

## **Division of Behavioral and Cognitive Sciences Response to the 2015 COV Report**

### **Executive Summary**

The Division of Behavioral and Cognitive Sciences (BCS) Committee of Visitors (COV) met August 19-21, 2015 and included the chair and sub-chairs and at least two members representing each of the ten programs: Archaeology/Archaeometry; Biological Anthropology; Cultural Anthropology; Geography and Spatial Sciences; Linguistics; Documenting Endangered Languages; Perception, Action and Cognition; Cognitive Neuroscience; Developmental and Learning Sciences; and Social Psychology. The members of the COV met in plenary and in program-focused and cross-program sessions and reported out to Dr. Fay Cook, Assistant Director of the Directorate for Social, Behavioral, and Economic Sciences (SBE), Dr. Cliff Gabriel, Acting Deputy Assistant Director of SBE, BCS division leadership, program officers, and administrative staff.

The following response document considers and addresses each recommendation made by the COV at the division level.

### **Quality and Effectiveness of the Merit Review Process**

#### **1. Recommendation**

In those Programs that have made important changes in review schedule or process, conduct a [sample] survey of Principal Investigators (PIs) who submitted proposals during an appropriate period of time, to help assess the changes.

**Division Response:** NSF is currently conducting a survey of reviewers, panelists, and principal investigators on their experiences with the merit review process at NSF, including the pilots in merit review, such as GSS One Plus. As such, BCS will refrain from any additional surveys that may prove to be redundant and will use the results of the NSF survey to inform its assessment of changes in merit review. BCS recognizes, however, that the results of such a survey are necessarily limited and must be taken into consideration in a context of other stakeholders and considerations such as workload pressures and budgetary constraints.

#### **2. Recommendation**

NSF programs should use the body of knowledge that has been built regarding virtual meetings. (Under what circumstances have virtual meetings been shown to work well, with what sorts of equipment, with versus without video, for what issues, for what duration, of how many people, who do or do not already know each other, held how often?)

**Division Response:** The division agrees with the COV's recommendation. To date, BCS has based its usage of virtual meetings on its gained experience over the years as well as the shared best practices from other organizations within NSF. A BCS Science Assistant has been given the responsibility of conducting a literature search on the topic. She will present the resulting information to the program officers to inform them of the best practices for virtual meetings.

### Recommendation 3

Program or Division staff should estimate the actual cost and time saved from major changes in the review process, for use in assessment and in considering changes in other Programs.

**Division Response:** The Division is actively tracking costs savings from changes in the merit review process as part of its ongoing assessment of these innovations and will continue to do so, as the COV recommends. For example, since the implementation of the GSS One-Plus system, costs associated with GSS senior panels have decreased 8-25%. Before the implementation of the College of Reviewers and the practice of taking only competitive proposals to panel, PAC panel costs were consistently between \$25,000 and \$30,000 per panel. Since then, annual panel costs for PAC have been reduced by over 50%. Savings in time are much more difficult to track and evaluate; however, one time savings is associated with a reduction in the number of ad hoc reviewers being asked to volunteer their time to NSF and their scientific community. For example, in the two years preceding the implementation of GSS One-Plus (FY10 and FY11), GSS program officers sent out over 5000 independent requests for reviews. In the two years since its implementation (FY13 and FY14), GSS program officers have sent out only 3200 such requests. This represents a significant reduction in burden on the reviewer community. BCS will continue to monitor the resource savings that have resulted from changes in merit review within the division.

### Recommendation 4

Within the Division, develop training (e.g., background information, examples, and *assessment criteria*) regarding broader impact (BI) and data management (DM) plans. Provide this training for members of review panels and “college of reviewers” (for Programs using them).

**Division Response:** The Division appreciates this and other recommendations the COV has offered regarding broader impacts and data management. These continue to be a concern across the Foundation, and NSF has taken steps to provide further information to the PI and reviewer communities. However, given that this concern remains, we need to do a better job disseminating this information to those communities. For example, the SBE Directorate provides additional guidance on Data Management Plans that would be useful to both reviewers and potential PIs at [http://www.nsf.gov/sbe/sbe\\_data\\_management\\_plan.jsp](http://www.nsf.gov/sbe/sbe_data_management_plan.jsp). In response to this COV recommendation, many BCS program officers are including this link in their ad hoc review requests and communications with panels starting Spring 2016. In terms of BI, programs are exploring ways to enhance reviewers’ familiarity with this merit review criterion, such as revising review request letters to highlight broader impacts and hosting webinars on merit review that will be available to panelists, reviewers, and PIs on the BCS website.

