of shaping proposal development, generally for resubmissions. Phone calls are not documented but are an important way of helping prospective PIs move a proposal forward.</p>	

II. Questions concerning the selection of reviewers.

Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: Reviews are solicited from scholars with clearly relevant expertise, from a range of institutions --- including from institutions abroad. As the panel is formed after triage by ad hocs, the panelists can be chosen to include representation in the research areas in the proposals that come to panel. The POs consider reviewers suggested by the PI and also ask those who decline to review to suggest alternatives. They can also consult a list of previously consulted reviewers.</p> <p>About half the panelists are repeaters, which provides a “PAC institutional memory”. For example, this allows improvement of a repeat submission to be acknowledged.</p> <p>We questioned whether the selection of reviewers that represent the submitted proposals might reinforce the existing structure of the field and constitute an unintended barrier to new research topics. This is discussed elsewhere.</p>	YES
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: There are strict rules on COI that are adhered to; for example, eliminating any reviewer or panelist who is at the same university as a PI. Reviewers and panelists must formally report any COI.</p> <p>PAC has developed a novel method involving multi-panels during a given cycle. This solution appears to be working well.</p>	YES
<p>3. Additional comments on reviewer selection:</p> <p>PAC relies heavily on ad hoc reviews to triage (about 50%) before passing to panel, which reduces the cost and duration of the panel. Conflicting reviews are handled by soliciting more, if appropriate, and the PO may return a review to an author if it is scanty in detail. Panels are informed by prior ad hoc reviews but tend to reach their own conclusion. Directors, however, look across the entire portfolio of reviews and</p>	

<p>may occasionally override panel preferences, recognizing that social dynamics may sway a panel unduly. On occasion they fund a proposal partly, after deleting aims that were not judged to be meritorious under the review process.</p> <p>Reviewer declines seem high overall, around 50% or higher. This was quite different across the two POs, possibly reflecting status (rotator vs. long-term staff) or sub-areas. It would be useful for PAC to compile data on the rate of reviewer declines in different subfields and possibly determine if reviewer gender or other variables are a factor.</p> <p>Researchers at non-research-intensive institutions, including RUIs, are sometimes invited to review, with the intention of providing them insight about the process that they can apply to their own proposals. Occasionally a sabbatical visit of someone from a RUI to a research university is supported, another mechanism to grow research activity in the RUI.</p>	
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III. Questions concerning the management of the program under review.

Please comment on the following:

<p>MANAGEMENT OF THE PROGRAM UNDER REVIEW</p>
<p>1. Management of the program.</p> <p>Comments:</p> <p>The management of PAC is outstanding: insightful, responsive, open, entrepreneurial, sensitive to PI needs, and focused on advancing basic research in the field, in service of the mission of the NSF.</p> <p>Budgetary conservatism at higher levels sometimes gives PAC an influx of money at the end of a cycle. PAC anticipates this by holding some high-ranking but unfunded proposals back for positive funding without a rewrite. They also share late inflows of money with other programs and use them for graduate fellowships and REUs. It would be better, however, to know about the funding up front.</p> <p>PAC had a period in which there was a decline in submissions due to community belief that there was little payoff: too low a funding level; arbitrary reviews, etc. A communication from Program Officer Betty Tuller was sent widely to interested parties to dispel this, and it succeeded in bringing proposals up to a full level (75-100 or so in a cycle). The directors believe that having fixed deadlines is critical to maintaining a reasonable submission level; rolling deadlines tend to reduce submission rates.</p>

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

The creation of new emphases can come from various sources. Sometimes the directors recognize that multiple proposals are coming in on some topic. At the other extreme, programmatic directions may come from higher levels, e.g., the Future of Work initiative or the RAPID grant call.

POs are in the interesting position of being able to identify emerging areas, without necessarily being able to solicit proposals specifically for those areas. The POs in PAC are very sensitive to the fact that they're in this position and appear to navigate well. New emphases may be announced via a Dear Colleague Letter to the community, although in experience this usually ends up eliciting white papers from single labs touting their own research. Workshops are funded and shaped by the POs to encourage new research thrusts. Occasionally there are groundbreaking ideas (e.g., the tongue as a hydrodynamic system that can be compared to the octopus) that are sufficiently novel to elicit new funding. There is also a modified cluster model, where proposals that come from different sub-areas can be considered as a whole, without shared budget.

The use of smaller panels, made possible by triage, also tends to encourage cross-talk among panelists with different areas of expertise and potentially leads to suggestions for inter-area collaboration.

Important areas that are not covered currently but could be of considerable importance are epigenetics (or genetic factors in general, currently the purview of NIH), dyadic or triadic interactions in language, computational cognition, and how science informs AI and vice versa.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

PAC deals with cognitive, motor, and perceptual processes, with an emphasis on process being a key component (as opposed, e.g., to pure method or neuroscience). The program directors interact with other programs to a substantial extent and co-fund with cognitive neuroscience, science of learning, developmental sciences, for example (to about 1/3 of portfolio).

The POs have a clear understanding of what is core to PAC and what is reasonable to co-fund with other programs. However, it is sometimes ambiguous as to which is the appropriate program for a proposal. For example, neuroscience is the purview of cognitive neuro, but cognition falls under PAC, so a decision must be made as to whether the neural component supersedes the cognitive or vice versa. The connection to learning sciences could benefit from further consideration to refine the role of the two programs. Education is in yet another directorate, making communication with PAC less direct.

Another issue is how change in the program definition might respond to scientific developments. There seem to be mechanisms that lead to inertia in the system regarding recognizing new potential thrusts. The use of established reviewers has the great advantage of historical knowledge as well as expertise but may tend to reinforce what they value already. The funds available for grants are already limited, making it difficult to finance experiments with new areas or bringing researchers together for a process of discovery.

Yet as we describe elsewhere, admirable efforts are made in these directions, including cross-disciplinary coalitions (some emerging top-down, like the Future of Work initiative).

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

The PAC response document was attentive to all points made. Unfortunately, the ability to adopt recommendations was limited by funds available (e.g., to expand the program to emphasize initiatives like genetics or to attend regional conferences).

Some of the recommendations have led to good responses (e.g., funding the Women in Cognitive Science conferences and activities). Where change is not appropriate, the PAC response provides useful context.

