



COSSA Washington Update

Consortium of Social
Science Associations

June 13, 2005

Volume 24, Issue 11

LIGHTFOOT TAKES COMMAND, BEMENT VOICES SUPPORT AT SBE ADVISORY COMMITTEE

After one full day on the job, David Lightfoot, the new Assistant Director for the Social, Behavioral, and Economic Sciences Directorate (SBE) at the National Science Foundation (NSF), met with his Advisory Committee on June 2 and 3. The Committee also has a new leader, Bob Groves, a Research Professor in the Survey Research Center at the University of Michigan.

Lightfoot noted his background in language development research, especially in children and their “explosion” of language skills at age three. He expressed excitement about the NSF priority in Human and Social Dynamics and its emphasis on researching change. Discussing the NSF budget situation, he expressed dismay that the FY 2005 current plan for spending is still under discussion with the Senate, while the FY 2006 budget is under consideration by the House Appropriations Committee (see related story), and the FY 2007 budget planning is about to begin.

Lightfoot also characterized the speech by Office of Science and Technology Policy Director John Marburger to the AAAS an “opportunity” for SBE scientists (see *UPDATE*, May 2, 2005). However, the development of econometric models and indicators for a “science of science policy” will require greater national investment in cyberinfrastructure in the SBE sciences, Lightfoot declared.

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CAPITOL HILL: SCIENTISTS DISCUSS “SIX DEGREES OF SEPARATION”

On June 10, the Coalition to Protect Research (CPR), along with COSSA and 12 other organizations, cosponsored a Congressional Briefing on the importance of social network research for public health and national security policy. The Coalition to Protect Research is a coalition of 60 organizations committed to promoting public health through research. CPR is headed by Angela Sharpe, Deputy Director for Health Policy of COSSA, and Karen Studwell, Senior Legislative and Federal Affairs Officer for the American Psychological Association (APA).

Social networks are based on patterns of interaction among individuals, organizations, groups, and even countries. Each individual’s unique social networks can have profound effects on their physical and mental health as well as their personal safety.

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The advisory committee gave well-deserved kudos to Wanda Ward, who led SBE during the past fifteen months, while the search for a replacement for Norman Bradburn occurred.

Bement: SBE Sciences “Essential To Every Policy Issue”

NSF Director Arden Bement told the panel that the SBE sciences are “essential to every policy issue.” Rejecting the “soft sciences” designation often applied to these areas of research, Bement cited their increasing sophistication and complexity as well as the tremendous opportunities that lay before researchers in these fields. He noted the importance of SBE research in responding to natural and man-made disasters, studying the social implications of technology, examining networks of all kinds (see related story), and guiding public policy research and development. He expressed some frustration that people on Capitol Hill are not yet convinced because “they haven’t gotten rid of the old tapes.”

Further commenting on the Marburger speech, Bement indicated that the president’s science adviser had raised an important issue: How much investment in research and development (R&D) is enough and how do you determine that? Bement suggested that U.S. domination in every field of science, the nation’s longstanding R&D goal, is probably no longer viable. Thus, he declared, choices among fields will become necessary. At the same time, he noted, the nation continues to need new knowledge and must invest in the future.

Bement wondered how one could measure all of these variables. There are intangibles, spillover effects, halo effects, intellectual leveraging, lead-time issues, hidden capital costs, and other factors that create difficulties in assessing the R&D system. Bement noted there is already existing evidence that could be tapped, particularly from SBE’s Science Resources Statistics division. He also suggested conducting case studies, but stressed the need for hard data. Bement declared that the whole subject of assessing the R&D system presented enormous opportunities for the SBE sciences.

The Advisory Committee also heard from Dan Atkins and John King of the University of Michigan. In 2003, NSF appointed a committee led by Atkins, which delivered a report called *Revolutionizing Science and Engineering through Cyberinfrastructure*. Both Atkins and King discussed the implications of NSF’s emphasis

on enhancing cyberinfrastructure for the SBE sciences. A recent workshop jointly sponsored by SBE and NSF’s Computer and Information Science and Engineering Directorate indicated that there are significant opportunities for increasing advanced computing hardware and software use for research in the social, behavioral, and economic sciences. These sciences can help to make computers “less horrible to use” through the application of human factors research. Furthermore, the social and political dimensions of advanced cyberinfrastructure (e.g. the spread of the Internet in China) are another aspect of this challenge. SBE has just completed a competition for research on advanced cybertools.