### Recommendation 5

Some level of NSF (the Foundation, the Division, or the programs) should re-establish an online link to examples of BI components or dimensions.

**Division Response:** The NSF website contains several sites featuring useful information about broader impacts, but BCS needs to do more to disseminate what is available as a resource to both PIs and the reviewer community. For example, a Broader Impacts Infrastructure Summit was held in April 2014 and resulted in the informative brochure *Perspectives on Broader Impacts* ([http://www.nsf.gov/od/oia/publications/Broader\\_Impacts.pdf](http://www.nsf.gov/od/oia/publications/Broader_Impacts.pdf)). In response to the COV’s recommendation, BCS will update its Divisional website to include a link to the NSB Broader Impact

website (<http://www.nsf.gov/od/oia/special/broaderimpacts/>) which includes links to *Perspectives on Broader Impacts* and other relevant documents.

### **Recommendation 6**

While each proposal must be assessed on the basis of (and reviewers must address) NSF's two review criteria, recognize that awards may be made that are assessed more highly on one criterion than another. It is important that the *portfolio* of awards in each Program contribute strongly to both criteria.

**Division Response:** The BCS Division wholeheartedly agrees.

### **Recommendation 7**

POs should create a library of "ideal reviews" (appropriately redacted) for access by new reviewers, enabling them to calibrate the expected level of detail and use of the rating system.

**Division Response:** Previous attempts to provide models of ideal reviews, proposals, or Data Management Plans have not been supported by NSF for two primary reasons -- 1) there is no one ideal, and 2) these examples can be interpreted as more prescriptive in nature. Division leadership discussed this recommendation from the COV with the NSF Policy Office In October 2015, but the response from Policy did not support the idea. However, there may be other ways to inform new reviewers about the expected level of detail and the use of the rating system without creating a library of model reviews that BCS can pursue. BCS will devote a portion of a staff meeting to brainstorm on these ideas.

### **Recommendation 8**

Program materials and POs should make it clear that PIs can initiate contact with the PO after their proposal has been acted upon, to obtain more nuanced feedback than may be provided in the written reviews and panel summary.

**Division Response:** Most programs within BCS actually do include such an invitation to the PIs to contact them with questions or concerns within the Context Statement that is included with every proposal action. Some POs also include an invitation for further discussion within a PO Comment that the PI can access when he/she accesses the reviews. As of Spring 2016, all BCS programs will include such a statement in the Context Statement to ensure all PIs receive this information.

### **Recommendation 9**

Training modules are available for recognition and discussion of implicit bias. The division should investigate these and determine whether they are potentially useful for POs, panelists, and frequent *ad hoc* reviewers.

**Division Response:** Incoming Program Officers are required to take the first two session of the Merit Review Basics Workshop, which includes an overview of implicit bias, how it operates, and what steps can be taken to address implicit bias within a review context to ensure fairness and objectivity. There is no comparable training for adhoc reviewers at the current time, but BCS Division leadership will discuss the idea of developing such a training for adhoc reviewers with the NSF Academy. In addition, some programs within BCS do include a discussion of implicit bias and how to guard against its influence in their panel introductions on the first day of the panel meeting. As of Spring 2016, every program will include such a discussion in its panel introductions. The Division will discuss other ways in which we could guard against implicit bias in the review process.

**Response Requested 1**

In some cases the Review Analysis provides further information that would be useful for the PI. Is there a way to provide some of that information to PIs, when POs feel it would be helpful?

**Division Response:** The Review Analysis is an internal document that includes a synthesis across all reviews and panel discussions to justify the Program Officer's recommendation to either award or decline. In some instances, POs will copy and paste part of their evaluation from their Review Analysis to a PO Comment, which is then available to the PI to read. Alternatively, some include statements from their Review Analysis in emails to PIs. Such additional information is often helpful to the PI when, for example, the reviews were inconsistent and contradictory as a set or when the panel found the proposal to be competitive but the PO recommended a decline. BCS will remind Program Directors that they may share some of their written assessment of the proposal, contained in the Review Analysis, with the PI when it is informative to do so.

**Selection of Reviewers**

The COV made no recommendations on this section of the report

**Program Management****Recommendation 10**

Whenever possible, each Program should have a "permanent" PO.