IV. Questions about Portfolio.

Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: The awards represent the current research thrusts in the field quite well. However, better data should be provided than the treemap figure, which seems to be generated from key words. Otherwise it is difficult to assess this.</p> <p>In addition, per comments elsewhere, there is the potential for inertia in the system that tends to favor existing thrusts in the field. It would be useful to consider mechanisms that might make it easier to detect worthy new initiatives.</p>	YES
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: There is a perennial issue of whether to fund more proposals at relatively low rates vs. fewer proposals fully. In recent time, PAC has moved away from cutting budgets to funding proposals essentially fully (after obvious fat being stripped), as they realized that cost-cutting could impact project success.</p>	UNSURE

<p>Ultimately, there appears to be a lack of data to assess whether the awards are appropriate in size for the scope of the projects, as this is only something one could assess by looking at the outcomes of the projects. There is apparent sensitivity to scale, however.</p> <p>In some cases, PIs were told to narrow scope for a next round. This seems in part to be tied to funding. So, one could say that the awards were appropriate for the scope, but the scope had to be tuned to the funds available for award. Conversely, proposals that were purely incremental rather than anticipating major new findings tended to be less well regarded.</p>	
<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments:</p> <p>It is difficult to say what the appropriate benchmark is here. The map of awards by state seems by eyeball to say that awards track submissions. It would be informative to have a table by state or region that lists the number of academic institutions, by size and research tier, or even (if possible) by number of faculty eligible to apply for NSF PAC support. In essence, this is the issue of the denominator: what is the distribution of scholars in these areas, and how well represented are they in the applicant pool, and in the awardee pool? Dr. Tuller has written a paper on this subject: https://www.psychologicalscience.org/observer/is-there-a-gender-gap-in-the-perception-action-and-cognition-program-at-nsf</p> <p>Note that even with consideration of the denominator, unevenness in geography or institution type could be misleading, because eligibility does not mean research qualifications per se.</p> <p>Geographical distribution should be looked at not just at the coarse-grain level of state-by-state. The data should be corrected for population density, and separately by institution density, within each of the regions. Even as presented, we observe that a handful of states (Massachusetts, Pennsylvania) have a higher percentage of awards than percentage of submissions. Institutions that do strong research in this area are disproportionately clustered in some geographical areas.</p> <p>We note that there are other approaches to expand geographical representation. One is collaborative proposals, which can incorporate researchers from RUIs and MSIs. Also, the Tribal Colleges and Universities (TCUP) program comes under a different NSF directorate and co-funds a large number of DEL proposals. More of this could be very interesting, and some current successes of the PAC program involve collaboration with MX3 (Mind, Machine, and Motor Nexus) in CMMI (Civil, Mechanical, and Manufacturing Innovation).</p> <p>As for research areas, the treemap approach is not particularly informative. A taxonomy of areas and statistics about submissions and awards would be more</p>	<p>UNCLEAR</p>

<p>useful. For example, a taxonomy could group keywords by features like: methods, populations, systems, as well as by award category features.</p>	
<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments: The POs work hard to find balance and use scarce resources wisely. Information provided to the COV offers a compelling picture particularly with respect to gender and prior/new PIs. The record for race/ethnicity also looks good, given the small N for non-whites. But a large proportion of PIs don't self-identify: this should be addressed. If applicants understood the importance of keeping track of gender equity, it might be that more would self-report.</p>	<p>YES</p>
<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <p>The program is disbursing funds wisely and well, given the topics in its purview. This is possible only because of the extra effort spent by the POs to do this well, something which doesn't seem to be well captured in how their workload is currently assessed.</p> <p>PAC regularly engages in excellent practices to diversify their portfolio. PAC panelists (many of them with history in the program) are aware of institutional differences, and apply this sensibility at panel meetings, where the overarching objective is to fund good science. PAC has also identified funding for mentoring activities, through the SPARK Society (https://www.sparkociety.org/) and through Women in Cognitive Science (http://womenincogsci.org/).</p>	<p>YES</p>

V. Questions for Division Level Discussion.

Please provide comments on both scientific and management aspects of the following division-specific questions:

<p>DIVISION LEVEL DISCUSSION</p>
<p>1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?</p> <p>A recurring question is how the current mechanisms can contribute to the development and recognition of emerging areas. To the extent that the review panels are driven by bottom-up categories of proposals, there</p>

is inertia in the system. The main alternative is NSF-wide initiatives. While “The PAC program is open to co-review of proposals submitted to other programs,” and the record shows substantial co-funding, this is not the same as developing novel research initiatives.

Response to the previous COV (2015) report shows one way this works: The COV highlighted areas of individual differences, genetics, and emotion as emerging and important. The response was to point to some existing representative grants in these areas and to add that (a) funding being zero sum, changes in priorities would necessitate reduction in some areas, which the program was loathe to do; (b) these areas would be explicitly mentioned in the web page synopsis.

Where are emerging areas? AI is highly promising, especially how AI draws from, replaces, inspires, or is inspired by core knowledge of PAC topics.

Infrastructure for this would require multi-program or even multi-directorate interactions: workshops, retreats, etc. A model is to consider how the field of cognitive science got going.

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

Right now, there are many places to store data – journal sites, university sites, larger sites. We do not recommend that NSF require every investigator to make data open. However, if open access is specified in the data management plan, it should be the PI’s responsibility to close the loop and report the data access site to the agency, so this information can be made available to the public.

Pre-registration is actively supported by PAC, in that they recommend to PIs that they consider it. However, we do not see pre-registration as unequivocally positive. A downside is that it could inhibit exploratory research and could limit the hypotheses that a PI puts forward.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

Existing summaries of funded proposals for the general public (and their outcomes, as they become available, including publications and datasets) serve well to communicate the range of work supported by BCS.

Investigators have a variety of methods for getting information about funding opportunities. Attendance at regional conferences is financially limited but might play a role in this effort.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

A bigger budget would allow PAC to fund more excellent science.

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

As described elsewhere in this report, the influx of funds at the end of the fiscal cycle is welcome, but sub-optimal in terms of the program's ability to plan.

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

We first answer this question regarding the division, BCS, as opposed to the agency, NSF. We identified areas of ambiguity as to which program a research initiative might best represent. For example, cognition in early childhood might be considered appropriate to assign to PAC, Science of Learning, or Developmental Science. To the extent that the assignment of a proposal to a program has impact on review and funding, this is a very consequential matter. Panels considered broad enough to cover proposals in one area might be ill-designed to review proposals that cross over to another area in fundamental and important ways. We suggest that the current structure of BCS might be revisited with an eye to creating mechanisms that are sensitive to the intricate relationships between the programs. At least, the possibility for PIs to declare up-front that they are cross-connected to multiple programs should be highlighted on the website. The logistics of applying to programs with different deadlines could be an impediment in this regard.

Regarding agency-level possibilities: we encourage BCS to seek out opportunities to remove infrastructure barriers to cross-divisional collaboration. Some of these might have to do with funding cycle restrictions, some with the time it takes to penetrate other silos, and some are linked to dogmatism about what is "STEM" in other parts of the agency.