Melvin Bernstein, head of University Programs at the Department of Homeland Security (DHS), described his division’s role for the Advisory Committee. He discussed the two Homeland Security Centers of Excellence where the SBE sciences play an important role. The first, anchored at the University of Southern California and dubbed CREATE, focuses on risk analysis and the economic consequences of disasters. The second, led by researchers at the University of Maryland and referred to as START, examines the motivation and intent of terrorists, resiliency, and risk communication activities. He also noted DHS’s fellowship programs as well as the summer student and faculty program, all of which provide opportunities for researchers and students to participate in the homeland security arena.

SIX DEGREES (Continued from Page 1)

Scientists working with social network models have identified how infectious diseases like SARS and STDs are transmitted across communities of individuals. Similarly, researchers working with the military have employed social network analysis to identify and track terrorist networks as well as locate terrorist targets. Briefing attendees heard from four distinguished scientists who are applying social network analysis to critical issues ranging from high-risk adolescent behaviors to military intelligence.

U.S. Major Brian Reed from the Center for Research on Military Organization at the Department of Sociology, University of Maryland College Park discussed social network analysis and resistance networks. Katherine Stovel, a sociologist from the University of Wisconsin, spoke about romantic networks among adolescents. Duncan Watts, a professor of sociology Columbia University and

author of the book *Six Degrees: the Science of a Connected Age* (W.W. Norton, 2003), talked about the unpredictability of epidemics, and American Sociological Association (ASA) Executive Officer Sally T. Hillsman moderated the session.

Hillsman opened the briefing by pointing out that social network analysis is often seen by non-academics as “soporific” and that in the past, it has rarely left the seclusion of academe. Now, she said, this area of study is becoming more visible outside of the academic world, emerging in sometimes unexpected places. Hillsman also gave reference to the play by John Guare that inspired the title of the seminar, “Six Degrees of Separation,” explaining the theory that any two people in the world are connected by a network of six or fewer people. The practical implementation of social network analysis, she said, can lead us to find “meaningful simplicity in the midst of complexity.”

Resistance: How Do We Depict a Network That Does Not Want To Be Found?

Reed elaborated on the application of social network analysis to military operations. He explained that the role of such analysis is to somehow infer organization in the absence of visible structure, which has played a pivotal role in attempting to track down terrorist, or “resistance” networks. As Reed pointed out, “How does one depict such a structure if the group does not want to be known?” He named the Bolsheviks and Viet Cong as prime historical examples of “cell networks,” the study of which may prove useful in depicting the structure of similar networks in Iraq or Afghanistan. Being able to diagram these networks, in concert with terrain analysis and an understanding of diverse populations, enable intelligence preparation in the battlefield, or (IPB). These factors are often studied in order to choose locations for and timing of maneuvers or attacks.

Reed presented three main ideas for the audience to take home. First, resistance networks do not behave like normal social networks. For example, strong ties between people can appear to be weak, incomplete results can compromise the network picture, it is often ambiguous who in the network is “in” or “out,” and the dynamic of the group is constantly changing. Second, he explained that the best practical application of social network analysis may be to identify suspects and then map their networks to see where they may lead. Third, he argued that social network analysis can allow for

better prediction of certain future behaviors, making for clearer evidence and a better likelihood of prosecution. Once a network has been identified, we are able to investigate its structure, how it works, how it is connected, and how to best destabilize it.