**Division Response:** This is a consistent recommendation from COVs across the foundation. In BCS, we are making progress on this goal. In FY15, BCS hired an additional permanent program officer in Cultural Anthropology and in FY16, BCS has posted openings for a permanent program officer in both GSS and Biological Anthropology.

**Recommendation 11**

Create a web-based alert system to which current and prospective PIs could register and automatically receive all relevant program announcements.

**Division Response:** There are several ways that current and prospective PIs can arrange to be notified about interesting announcements at NSF, all found at [nsf.gov](http://nsf.gov) under the heading "Follow us." In addition to following NSF news and funding opportunities on Facebook, Twitter, and LinkedIn, interested parties can sign up for email alerts for information about Discoveries, Events, Funding Opportunities, Upcoming Due Dates, News, and Job Vacancies, within selected scientific disciplines. BCS will make sure our scientific communities know of this resource by including it in Outreach presentations. Communicating directly to our scientific communities can be challenging, and PAC is piloting a new approach by creating a portal through which interested parties can provide their emails for announcements. When a funding opportunity or job vacancy is announced, the PAC POs will send a mass email out to this list. This effort is just beginning, and the Division is monitoring its progress as other programs may want to adopt this approach.

**Recommendation 12**

The Division should develop a longer-term (e.g., 9-year) strategic plan, to be assessed at the Division-wide level, every three years. By necessity, such a long-term plan would need to be schematic, emphasizing broad attributes of the desired portfolio (distribution of size and length of awards, geographic distribution of proposals, distribution of researcher and institution attributes).

**Division Response:** BCS recognizes the need to update its strategic plan and appreciates the COV recommendation that it extend its vision to a longer-term plan. The assessment of the Strategic Plan could correspond to the division's next COV. We do note that the attributes mentioned by the COV might be too specific and dependent on short-term fluctuations to be a part of a longer-term Strategic Plan. However, the broader topics that the COV discussed, such as the balance between large and small award sizes and the balance between disciplinary and interdisciplinary research, will be included in the longer-term Strategic Plan.

## **Research Portfolio**

### **Response Requested 2**

The COV shares NSF's concern for soliciting proposals from the widest possible universe of researchers across U.S. institutions, reviewing them fairly, and making awards that invest in a broad range of researchers and institutions.

- Supplement funded projects to involve/employ undergrads or post-baccalaureate students in projects, especially in fields that require technical research experience before grad school.
- Is it possible to provide supplements to employ high school students?
- Provide support for POs to get to institutions that are underrepresented (given their size and academic programs) among proposals and/or awards, and institutions that serve high proportions of students underrepresented in BCS fields.
- Is there a way for the Division to link to or benefit from NSF's efforts to support research by faculty of minority-serving institutions, community colleges, and tribal colleges?
- Encourage Programs to seek proposals that include organized mentoring of students underrepresented in BCS fields.

**Division Response:** The Division shares the COV's concerns and appreciates its suggested actions. It is possible to supplement projects to enhance broader impacts, including broadened participation. In the past, the Division has even provided funds from available reserves to provide support for PIs who are from underrepresented groups or underrepresented institutions. In an effort to enhance participation of underrepresented institutions, the 2015 DEL solicitation includes a new funding mechanism to support collaborative proposals with the NSF Tribal Colleges and Universities program.

### **Recommendation 13**

NSF has hosted workshops and has funded research projects to add to "the science of broadening participation." Findings to date from that work should be identified and used to inform (a) Division practices (reviewer and PO recruitment, proposal solicitation, publicity of funding opportunities) and (b) the assessment of proposals submitted to the Division's Programs.

**Division Response:** BCS strives to use empirical basis for division processes wherever practicable, and this includes our efforts to broaden participation. For example, as mentioned earlier, all POs have taken training on implicit bias and, in particular, how it might operate within the merit review context. They are trained to take action should bias appear within the review context. BCS values diversity and

inclusion and continues to welcome innovative ideas on ways to enhance participation in the sciences. BCS will encourage Program Directors to work with their professional societies to better target outreach presentations to underrepresented groups to ensure wide publicity of job openings, funding opportunities, and reviewing opportunities.

#### **Recommendation 14**

Consider establishing a Division fund (budget) for projects that explicitly broaden participation (through mentoring, students' involvement, or grants to scholars from underrepresented groups).