4. Please provide comments on any other issues the COV feels are relevant.

None Provided

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

The box format is stifling and probably precludes entry of useful comments. A free narrative, constrained by headings, would encourage more thorough responses.

Getting all the documents for the review at once instead of in a trickle would have made it easier to understand the scope of work.

Data (on representation of applicants, awardees, reviewers, for example, and whether these are linked to funding decisions) is something that we (and the COV more broadly) found to be lacking. It could be that there are issues of confidentiality that make disseminating this information not possible; it could be that for particular programs the sample size is so small that meaningful explorations are not warranted. If maintaining portfolios that are broadly representative is an intent of the BCS (and of the NSF more generally), providing this information to COVs should be a priority, in order to facilitate sound evaluation.

The Committee of Visitors is part of a Federal advisory committee. The function of Federal advisory committees is advisory only. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the Advisory Committee, and do not necessarily reflect the views of the National Science Foundation.

SIGNATURE BLOCK:

/s/ Eva Fernández

/s/ Roberta Klatzky

For the Perception, Action & Cognition Program

Science of Learning Program – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review

process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments: Yes. It appears that most decisions followed panel review, except for the mechanisms where the decision was appropriately internal.</p>	YES
<p>2. Are both merit review criteria addressed</p> <p>a) In individual reviews?</p> <p>b) In panel summaries?</p> <p>c) In Program Officer review analyses?</p> <p>Comments: Yes, in the material we reviewed. However, the CoV has concerns over clarity and interpretation of the Broader Impacts criterion, which we offer in the overview comments.</p>	YES
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments: In most cases, yes. However, some reviews were overly brief, disjointed, or difficult to understand. In the future, reviewers might benefit from being encouraged to write connected narrative touching on specific topics, and guidance/examples of effective reviews rather than boxes to fill in, which is confusing and produces choppy reports. Replace the boxes with heading like “strengths” and “weaknesses” organized to make the review flow in a natural way.</p>	YES, mostly
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: The panel summaries are often difficult to understand. The PO summaries are better: not a surprise since there is more time to write them. Applicants should see both summaries.</p>	NOT CLEAR

<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: Yes.</p>	<p>YES</p>
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments: Not clear. In most cases, we believe that applicants would benefit from follow-up discussion. We did not know if there were such conversations. They should be encouraged and documented. Often the summaries do not reflect the discussion at the panel, some of which is sensitive. The conversation with the proposer could convey the spirit of the discussion, to help guide the resubmission.</p>	<p>NOT CLEAR</p>
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p><i>None provided</i></p>	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

<p>SELECTION OF REVIEWERS</p>	<p>YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE</p>
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: Yes, we examined the list of panelists and judged them all clearly competent and expert in their fields.</p>	<p>YES</p>
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: We could not evaluate this issue. We assume so and we have no reason to think not.</p>	<p>UNSURE</p>

3. Additional comments on reviewer selection: None.	
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III. Questions concerning the management of the program under review. Please comment on the following:

<p>MANAGEMENT OF THE PROGRAM UNDER REVIEW</p>
<p>1. Management of the program.</p> <p>Comments: The PO has worked effectively at the challenging task of transitioning a Centers program through a Networks program to a more standard portfolio of smaller investigator-initiated grants. We want to underline that this transition is still in progress, in the sense that the research community is only beginning to understand what the current priorities and scope are. One of the delicate issues to negotiate has been to utilize the expertise developed in the Centers without giving undue priority to the center-associated people and topics. We judge that there is a good balance. Only a few panelists and only a few awards went to people from the former Science of Learning Centers.</p>
<p>2. Responsiveness of the program to emerging research and education opportunities.</p> <p>Comments: The amount of cross-program and cross-directorate funding speak to the program officer's responsiveness to emerging opportunities. It has taken time and effort to establish these relationships. However, she has a difficult task in staying abreast of a sprawling field still in the process of delineating itself and establishing its opportunities and limits. It would be judicious to have backup resources and alternative perspectives. We suggest that NSF could consider how best to provide guidance and support to the PO.</p>
<p>3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.</p> <p>Comments: Given what we have said above, it should be clear that program planning and prioritization are unusually demanding for Science of Learning. We would advocate additional resources devoted to supporting the program by delineating the field, getting it widely known so that it attracts more proposals, and identifying new opportunities. One possibility for doing so is conducting a competition to hire an external evaluator to look at the history of the program from the funding of the first Centers in 2004 through the network phase to the present. Information on the impact of the six Centers, the Networks, and the various other efforts such as workshops can provide both valuable data on important issues:</p> <ul style="list-style-type: none"> • how to fund science effectively at various scales (relevant also to the STC and ERC programs) • how the field has evolved and what targeted funding could help its evolution • how best to exploit its insights

4. Responsiveness of program to previous COV comments and recommendations.

Comments: Not applicable because there are no previous COV comments and recommendations.

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: The range of projects, workshops, CNCRS, EAGER, CAREER, etc. are very broad, and many have significant engineering and computational components. This is a strength but also a major challenge in reviewing, coordinating and integrating the many interdisciplinary research directions. Overall, this has been a successful effort, but changes could be made that would further enhance the program. The increasing importance of computational approaches and applications of machine learning to big data, already represented in the portfolio, will probably lead to more grant proposals in this area. An assistant Program Officer with a background in big data should be hired who could help with identifying panelists and reviewers as well as provide a natural bridge to CISE and other engineering directorates. This hire would be justified by the expanded purview of this program.</p>	YES, mostly
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: Probably, although we add the caveat that a thorough evaluation of scope and budget would require reading in greater detail than was possible. We highly recommend that these statistics be provided to future COVs to help them with making an evaluation.</p>	PROBABLY
<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p>	DATA INSUFFICIENT

<p>Comments: Perhaps, but we needed more data on ratios of potential applicants to applications to awards to ascertain. The maps provided were insufficient for such evaluation, and in any case were not broken down by program.</p>	
<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups?</p> <p>Comments: Perhaps, but the numbers are too small to give us stable data. In addition, the definition of new investigator is unclear. We would prefer data by academic rank and/or years post PhD.</p>	<p>DATA INSUFFICIENT</p>
<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <p>Comments: To answer many of the above questions, we were stymied by a lack of analyzed data. We do not have enough time to read all the grant proposals and to extract the information needed to make an informed judgement. NSF has a tremendous amount of data on grants and PIs. The application of techniques from machine learning and network science to these data could be revealing. Advances in natural language processing could automate this process. This should be done NSF-wide to amortize the cost of the software.</p>	

V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

<p>DIVISION LEVEL DISCUSSION</p>
<p>1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?</p> <p>The rise of engineering and computational approaches to complex problems in behavior and cognition has implications for many of the programs in BCS. The lessons learned from pioneering efforts in the Science of Learning program could help other programs make this transition so they will not be left behind. The next generation of Program Officers in BCS should have training in data science.</p>

However, Science of Learning is a broad field, and the data science expertise needs balance from program officers who can liaise with the neuroscience and with the education communities. The challenge is to grow the program so as to justify the personnel expense – up-front investment is likely necessary.