Stovel: We Must “Rethink” Individual Risk Within Sexual Networks

Stovel shifted the discussion to the National Longitudinal Study of Adolescent Health, or the “Add Health Study,” an ongoing study on adolescents attending 143 schools in 80 communities throughout the U.S. and sponsored by 17 federal agencies. It was designed to measure the social contexts of adolescent health. The study includes in-school questionnaires, in-home interviews, and parent questionnaires. Using wave one data, she talked about a segment of the study that examined the romantic networks among youth. In mapping these networks, contrary to conventional theory the data did not indicate a “core,” or dense clusters of high-risk people interacting with each other (a core model of rapid disease transmission). Instead, it showed primarily “romantic cascades,” or networks where high and low-risk people interact without cycles (within which the spread of disease is slow, but where subtle changes in romantic chains can cause massive effects on disease risk). Stovel illustrated her points by using maps of the networks in one of the study’s high schools, where participation was 100 percent. She emphasized that we must begin to “rethink” individual risk; “risk” is not necessarily what individuals do, but also who they do it with and the type of network in which they are embedded.

Conventional Epidemic Models May Be Flawed

Watts began his presentation about the unpredictability of epidemics by explaining why many of the longstanding conventional models used to predict epidemics are fundamentally flawed. The SIR (Susceptible, Infected, Recovered – or Removed) model, for example, assumes that the “susceptible” and the “infected” run into each other in random mass action. Watts elaborated on the reasons that so many models use this “mass action” assumption: “... the standard model is to assume that individuals bump into each other at random. And so the probability of an ‘infected’ running into a ‘susceptible’ is just proportional to the product of their population sizes... this is a tremendously simplifying assumption because now you don’t need to model the disease at the level of individuals; you can instead model it at the level of populations.” He added: “... this is a very powerful

assumption. It enables you to write down differential equations instead of having to do very complicated simulations.” Watts argued that this is not accurate because the nature of epidemics is such that they either infect very few people, eventually disappearing, or the disease spreads rapidly and a large chunk of the population becomes infected.

He also challenged the notion that epidemics only “peak” once during their run. The reality, he said, is that due to their introduction into different parts of the world with sometimes vastly different living conditions, any given epidemic can peak several times. Diseases will often circulate in a certain locale, and then “jump” to a distant place because of a few individuals who travel. “And furthermore,” he added, “temporarily there is a lot of uncertainty as well. Just because the disease is burning itself out doesn’t mean that it can’t find itself a new population and start right back up again.” According to Watts, these examples serve as illustrations of the need to study population structure in order to better predict and understand epidemics.

During the question and answer period, Mary Jo Hoeksema of the Population Association of America (PAA) asked about the role that technology has played in both the rise of resistance networks and their identification. Reed responded that new technology has made communication more vulnerable on both sides, but has also sped up the communication process. For this reason, he pointed out, we are starting to see these networks revert back to more primitive, secure modes of communication.

Implications of Social Network Research for Public Policy

Hillsman interjected a question of her own, asking each presenter whether they think that data on social networks are improving and if there are actions that government and policymakers can take in order to further the science. Stovel responded by saying that data collection efforts are improving, but that more understanding of network patterns is needed. She observed that at some point, it would be useful to integrate mathematical modeling into social network analysis in order to see if there are some identifiable patterns emerging. Watts added that “there is a tremendous advantage going on now in recording who interacts with whom and possibly even with what consequences. Unfortunately, for publicly funded researchers, that is almost all in the corporate world and it’s proprietary.” In many cases, he argued, progress is encouraging and simply needs more data,

while other areas are not as promising as the others and may need a new approach altogether.

David McMillen of the House Government Reform Committee questioned the extent to which social network analysis can be ethically and justly used in the public policy arena, for example, those who have distant relations or one-time interactions with al Qaeda members being hunted down as terrorists; “... how do we draw that line between what is valuable research and when is it appropriate to move that research into the policy realm where the consequences are quite big?” Watts answered the question by saying: “The problem with individuals is that they are very complicated and two people who have very similar histories and backgrounds can end up behaving very differently... even if you happen to be genetically identical you can have very different life courses depending on any number of variables... So you have to ask the right questions and unfortunately, a lot of the questions that people want the answers to, particularly in the policy world are the wrong kinds of questions scientifically.”