**Division Response:** The Division agrees that support should be provided for activities that explicitly broaden participation. BCS leadership has informally done just this for many years out of the division's discretionary funds upon request from Program Officers. We will remind the Program Officers to bring such opportunities to the attention of division leadership.

#### **Response Requested 3**

The COV noted disparity between programs in the number of proposals received and the funding available for Programs. The range in annual expenditures by programs is noticeably less than the range of number of proposals by the Programs. (There are many ways to measure this. As an example, 7 of the 11 funding programs had FY14 expenditures in the \$6-9 million range, yet the number of senior proposals received in those 7 Programs that year ranged from 87 to 233). Does this lead to higher rejection rates in some Programs? Is the mean or median award size very different across Programs? If so, do the differences reflect the differences in proposals' budget requests? The same is true for mortgage rates. Some Programs have much higher mortgage rates, which means that they are funding longer term projects. Other Programs have less or very little money devoted to mortgage – are these Programs not funding longer term projects or is money available from other sources for longer term projects?

**Division Response:** The COV is not mistaken in its perception that number of proposals received and funding are not closely linked. A program's base budget is determined by several factors of which proposal pressure is only one. Differences in base budgets do contribute to differing success rates and award sizes between the programs.

The concern over mortgage rate however is not based on an accurate interpretation of the data. Programs may fund a project as a standard award, in which the entire cost of the project across all years is paid during the current fiscal year, or as a continuing award, in which the cost of the award is paid each year over the duration of the award. Continuing awards, therefore, add to a program's mortgage, whereas standard awards do not, even though they may be of the same duration. Current mortgage rates are also a bit misleading in that the Division has made a concerted effort to use year-end additional funds to assist programs in paying down their mortgage.

#### **Response Requested 4**

The COV conceptualized awards along distinctions of size, duration, and infrastructural nature. In addition to large versus small awards, the COV recognized that there is a special case of large awards – these include awards for long-term, field-based projects and for longitudinal studies. These projects represent considerable investment by NSF. They include significant infrastructure and are used by scientists in various disciplines. These projects take years to set up and often do not yield results for several years. Many of these projects are funded by special initiatives and can lead to transformative results in many disciplines. The COV felt that it was important to recognize this as a special category of award.

**Division Response:** The Division is committed to funding critical infrastructure for the behavioral and cognitive sciences and its communities, as resources allow. Division leadership will discuss this recommendation with relevant program directors to determine the feasibility of pursuing something along these lines.

## **Emerging Issues and Areas for Potential Support**

### **Recommendation 15**

BCS should lead some big, cross-disciplinary questions and get other divisions (across the Foundation) to participate in special opportunities.

**Division Response:** The Behavioral and Cognitive Sciences at NSF are proud to be engaged in a leadership role in NSF-wide research priorities such as Understanding the Brain. The BCS Deputy Division Director serves as co-chair of NSF's investments in Understanding the Brain, and a BCS PO has taken primary responsibility for developing and implementing the very successful competition on Integrated Strategies for Understanding Neural and Cognitive Systems. Through the efforts of many individuals in BCS, the science of humans and human systems has been highlighted in Sustainability, Risk & Resilience, Cybersecurity, INFEWS, and Coupled Natural and Human Systems to name a few NSF-wide priorities. While it is not realistic to assume leadership roles in all these activities, BCS staff have successfully represented our sciences in multi-disciplinary contexts to ensure enhanced funding opportunities for our broad and diverse scientific communities.

### **Recommendation 16**

The Division (or perhaps the Directorate) should develop a system of support for large-scale field science that is more sustained and requiring participation (over time) from different research areas. Investments in a field locality should reap benefits across individual studies. (NSF-funded Long-Term Ecological Research sites were mentioned as an example.)

**Division Response:** The Division will take this recommendation under consideration and discuss it at a future BCS staff meeting. Of course this can only be undertaken if the Division is assured of having sustainable funds to allow long-term support. The current level of funding in BCS would not be sufficient.

### **Recommendation 17**

NSF and its directorates should create incentives to individual institutions, or collections of institutions, to develop data archives that will meet the requirements of NSF's Public Access Plan and DM expectations. Clearly, this will be easier for electronic data sets than it would be for physical data (e.g., artifacts).