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

It is not easy for most of the researchers funded by BCS to make their data open source. First, it takes expertise that many PIs do not have. Second, it is expensive to prepare data for open source because the data needs to be in a common format, and each lab collects their data in an ad hoc format. Third, there has to be a repository to make the data available. Fourth, some of the data are sensitive and a special effort is needed to secure the data. Fifth, it is not easy to decide and control who has access to the data and what credit accrues to the creators of the data. BCS should provide the infrastructure to help make it easy for PIs to navigate all of these steps. Do not underestimate the problems that have to be overcome and the cost of the human and computational resources that are needed. You should get advice from other NSF research communities that have already navigated these hurdles, which includes cognitive neuroscientists who deal with large imaging datasets, NeuroNex PIs who deal with large physiological and anatomical datasets, and developmental scientists who manage Databrary.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

It is not easy for a new researcher to find the right program for their research. There are AI algorithms that can create a topic analysis for each of the grants funded in every program. This would make it possible for a researcher to sort through them using their own abstract as a search query. This is a general problem at NSF and could be funded as a CISE project. Many other directorates would buy in.

We also wished to flag that the proliferation of Big Ideas and cross-cutting efforts and new names and acronyms has grown to dizzying proportions. It may be time to settle on a more stable structure and revise it only periodically.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

None Provided

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

None Provided

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

None Provided

4. Please provide comments on any other issues the COV feels are relevant.

None Provided

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

None Provided

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SIGNATURE BLOCK:

/s/ Nora Newcombe

/s/ Terrence Sejnowski

For the Science of Learning Program

Social Psychology Program – 2019 COV Report

I. Questions about the quality and effectiveness of the program’s use of merit review process.

Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments: Overall the review methods are appropriate. In addition to the PO, a minimum of 2 panel reviewers plus a minimum of 1 ad hoc expert are involved in the review process. In some instances, additional ad hoc reviewers are involved, and when a proposal is shared between NSF programs, more than one panel may review.</p> <ul style="list-style-type: none"> • Regarding assigning panel members to proposals, the Social Psychology program makes concerted effort to assign panel members who are more informed on the topic. • The program has an effective electronic system for assigning panelists to areas of interest or expertise. • There appears to be a concerted effort to include at least 1-2 expert reviewers (often as ad hoc reviewers) who are familiar with the research topic and/or methodology. • The program recently implemented a triage system whereby proposals are not discussed by the panel if ad hoc reviewers evaluated a proposal as only “Good” or lower. We are concerned about this system’s reliability when there is only one ad hoc reviewer. This system may undermine the purpose of a panel review if the judgment of one individual who is not present for discussion can dictate the outcome of a proposal. We recommend tracking the percentage of proposals that are triaged based on the rating of a single ad hoc reviewer and considering requiring at least two ad hoc reviewers to trigger triage. 	YES
<p>2. Are both merit review criteria addressed</p> <p>a) In individual reviews?</p> <p>b) In panel summaries?</p> <p>c) In Program Officer review analyses?</p> <p>Comments:</p> <ul style="list-style-type: none"> • Overall, both criteria were mentioned across a, b, and c listed above. 	<p>a) Yes</p> <p>b) Yes</p> <p>c) Yes</p>

<ul style="list-style-type: none"> • Addressing “Broader impacts” was weaker than “intellectual merit” and was given cursory attention across a, b, c in most instances. Although “broader impacts” is put forth as an equal criterion, it is clear that most reviews are based almost exclusively on intellectual merit. • Panel Summaries tended to be extremely brief and cursory overall • Broader impacts are defined in slightly different ways (or at least with different detail) at different places in materials for PIs and reviewers. NSF should have more stringent, and clearer criteria. <p>WHAT BROADER IMPACTS ARE MOST RELEVANT TO SOCIAL PSYCHOLOGY?</p> <ul style="list-style-type: none"> • NSF documents contain many definitions, with some included only in a few documents and not in others. All are reasonable, but we agree with the suggestion that they be placed on some continuum of breadth and reach. e.g. “educator development at any level” is narrower than “development of a diverse, globally competitive STEM workforce”, each of which is mentioned in the PAPP Guide. • Expand participation in science by racial/ethnic minority groups, people with disabilities, and other underrepresented groups. (Note: The program has done a good job including women, but still lags with other groups. Therefore, we may need to be more specific about underrepresentation). • We care about research that can impact social change. Most articles tout potential social change related to their findings--even if it is downstream. Research that promotes real social change in some manner should be rated strongly. • Projects that include demographically diverse samples, and especially projects that are designed to study understudied groups, should get higher ratings. 	
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments:</p> <ul style="list-style-type: none"> • Ad hoc reviewers tended to provide detailed comments while panel reviews tended to be more cursory • The majority of reviews focused on intellectual merit and methodology with scant attention to broader impacts. This can be problematic for more applied proposals that may not be adding novel theoretical perspectives but rather apply strong theory to novel contexts. Our field’s dependency on novelty and theory could be a hinderance for supporting sound research that can actually test our extant theories in broader contexts (which is essential to good science and sound theory development as well as to broader impacts). • It would be helpful if reviews would explicitly suggest what the PI could do to make the project more fundable. 	<p>Yes</p>

<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments:</p> <ul style="list-style-type: none"> • Panel summaries offer a brief (often 1-2 sentences) overview of main discussion points followed by a phrase indicating that the panel agreed that the summary was representative of discussion. • Rarely does the panel summary discuss the process for rectifying disagreements, often ignoring reviewer comments that contradict the panel decision. • These contradictions were sometimes, but not always, addressed in the PO review analysis. • We found no evidence of a panel not reaching a consensus. 	<p>Yes</p>
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments:</p> <ul style="list-style-type: none"> • Information about the rationale is provided in the panel reviews and correspondence. 	<p>Yes</p>
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>Comments:</p> <ul style="list-style-type: none"> • the reviews, particularly from the ad hocs, provided detailed rationale; however, the panel summaries were sometimes less informative. • The PO “Review Analysis” is superior to panel summary and it would be good to provide that to the PI. • Some of the correspondence (emails) provided more detail as well, but this was typically for competitive proposals • This is due in part to awardees getting more communication, but could also be because experienced grant writers know how to liaise with NSF better than newer PIs. • It would be important to ensure that newer scholars, first-time submitters, underrepresented scientists, and scholars from smaller institutions (that may not have the culture or resources to properly support their faculty) get extra guidance from NSF. 	<p>Yes</p>