Stovel also tackled a question about using populations in other countries to study the progression and network pattern in the U.S. AIDS epidemic. She explained that currently, mathematicians and workers in the field are collaborating in places like Southern Africa to come up with better models of disease transmission. “... I think this is a context where we really do need people working with different kinds of expertise to feed better estimates of social behavior, sexual behavior, whether it’s sexual relationships per se or other kinds of things that might bring people into proximity with one another...”

The final question of the day came from Barbara Solt of the Institute for the Advancement of Social Work Research, who asked about the need for getting data on networks that are not terribly popular, such as disease transmission among truck stop prostitutes – one of the 150 sexual health research grants funded by the NIH that have been the subject of congressional inquiries, the most recent at a House Energy and Commerce hearing on the possible reauthorization of NIH (see *UPDATE*, March 21, 2005). Stovel responded “... I think the more we study networks, the more we find both that there are strong similarities; there are some principles that seem to guide people’s interactions with one another... And yet there is important variation as well. And to the extent that we can understand that variation... we then will be able to begin to think about the consequences of networks in a more robust way.”

Concluding that there are “no easy answers here,” Watts emphasized that as with the prediction power of any variable, social network theory cannot yet provide definitive answers to terrorism or disease because it is still in its fledgling years of study. He drew an analogy between the future of social network analysis and the future of DNA back in 1953; years of research and billions of dollars have been put in to harness the power of this science. Watts concluded by saying “this is science like any other kind of science. And if you want answers, you have to pay for them... you don’t get there with just one person sitting and dreaming up his or her theory of the world in their office... You need to industrialize these things.”

The organizations cosponsoring this briefing included: American Academy of Political and Social Science, American Psychological Association, American Sociological Association, Association of American Medical Colleges, Association of Population Centers, COSSA, Federation of Behavioral, Psychological and Cognitive Sciences, Institute for the Advancement of Social Work Research, Population Association of America, Reproductive Health Technologies Project, Society for Research in Child Development, The AIDS Institute, and The Mautner Project, the National Lesbian Health Organization.

A transcript of the proceedings will be available at: www.cossa.org/CPR/cpr.html.

SPENDING BILLS MOVE FORWARD IN HOUSE; SENATE BEGINS PROCESS

Spurred by new Appropriations Committee chairman Rep. Jerry Lewis (R-CA) to pass all of the FY 2006 spending bills by July 4, the House is moving swiftly and steadily through the process. Five bills have already passed the full House, including Agriculture. Two more, the Defense and Science, Commerce, and Justice bills will be on the House floor this week. The massive Labor, Health and Human Services, and Education bill has moved through the Subcommittee and will go to the full panel on June 16.

The Senate began the process by moving the Interior and Environment bill through the full Committee on June 9. The National Endowment for

the Humanities received \$143.1 million, the same as the House-passed level. The Senate expects to accelerate its activity by marking up six more bills by June 30.

With committee reports now obtainable for the Agriculture and the Science, Commerce, and Justice bills, more details are available concerning spending levels and congressional directives to the agencies. These are summarized below:

National Science Foundation (NSF)

As noted in the last *UPDATE* (May 30, 2005), the House Appropriations Committee recommended \$5.643 billion for the NSF in FY 2006, \$170.5 million above its FY 2005 funding, and \$38.4 million above the President’s request. The Research and Related Activities Account received \$4.378 billion from the Committee, \$157 million above last year, and \$44 million above the request. Once again this year, the appropriators did not designate the distribution of this funding by directorate, providing NSF director Arden Bement the discretion (subject to congressional approval) to make the allocations, including funding for the Social, Behavioral and Economic Sciences (SBE) Directorate. The report included language directing SBE to continue funding research in child development, citing the important “interdisciplinary collaborations” of the Children’s Research Initiative.

The Committee recommended \$807 million for the Education and Human Resources Directorate, \$34.4 million below FY 2005 funding, but \$70 million above the request. The Committee expressed its “disappointment” in the proposed budget reductions for this account. For the Research, Evaluation, and Communication division, the panel provided \$50 million, which is \$9.5 million less than last year, but \$16.2 million above the request. The Committee accepted the Administration’s proposal to move new Math and Science Partnership awards over to the Department of Education, allocating only \$60 million to NSF for existing awards.