**Division Response:** This is an interesting idea, and the Division will discuss the recommendation with the SBE Assistant Director and the SBE Senior Management. SBE has engaged in activities focused on the development and implementation of data resources and analytic techniques for the past several years through its Resource Implementations for Data Intensive Research in the Social, Behavioral, and Economic Sciences (RIDIR) solicitation. RIDIR builds on previous investments in Building Communities and Capacities in Data Intensive Research in the Social, Behavioral, and Economic Sciences and in Education and Human Resources (BCC-SBE/EHR). We are currently working to ensure the BCS

communities are aware of these important funding opportunities for infrastructure to support data intensive science.

### **Recommendation 18**

NSF, BCS, or individual Programs should develop exemplars of DM-plan components (meta-data, level of data to be made available, software or technical specifications to be made available, human-subject concerns), for dissemination to their research communities. Given the heterogeneity across Programs, the program level may be the best level for this. NSF as a whole may be the correct level for publicizing the long-term archival resources available to PIs.

**Division Response:** As mentioned earlier, NSF is, in general, hesitant to provide exemplars, models, or examples of proposals, reviews, or plans to avoid being overly prescriptive and misleading the scientific audience to think there is a homogeneous approach. However, BCS agrees with the sentiment of the COV's recommendation that guidance could be provided, much as the Documenting Endangered Languages program has done within the context of the DEL solicitation. Data management is very central to the concerns of the DEL Sciences. BCS will provide a link to the SBE Guidance on Data Management Plans on its central website to ensure that prospective PIs have that informative document available to them.

### **Recommendation 19**

While our communities are still developing the use of data management, data archiving, and data sharing, POs may need to work with PIs to improve their DM plans before a potential award is finalized. (In other words, don't reject a really strong proposal because of a less-than-sterling DM plan.)

**Division Response:** The Division concurs with this recommendation. In cases where the proposal is meritorious but the DMP was lacking, POs have asked for a revised DMP, and once that was judged to be appropriate for the project, the POs have proceeded with their award recommendation.

### **Recommendation 20**

NSF and its directorates should encourage PIs to actively manage their datasets in a manner that makes them easily citable. This might be as simple as creating a digital object identifier (doi) number for electronic datasets or the electronic metadata associated with physical data. This serves several purposes: (a) provides "credit" to the investigator and (indirectly) NSF when the data are cited, (b) allows a method to search for the data, and (c) potentially provides recognition of the data archive.

**Division Response:** The Division agrees with the COV's recommendation, and the SBE Directorate has been actively exploring this issue. In FY14, SBE, along with the Division of Advanced Cyberinfrastructure in CISE issued a Dear Colleague Letter on "Supporting Scientific Discovery through Norms and Practices for Software and Data Citation and Attribution." Several relevant workshops were funded including one on "Developing Standards for Data Citation and Attribution for Reproducible Research in Linguistics" that focuses on developing standards in linguistics and language science.

### **Recommendation 21**

Projects' final reports should be checked to insure that the DM plan and BI actions have been undertaken.



**Division Response:** The Division agrees with this recommendation. BCS Program Directors will be reminded that they need to be mindful of this when reviewing annual and final reports.

### Recommendation 22

Reviewers should check the “Results of Prior Support” section of proposals for data management.

**Division Response:** BCS agrees. Starting in Spring 2016, BCS program directors will include such a reminder in communications to reviewers and panelists.

### Response Requested 5

According to Table 4 of the “Overview of the Division of BCS Report for the 2015 COV,” the total number of senior proposals received across the standing Programs was 1686 in FY12, 1437 in FY13, and 1343 in FY14: annual declines of 15% and 6%, for an overall decline of 20%. Over the timespan, the number of senior proposals declined in 10 of the 11 standing Programs: 7 of them saw declines of >10%, and 3 saw declines of >25%. Six of the 11 Programs had annual declines in FY13 and in FY14. Please comment.

**Division Response:** The decline in proposal load observed 2012-2014 is part of a wider trend across the Directorate and Foundation (see table below for SBE and BCS comparison). Following the infusion of funds from ARRA in 2009, NSF saw a significant increase in the number of proposal submitted in 2010 and 2011. Since then, the numbers have been in decline due in part to two factors: 1) regression to the mean, and 2) intentional steps that were taken across NSF to address what was viewed as an unsustainable proposal load. The latter includes some of the innovations in the peer merit review process, such as GSS One Plus, or Biological Anthropology’s move to 8-month cycles rather than 6-month cycles. The decline that the COV is concerned about is actual welcome news to NSF. Even with these lower number of proposals, BCS is still in the unfortunate position of having to decline many proposals that are meritorious and competitive.