<p>7. Additional comments on the quality and effectiveness of the program’s use of merit review process:</p> <ul style="list-style-type: none"> • In balance, the merit review process engaged diverse experts to provide sound and useable feedback. • Proposals are awarded under the RAPID program without any reviews. There is a need for a speedy response to time sensitive research proposals, but a question is whether it is appropriate for only the PO to weigh in. This seems to be an NSF wide policy, so perhaps this concern is not relevant. 	
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II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: As mentioned previously, the POs make an effort to align panel members’ expertise to proposals. Furthermore, effort was made to find experts in the domain of inquiry, special methodologies used in the research, or both. It was clear that the majority of ad hoc reviewers’ expertise was appropriate for the proposals they reviewed.</p> <p>The program also provides both continuity and diversity on the panels by having some panel members serve on multiple panels, while other slots were reserved for junior faculty and newer PhDs to serve for single cycles to increase diversity and participation.</p> <p>Ad hoc reviewers who could provide topic-specific expertise were solicited to supplement panel reviews.</p> <ul style="list-style-type: none"> • Once the program clarifies their definition of what constitutes broader impacts, they should make a concerted effort to recruit reviewers who are in a better position to evaluate the broader impacts and their feasibility. • For future assessments, it would be useful to provide a brief bio of each panelist to elucidate area(s) of expertise in order to assess the match between panel expertise and proposal topics. It would also help us ascertain the impact of panel expertise on funding prioritization. • It also would be useful to provide future COVs with information about the selection process for panel members. 	<p>Yes</p>

<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: The program does a good job addressing conflicts of interest (COIs). When a panel member had a conflict of interest, they were entered into the system to prevent access to the proposal and left the room during panel discussions of that proposal. If the PO had a conflict of interest, they would recuse themselves and a different director would oversee the process.</p> <ul style="list-style-type: none"> • It was noted that the electronic system used to process proposals did not readily flag COIs, and that identifying COI required extra procedures. NSF should examine ways to improve their electronic system to identify COIs earlier in the process. 	<p>Yes</p>
<p>3. Additional comments on reviewer selection:</p> <p>A stated goal of the program is to improve the demographic, geographic, and institutional diversity of the review panels in order to provide broader perspectives, democratize the funding process across the discipline, and enable scholars from groups underrepresented in NSF funding to better understand the process. Despite these goals, panel members appear to be predominantly from majority groups and larger, Ph.D. granting institutions. Ad hoc reviewers were more diverse. More effort needs to be made to recruit qualified, experts from less represented groups.</p> <ul style="list-style-type: none"> • In order to track progress on these goals it would be useful to collect demographic data on the panelists and ad hoc reviewers. At present only name and institutional data are readily available. • It would also be helpful to formalize the process to diversify the panels and articulate metrics for success. • One suggestion to diversify the panels might be to establish a volunteer system (bottom up) where scholars from across the discipline can self-nominate to serve. This could create a more diverse pool of potential panel members. • We also wanted to know how panelists are selected. The composition of the panel and their areas of interest can have a powerful impact on funding prioritization. Is panel composition driven by proposal topics? Major areas of research interest in SPSP? How does the program ensure that newer areas of research can get funded? • There is notable variability in the number of reviewers across proposals. Sometimes this reflects the fact that the proposal was reviewed by two separate programs when cost-sharing was a possibility. • We encourage efforts to obtain more than 1 ad hoc reviewer to provide more detail and diversity of feedback. 	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW

1. Management of the program.

Comments: The management of the program has been excellent.

- The review process is well managed.
- Relatively low 'mortgage rate' allows the program flexibility to fund new and innovative research each year.
- Co-funding efforts to leverage use of resources across panels within SBE is commendable. This fosters interdisciplinary research that may not succeed in securing funding within one program.
- The cost-sharing with other programs does a good job of enabling many larger and/or longer-term grants to get higher funding. The program was able to fund several ambitious grants through varied mechanisms
- Furthermore, the program was successful in securing funding for several CAREER and RAPID awards as well as awards for special programs (e.g., Robust and Reliable Research).
- Interesting that other directorates come to social psychology for co-funding more than vice versa. Perhaps social psychology could encourage researchers to develop proposals that tap into resources in other directorates?
- Difficult to assess other aspects of how the finances are managed. To address this, it would be useful to see not only the average grant duration and funding but also the median and range.

2. Responsiveness of the program to emerging research and education opportunities.

Comments: The program has utilized the RAPID mechanism to fund important emerging research opportunities. Although NSF research grant proposals are investigator initiated, more proactive efforts within the social psychology program is needed to elicit regular grant proposals pertinent to emerging research. For example, one relevant area is the threat of climate change. This is a critical area of research to which many social psychologists are uniquely positioned to make important contributions. It is also an area of research that NSF is uniquely positioned to address through interdisciplinary collaborations involving social psychologists together with scientists in other SBE programs as well as other NSF directorates. Indeed, one of the biggest hurdles to addressing the climate crisis is figuring out how to motivate behavior change. Yet, the tree map of Social Psychology portfolio research areas shows nothing on this topic.

Encouraging research in a particular area, like the threat of climate change, would be facilitated by earmarked funding. NSF recently invested \$30 million in Big Ideas that serve the Nation's future. Another relevant initiative is the NSF2026 Idea Machine that launched in the summer of 2018. Both of these initiatives have a place for social psychology research – e.g., long term ecological research is one project under the umbrella of 'Convergence Research'

<https://www.nsf.gov/pubs/2019/nsf19594/nsf19594.htm?org=NSF>

NSF wide research opportunities on topics such as these should be made known to the social psychology community with encouragement to submit relevant proposals. Tapping into such resources will not only benefit social psychologists by providing additional funding opportunities, but also the country and the world.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

- Areas of priority that guided the portfolio development include: 1) Stereotypes, Prejudice, and Social Identity; and 2) Robust and Reliable Research. These are important topics that have been of great interest to social psychologists and there were many first-rate grant proposal submissions on these topics.
- Other areas of priority influencing the portfolio were funding of CAREER awards, which brings in new investigators, and participation in special competitions for Robust and Reliable Research, the Science of Broadening Participation, and Research in Undergraduate Institutions.