Since this was the first year that science programs came under the jurisdiction of Chairman Frank Wolf (R-VA), he wanted to issue a strong statement in the report concerning science and technology budgets. Placed in the language concerning the White House Office of Science and Technology Policy’s budget (OSTP), it reads:

“The Committee is deeply concerned about the state of the Nation’s dedication to maintaining our position as the world leader in science, technology and innovation. Further, the Committee is convinced that bold and dramatic commitments are necessary to ensure the United States’ economic leadership in the 21st Century and a rising standard of living for all Americans. In this regard, the

Committee encourages OSTP to ensure that Executive branch policy makers and budget officials understand the impact of stagnation in science and technology on all areas of national life. The Committee expects that future budget requests for science and technology programs will reflect the importance of these investments to the competitive and economic future of the nation.”

U.S. Census Bureau

The Committee recommendation includes a total operating level of \$832.2 million, \$87.4 million above FY 2005, but \$5.1 million below the request. For Periodic Censuses and Programs, the Committee provides \$624.2 million. This is \$75.5 million above last year, but \$33.1 million below the request. To continue designing a short form-only census for 2010, the Committee allocated \$213.8 million, \$630,000 below the request. The Committee report noted that a “simplified, streamlined census” should cost \$2 billion less than the traditional long-form census. It also provided \$79.8 million, the amount requested, for continued updates to the address list (MAF) and digital maps (TIGER system).

The American Community Survey (ACS) received close to \$170 million, the amount requested. In 2006, the Bureau plans to add group quarters (such as college dorms, nursing homes, and prisons) to the survey for the first time. The Committee noted that its support for replacing the decennial long form with an ongoing short-form survey remains “steadfast.”

The appropriators continued the requirement that the Bureau collect data on “some other race” in the census, curtailing the Bureau’s test of a revised census race question that eliminated the “some other race” option.

For the Salaries and Expenses account, the Committee appropriated \$208.2 million, \$11.9 million above FY 2005 funding, but \$12 million below the request. The report directs the Census Bureau to use prisoners’ permanent homes of record rather than their incarceration sites when determining their residences. Since many prisoners are now housed in rural prisons, yet come from urban areas, this counting change could affect funding distributions as well as political boundary drawing.

The Economics and Statistics Administration, which includes the Bureau of Economic Analysis, would receive \$80.3 million, \$1.4 million above FY 2005, but almost \$5 million below the request. The Committee notes that this account has received increases totaling 60 percent over the past five years “to ensure that policy makers have better access to more accurate and timely economic data on the changing global economy.”

Justice

The FY 2006 allocation from the Committee for the National Institute of Justice (NIJ) is \$56 million, a slight increase over FY 2005. NIJ would also continue to receive funding from the Violence Against Women program, the State and Local Justice Assistance programs (Congress rejected the Administration’s proposal to end these programs), and the DNA Initiative.

The Bureau of Justice Statistics (BJS) would receive \$35 million in FY 2006 under the Committee’s proposed bill, almost \$1.5 million above the current appropriation. The Committee report is silent on the proposed resurrection of the Arrestee Drug Abuse Monitoring Program (ADAM), formerly in NIJ, which was renamed the Felony Arrest Drug Abuse Reporting Program. BJS had proposed spending \$6.2 million on this program in FY 2006.

Educational and Cultural Exchange Programs

The Committee proposed funding of \$410.4 million for the State Department’s Educational and Cultural Exchange Programs, \$54.5 million above FY 2005, but \$20 million below the request. The panel supported the transfer of the microscholarship program, which helps young people in the Arab and Muslim world learn English, from the diplomatic and consular services account.

Agriculture

On June 8, the House passed the FY 2006 Agriculture, Rural Development, FDA and related agencies appropriations bill by a vote of 418-8. The bill provided \$80.7 million for the Economic Research Service, a boost of \$1.8 million over last year. Most of the increase goes toward continued development of the Consumer Data and Information System, which tracks food supply and consumption patterns. The National Agricultural Statistics Service received \$136.2 million, an increase of \$7.8 million over last year. The appropriation also includes \$29.1 million for the Census of Agriculture.