4. Responsiveness of program to previous COV comments and recommendations.

Comments: Many responses were strong, but some problems identified in 2015 are still problems in 2019.

Recommendations regarding broader impacts:

- Although efforts were made to educate panel reviewers about the nature of broader impacts, the review of broader impacts continues to be cursory. The program should consider including separate ratings for intellectual merit and broader impacts to ensure that it is addressed fully.

Recommendation to provide more information about decisions. That is, POs should give more feedback to the PI about their proposal (e.g., in the form of PO comments):

- In most cases, documentation in the jacket does provide the rationale. However, the best rationale is often in the PO review analysis, which is better than the panel summary but is not sent to PI. We recommend that the PO Review Analysis be shared with PI.

Recommendation to provide information about whether or not a proposal is a revision. Data would be helpful for COV analysis.

- A case was made for why these data are not included in the jacket for panel and ad hoc reviewers; however, the POs seem to have these data and it would be very important for program analysis to see if revised proposals are more (or less) successful than new proposals. This would inform training and outreach to newer proposers.

Recommendation that panels should be balanced in gender, and membership should be rotated so that there is some continuity in membership cycle to cycle. One or two panel positions might be reserved for experts in the area of replicability/quantitative psychology.

- We were not originally provided information about the members of the panel. We requested and received a list of names.

- It seems that there are more women than men on the panel.
- There is no information about each panel member's particular expertise, although we recognize many as highly qualified.
- From the lists, we can see that there is continuity, with each panel including some members who have served previously.

Recommendation to give reviewers a tutorial on issues of replicability and power and robust science issues and remind them of relevant issues (need for larger sample studies, well-powered pilot studies, and the likely impact on reducing the number of total experiments).

- The PO now sends out a letter reminding reviewers about standards of "robust and reliable science." Power issues do seem to come up in reviews but probably should be articulated to PIs ahead of time.

Recommendation to Involve more junior scholars from underrepresented groups in the reviewing process, when possible.

- The policy is now to include some junior scholars on each panel, with any individual serving only one term so as not to overburden them as they develop their own research program. The list of panelists that the PO provided to us did not indicate who was a junior scholar.

Recommendation to more clearly identify new investigators in the eJacket system.

- The PO does not have the power to change the eJacket system. It was indicated that a request would be made but there is still no information in the eJackets identifying new investigators.

Recommendation to Increase the program's budget.

- Budgets were increased following the 2015 COV

Publicize that the program funds workshops, conferences, and other nonstandard mechanisms such as RUIs, RAPIDs, and collaborative proposals, especially in geographical areas where there seem to be few funds spent. In addition, reach out to other professional societies.

- The program continues to issue solicitations and announcements and to publicly encourage diverse submissions;
- however, there continue to be issues with geographical/institutional representation (e.g., few RUIs), so maybe announcements are not sufficient to broaden participation.

Recommendation that funds could also be directed at convening workshops designed to directly address the problems faced by the Social Psychology program, for example, how to increase applications from women and racial minority investigators; webinars might also be used to actively recruit underrepresented groups.

- In many ways, the Social program has been successful in broadening diversity. Participation by women has increased in this cycle and proportion of awards has outpaced men. Actions by ethnic/racial minorities remains low but is comparable to the proportion of members-of-color in our main professional organization. Asians continue to be underrepresented. Special programs should be developed for outreach to the Latinx and Asian communities--which are rapidly growing demographic groups in the U.S.

Recommendation to reach out periodically to young PIs post-award, providing prompt and detailed feedback on their annual reports (particularly if activities are not commencing as planned).

- Ongoing efforts are made to continue communication with PI's (especially newer PIs) throughout the award period

IV. Questions about Portfolio. Please answer the following questions about the portfolio of awards made by the program under review and provide comments or concerns in the space below the question.

PORTFOLIO REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Does the program portfolio reflect an appropriate balance of awards across the disciplines and subdisciplines of the field?</p> <p>Comments: It is difficult to answer this question based on the data provided. The "Tree map" given to the COV members provides information based on the POs categorization of awards and arranges them in ways that may reflect proposals but might not reflect their relationships within the literature (e.g., morality is not only associated with neuroscience).</p> <p>Comparing categories in the tree map with keywords in 2018 SPSP conference submissions suggests some convergence and divergence with prioritization in the field.</p> <ul style="list-style-type: none"> • Both the portfolio and SPSP reflected interest in close relationships and stereotyping; • However, highly represented categories in the field were not well represented in the 5-year cycle (e.g., emotions; intergroup relations; judgment/decision making; morality to name a few). These data are incomplete and difficult to analyze. • It would be useful to have a complete list of award titles to help in this analysis. • It might be helpful to have a common list of keywords shared between SPSP and NSF, that proposers could check-off, in order to better track trends in the discipline and the degree to which they are mapping onto funding decisions. 	<p>DATA DIFFICULT TO USE</p>

<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: Yes. The program is doing a very good job budgeting award money based on the needs, nature and duration of the projects.</p> <ul style="list-style-type: none"> • The vast majority of the larger awards (>\$100,000) went to grants spanning a longer timeframe (36 mo). • The program does a good job cost-sharing with other programs, thereby enabling many larger and/or longer-term grants to secure higher funding. As a result, the program was able to fund several ambitious grants through varied NSF programs and mechanisms. <p>Suggestions for future evaluations: To answer this question it would be helpful to have a list of all awards with their duration and funding. This would enable COV members to select projects that might possibly have awards that are too big or too small for further inspection. We requested that from PO and received it.</p>	<p>YES</p>
<p>3. Does the portfolio demonstrate diversity with respect to geographical distribution of principal investigators and types of institutions?</p> <p>Comments: Somewhat. There was definitely geographical and institutional variability. Geographically, proposals are coming from almost every state in the country, but the majority of awards go to schools on the east and west coasts, southwest, and a few central states like Illinois and Colorado (“high profile states”). Colleges and universities in the mountain, southern, Midwest, and plains states (“low profile states”) are participating less and getting fewer awards (by percentage).</p> <ul style="list-style-type: none"> • A deeper examination of data by action, award, region and university type confirms that the percentage of awards as a function of proposals within the high-profile states is more than twice that of low-profile states. <p>There also appears to be disparity in awards to smaller colleges and universities. This may be due to concerns that faculty do not have the time (e.g., course load) or resources (university supports) to ensure project success. However, this is not always the case. Some smaller institutions might have adequate support and infrastructure yet might get a lower review due to false assumptions.</p> <ul style="list-style-type: none"> • Unfortunately, institutional bias may be exacerbated by review criteria that establishes a) track record for success (more likely to favor established grant writers than new submitters), and b) institutional support (reviewers might assume that smaller colleges and universities will be less likely to provide support). • These standards should probably be phrased in more inclusive ways to not disadvantage proposals from smaller institutions. • More detail should be provided to PIs about the types of information to include in the facilities and resources section of the grant. While most PIs might assume this refers to lab space and equipment, PIs should also include 	<p>Yes/No</p>

<p>letters of support, information about grant management resources, and course/workload clarifications to ensure that reviewers fully understand the supports available.</p> <ul style="list-style-type: none"> • RUIs can address the problem of under-representation of smaller institutions. We recommend that SBE allocate a portion of the budget to a RUI funding pool that programs can then ‘bid on’. This will provide an incentive to make awards to undergraduate research institutions. • POs should emphasize the importance of institutional diversity with panel reviewers who might show preferences for larger universities in more urban areas. • Data separating awards at the state and institution level should be examined at more regular intervals to ensure that outreach and support strategies are effective. • Workshops on best practices for grant writing at national and regional conferences are good but may not reach as large an audience given that some of the faculty at low profile institutions might not have travel funding to attend these conferences. Efforts should be made to disseminate best practices and tips to faculty directly at underrepresented institutions. 	
<p>4. Does the portfolio demonstrate diversity with respect to balance of awards to new investigators, demographics of principal investigators, and participation of underrepresented groups? Comments:</p> <p>New Investigators: New investigators were funded at substantially lower rates in 2015, 2016, and 2017. The disparity was not present in 2018.</p> <ul style="list-style-type: none"> • This is problematic because if most grants are being awarded to those who have already received prior funding then a smaller pool of ideas is shaping the direction of the program and, ultimately, the foundation. • New ideas should be encouraged by supporting the work of a broader pool of applicants. If their applications are not as well developed, guidance should be provided to those newer to the process to reduce variability due to inexperience. • The program should continue its good efforts to promote CAREER awards, especially for underrepresented scholars. It would be informative to compare not only new investigators to prior investigators, but also to compare number of grants awarded to assistant, associate, and full professors. <p>Demographics of PIs: Social psychology cares deeply about racial and gender parity and important efforts have been made to improve inclusion in our discipline. When it comes to outcomes, the program has mixed but promising results.</p>	<p>Yes/ No</p>

Race:

The number of proposals from ethnic/racial minority groups is rather small compared to Whites. Although funding rates appear to be high, this is due in part to lower overall participation. One important question is whether proposal and funding rates reflect proportion of demographic groups in the field who are eligible to apply for NSF grants (e.g., faculty). After examining percentages of SPSP members from different racial groups at the Assistant, Associate, and Full Professor levels, several important findings emerged.

- Percentages generally reflect the percentages in SPSP at career levels associated with grant writing (Assist., Assoc., Full), however Asians are underrepresented in grant actions.
- The actual success rate of minorities is impossible to ascertain because many PIs do not identify their ethnicity.
- Blacks and Latinos are receiving grant funding at roughly proportional rates to their numbers in SPSP. Once again, Asians are underrepresented in awards relative to their proportion in SPSP. The program should continue to monitor this while increasing efforts to improve participation.
- Most proposals, even those targeting issues related to minorities in society almost exclusively focused on the perspective of the majority (mostly White) participants. People of color/stigmatized groups were almost always abstracted targets in research stimuli. Few included underrepresented groups as participants. This is a problem.
- The program is to be commended for implementing special outreach for African-Americans/Blacks at SPSP conferences, but there are not comparable programs for Latinx. This is despite the fact that Latinx is one of the fastest growing undergraduate groups in the Society.

Gender:

The 2015 COV review noted that there was a gender disparity in Social Psychology awards despite primarily female panelists. In the current review period, this disparity has improved.

- Funding rates (based on total number of awards) favored female PIs in 2016 and 2017, with a more negligible favoritism of male PIs in 2015 and 2018. Nonetheless, the proportion of awards to women still fell short of the proportion of women in the field. Continued efforts should be made to bring the gender ratio into balance.
- As with race, assessing gender disparity is difficult because not all of the awardees self-identified.
- We requested information about the gender distribution of panelists or reviewers in the current Social Psychology Program dossier. However, there is too much missing data to draw any meaningful conclusions.

<p>5. Do you have additional comments about the program portfolio and the projects the program supports?</p> <ul style="list-style-type: none"> • Diversity benchmarks should be better defined—e.g., females are the numerical majority in social psychology but may still be underrepresented in certain domains (like grant awards). • The program should collect demographic data. Tell people why they are being asked (i.e., to assess whether groups are being underrepresented in awards). Also give better response options ('other' or 'non-binary' in addition to 'male' and 'female'; 'biracial' or 'mixed-race' in addition to specific race categories). • Underrepresented groups were almost always abstracted targets in research stimuli. Few included underrepresented groups as participants. This is a problem. 	
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V. Questions for Division Level Discussion. Please provide comments on both scientific and management aspects of the following division-specific questions:

<p>DIVISION LEVEL DISCUSSION</p>
<p>1. Looking forward over the next 10 years, what are the likely emerging areas of inquiry or issues across BCS disciplines that we should pay attention to or prioritize? What infrastructure investments would be needed to support the future of BCS (assuming unlimited resources)?</p> <p>Emerging Areas of Inquiry:</p> <ul style="list-style-type: none"> • Research bearing on the threat of climate change should be prioritized. Climate scientists agree that the greatest hurdle to addressing the challenge is changing human behavior--not just at the individual level, but also at the level of policy makers. Social psychological research on attitudes and behavior, attitude change, group norms, conformity, among other areas, all have much to contribute to this world threat. • The impact of social influence via social media and anonymous sites is becoming a dominant theme in creating grass-roots mobilization (in good and bad ways). It is also becoming a predominant way that people gain knowledge about the world and is thus a prime platform for social influence. Studying these "big data" dynamics will become more important and training in these techniques should be expanded. • Demographic changes in the US and around the globe are becoming major factors in issues related to identity, intergroup conflict, prejudice, and community. We need to start paying attention to the social psychological consequences of massive demographic shifts. This includes population aging as well as ethnic shifts. • As demographics change, we need to pay more attention to the psychological experiences of minority groups not just majority groups. We need to move away from predominantly White, college participants.

- Investigations into identity are dramatically shaping a variety of important issues in the U.S.--political identity, racial identity, regional (urban vs. rural) identity, gender identity, and so on.
- Radicalization and the rise of domestic terrorism (e.g., White nationalism) will likely be an urgent issue of inquiry in the next 10 years.

There are barriers to encouraging grant proposals in emerging areas of inquiry and to fund the best of them.