In allocating for the Cooperative State Research, Education, and Extension Service (CSREES), the House rejected the Administration’s attempt to begin phasing out formula funding programs such as the Hatch Act. For FY 2006, the House provided \$178.8 million for payments under the Act, an increase of \$100,000 over last year.

The National Research Initiative Competitive Grants (NRI) program received \$214.6 million, an apparent

increase of \$35 million over last year, but \$35.4 million below the request. However, seven programs totaling over \$43 million in FY 2005 appropriations have been merged into the NRI from the Integrated Activities account, with the Committee directing the Agriculture Department to continue their funding at FY 2005 levels.

As usual, the House rejected the Administration's request to sharply curtail Special Grants. Instead, the House provided funding of \$107.1 for these grants, including \$1.2 million for the Rural Policy Institutes.

Health and Human Services

On June 9, the House Labor, Health and Human Services, and Education Appropriations Subcommittee, chaired by Rep. Ralph Regula (R-OH), marked up its FY 2006 bill. Although the details that come with the release of the Committee report are currently unavailable, the Subcommittee did make its numbers public. The Subcommittee appropriated \$28.507 billion for the National Institutes of Health (NIH), up \$142.3 over last year or 0.5 percent, and slightly below (\$2.8 million) the request. The Office of the Director would receive the bulk of the increase, \$124.2 million.

The Centers for Disease Control (CDC) would receive \$5.946 billion, a \$1.435 billion boost over last year and almost \$2 billion above the request. The increase includes \$1.616 billion for bio-terrorism preparedness and response. Funding for the rest of the CDC's programs would decline slightly.

Education

The Subcommittee recommended \$522.7 million for the Institute of Education Sciences (IES), \$538,000 above last year, and \$43.6 million above the request. The House panel once again rejected the Administration's request to eliminate the Regional Educational Laboratories and provided them with \$66.1 million, the same as last year. Research, Development and Demonstration (\$164.2 million), Statistics (\$90.9 million) and Statewide Data Systems (\$24.8 million) were all funded at last year's levels. Since the panel rejected the Administration's proposed extension of assessments to high schools, the National Assessment of Educational Progress (NAEP) budget of \$89 million represents a \$22.5 million drop from the requested level, although the funding remains the same as FY 2005.

International education and foreign language programs (\$108.9 million) and the Javits Fellowships program (\$9.8 million) received the same funding as last year from the Subcommittee. Once again, the House refused to fund the Thurgood Marshall Legal Education Opportunity Program. The Senate has rescued this program in the past. The Fund for the Improvement of Postsecondary Education (FIPSE) received \$49.2 million, down from its earmark inflated FY 2005 budget of \$162.1 million, but this year's earmarks will most likely come later in the appropriations process.

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The Consortium of Social Science Associations (COSSA), an advocacy organization for Federal support for the social and behavioral sciences, was founded in 1981 and stands alone in Washington in representing the full range of social and behavioral sciences.

Update is published 22 times per year. Individual subscriptions are available from COSSA for \$80; institutional subscriptions - \$160; overseas mail - \$160. ISSN 0749-4394. Address all inquiries to **COSSA**:

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SCHOFIELD CLEARS THE SENATE

Regina B. Schofield, President Bush's nominee for the Assistant Attorney General for the Office Justice Programs, finally cleared the Senate confirmation process on June 8 by voice vote. Schofield replaces Deborah Daniels after her resignation last year (see *UPDATE*, April 4, 2005). OJP provides federal leadership to develop the nation's capacity to prevent and control crime, administer justice, assist crime victims, and improve the criminal and juvenile justice systems. Within the OJP's jurisdiction are the National Institute of Justice, Bureau of Justice Statistics, Office of Juvenile Justice and Delinquency Prevention, Bureau of Justice Assistance, and Office for Victims of Crime.