- A high percentage of awards are made to previously funded PIs, which means that areas of research previously funded will continue to consume a large percentage of the budget.
- The panels have been selected, at least in part, with expertise that matches the content of the grant proposals. This means that the panel may lack the requisite expertise to evaluate proposals in emerging areas and/or be disinterested in funding them.
- One way to encourage grant submissions in emerging areas is to publicize NSF-wide initiatives, like NSF 2020 Big Ideas and NSF-2026 Idea machine. Informing social psychologists that there are additional pots of funding that may be available for research on certain topics should encourage more submissions on those topics.
- A shortcoming of this approach is that proposals submitted through these initiatives are reviewed in separate panels that will only have representation by SBE programs like Social Psychology if the PO asks to participate. This may place an undue burden on the POs limited time. We also learned from the Social Psychology PO that social psychologists who are funded under these initiatives are not tallied in any way in the Social Psychology Program portfolio.
- We recommend a better incentive structure to facilitate participation in the NSF wide-initiatives by Social Psychology and other SBE Programs.

Infrastructure Investments:

In an effort to democratize the field (in terms of geographic, institutional, and demographic diversity), improve our samples, better train scientists in our discipline, and promote transformative research in the field, the social psychology program can make the following infrastructure investments:

- As neurological and physiological psychology become more prominent in our fields, NSF could expand access to this technology by investing in either regional fMRI/bio centers (brick and mortar) or “mobile” fMRI/bio labs. These can be reserved and leased out by different scientists in the region. Mobile labs could also help increase diversity of samples by enabling research in harder-to-access areas and neighborhoods.
- Social psychology should have an annual, representative, large sample database (like the GSS or ANES) that includes often-used measures in social psychology along with the option to submit questions for inclusion. This would be publicly available to those in our field and would greatly help scientists expand the scope and generalizability of their research (esp. scientists from smaller institutions without access to funding or subject pools).
- Mturk has become a popular method among social psychologists for getting more diverse samples (beyond college students); however, Mturk has many sampling problems. NSF could invest in developing a large, more-representative pool of potential participants that social psychologists could recruit from and pay Mturk-like prices.
- Institutional diversity in funding is an NSF priority, but is difficult to achieve. NSF should set aside special funding streams dedicated to fund and/or supplement funding for proposals from non-PhD granting institutions.
- The same should be done for CAREER to promote newer scholars, especially in underrepresented areas/institutions and from underrepresented groups

- To enhance open-science, it would be good if the field had a “one-stop shop” for data preregistration, archiving, and sharing. Right now, there are various outlets that make finding data or comparing research difficult.
- Social psych has supported a multidisciplinary retreat (MSA) for Black scholars. This should continue, and similar efforts should be made to provide professional opportunities for other underrepresented groups like Latinx (one of the fastest growing groups in our discipline at the undergraduate level) and Asians who remain underrepresented in grant awards.
- “Big data” is becoming an important theme in social psychology, especially in terms of online behavior and social media. However, few people in the discipline have the knowledge or capabilities to conduct this research. Funding a center for data analytics devoted to providing “big data” analysis to researchers across the country would expand research in this area.

2. Issues of open access to data from NSF-funded research have been the focus of agency and community discussion. What steps should BCS take, if any, to support this part of the open science agenda?

- Provide better guidance to PIs on this criterion.
- One issue is how to put teeth into this condition. Perhaps NSF could adapt the NIH requirement that all articles published with NIH funding have to be uploaded to NCBI (National Center for Biotechnology Information) before the next years increment in funding will be released as well as before any new grant proposal will be processed. The same rules could be applied to fulfilling the data management plan in the grant [open access of data].
- Scientists not involved with open science seem to not know how to get started. Providing simple step-by-step guides would help (not just workshops at conferences where participation might be low)
- There is also a lot of ignorance about open science. Researchers want to protect their data so that they and their students get publication priority. These guidelines and safeguards need to be clearly articulated. At present, it seems to be unclear what the dividing line is.
- It is also important to define “open access.” For many (esp. junior) faculty who invested a lot of time and resources, they want to ensure that they can publish as much from their data before others can utilize it. Making data available for quality control and cross checking is different (and satisfies different goals) than making data available for others to use for publication. NSF should establish a *minimum* standard that data should be available in a protected form (e.g., other cannot publish from it without the PI’s approval) for quality control purposes. This would increase buy-in and participation (note: at several SPSP workshops on open science, protecting publication rights was a consistent concern), but continue to encourage data sharing.
- It might be useful for NSF to provide a comprehensive data archive where data can be stored and organized in a rational manner that would facilitate meta-analyses.

3. There are various ways that programs communicate about funding opportunities and awards to prospective PIs and the public. Are there ways that BCS can better facilitate these efforts?

- Our understanding is that communication about funding opportunities to prospective PIs is provided in the online Social Psychology program announcement as well as at the annual meetings of the Society of Personality and Social Psychology (SPSP). In addition to hosting a session with interested parties at those meetings, it would be good to include best practices in the registration packet of

each attendee (e.g., a one-sheet description of the Social psychology and NSF-wide funding opportunities, important tips, and encouragement to apply).

- Although SPSP is the largest meeting of social psychologists, many attend other meetings, including APS and SESP. NSF funding opportunities should be publicized at these meetings as well.
- What is NSF doing for institutions that might not have a lot of internal supports? For example, smaller colleges and universities, institutions that might not have designated staff. Can NSF provide more guidance and pre-proposal feedback or outreach?
- For example, it would be good to indicate the types of documentation and assurances from department and college/university administrators to indicate university supports or work-load reductions that might reassure panel reviewers that the grant project would be feasible at that institution.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

None Provided

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

None Provided

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

None Provided

4. Please provide comments on any other issues the COV feels are relevant.

None Provided

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

- As we have indicated in several places, the data we were provided often does not allow us to draw clear conclusions because it is unclear what the proper 'denominator' is in equations assessing the allocation of awards across gender, race, and geographic locale.
- The tree map showing the areas of funding was not at all useful. A list of titles of awarded proposals as well declined proposals would be better. The latter could shed light on whether there are areas of research that are not funded.
- Demographic information about reviewers and panelists is needed to answer certain questions.
- The PO's and staff were extremely helpful and did a great job getting us the additional data we needed. Thank you.

The Committee of Visitors is part of a Federal advisory committee. The function of Federal advisory committees is advisory only. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the Advisory Committee, and do not necessarily reflect the views of the National Science Foundation.

SIGNATURE BLOCK:

/s/ Christine Reyna

/s/ Leslie Zebrowitz

For the Social Psychology Program