



OBSERVER

Published by the American Psychological Society

Vol. 4, No. 6

November 1991

NSF Directorate: Yes!

New Directorate for Psychology, and Other Behavioral and Social Sciences

WASHINGTON, DC — It's finally going to happen. A directorate for psychology and other behavioral and social science disciplines is being formed by the National Science Foundation (NSF).

More than just a much-needed organizational change, the separate directorate represents a comeback from a decade ago when the behavioral and social sciences sustained enormous budget reductions. At that time, psychology and other disciplines were the targets of political prejudice in Congress and the White House.

Ten years later the situation has changed, and congressional support for psychology and other behavioral and social science disciplines is seen as pivotal in convincing NSF to divide the current Biological, Behavioral and Social Science (BBS) directorate.

The establishment of a separate directorate at NSF also represents a kind of "coming of age" for APS, according to Executive Director Alan Kraut, noting that APS initiated several actions in the

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*Learn How, Why, and
When It Happened:*

See pg. 24

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Do Science Museum Exhibits Really Teach?

**A New Program Is Designed to Find Out:
Here's an Invitation to Participate**

Ppsychologists now have new opportunities to do research in the high-growth field of informal science education.

The National Science Foundation (NSF) is trying to help fill a research gap that grows wider each year. Science museums and centers have been multiplying and expanding their facilities dramatically. But few psychologists have ever focused on their educational effects.

Science museums in the United States now have aggregate attendance figures estimated at 40 to 50

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Vortex display at Reuben H. Fleet Science Center in San Diego, CA, entertains family members.

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The **APS Observer** (ISSN: 1050-4672) is the monthly publication of the American Psychological Society (Federal ID Number: 73-1332437). On alternative months, beginning with February, the **Observer** consists of the **APS Employment Bulletin**. Editorial and advertising offices are at APS, 1010 Vermont Avenue, NW, Suite 1100, Washington, DC 20005-4907; Tel: 202-783-2077, Fax: 202-783-2083, Email (BITNET): APSKLH@UMUC; (PsychNet): APSNET.

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All APS members receive the **Observer**. Non-member subscription rates are \$30 (domestic) and \$40 (foreign) per year. Send subscription requests to the address above. Third-class postage is paid at Washington, DC. **Postmaster:** Send address changes to American Psychological Society, 1010 Vermont Avenue, NW, Suite 1100, Washington, DC 20005-4907.

Contributors: Unsolicited articles, announcements, and letters to the editor should be submitted to the Editor at the address above. Submit one double-spaced paper copy via mail, fax, or email. If submitting material on computer disk, submit a paper copy and a wordprocessed or ASCII file on Macintosh (3.5") or DOS (3.5" or 5.25") disks.

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On Giving Psychology Away

Robert A. Bjork

University of California, Los Angeles



Robert A. Bjork

The year 1969 was an eventful one, including, among other things, the first moon landing, Woodstock, and the Manson murders. It was also the year that George A. Miller, in his APA presidential address, argued eloquently for the need to "give psychology away."

With Miller's recent receipt of the National Medal of Science fresh in my mind [see the September, 1991, *APS Observer*], I was prompted to reflect back on his arguments by a reporter's question at a September 24 press conference — held at the National Academy of Sciences — to release *In the mind's eye: Enhancing human performance*, the second report of the National Research Council's Committee on Techniques for the Enhancement of Human Performance.* As chair of the committee, I was joined at the press conference by three members of our 12-person committee (Gerald C. Davison, Eric Eich, and Daniel Landers) and by our study director, Daniel Druckman.

After we had cited evidence that typical training programs can be improved substantially and that certain preparation techniques can enhance performance under pressure, a reporter asked if we were aware of the money that could be made by marketing such innovations. We responded that, aware or not, our goal was to give our findings away — to the Army Research Institute, which sponsored our study, and to any other individuals and organizations in need of our conclusions.

Just what is it we have, as experimental psychologists, academic and applied, to give away? From the perspective of having served on the National Research Council committee referred to above, I would say it is as much our methods as our results. Over the last six years, in two separate phases (the first chaired by John Swets), the committee evaluated a range of techniques designed to enhance performance, including a variety of unconventional techniques claimed by their proponents to

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* The impending release of *In the Mind's Eye* was announced in the September, 1991, *Observer* (pg. 19). To do justice to this important report — which draws almost exclusively on psychological research — the reader will find in this issue of the *Observer* two other articles that, together with the September *Observer* announcement and story on subliminal audiotapes, give a fairly well-rounded preview of the contribution of the report to society and the discipline of psychology. To continue your tour of the report, read also the summary that begins on pg. 13 following this column, and read the article on training beginning on pg. 10. A list of the committee members appears on pg. 13.

The Editor

The APS Convention in '92

★ San Diego, June 20-22 ★

The Stars Will Be Out . . .
 In the Sky Over Harbor Island, Home of the '92 Convention . . .
 And Inside the Sheraton on Harbor Island . . .

- ★ the keynote address by W. K. Estes;
- ★ invited addresses by Linda Bartoshuk, Allan Collins, Judy Dunn, Mortimer Mishkin, Ulric Neisser, Michael Posner (with commentary by Ron Mangun), Robert Rescorla, David Rumelhart (with commentary by Richard Shiffrin), Shelley Taylor, Larry Squire, Elissa Newport, and Robert Sternberg
- ★ the bring-the-family address on eating preferences by Paul Rozin;
- ★ symposia on the topics of plasticity & sensory systems, and motivation & performance, and multi-specialty symposia on metacognition, and reading
- ★ the Presidential Symposium on the topic of post-traumatic stress disorder.

And that's only a *small* portion of this year's program, which is just beginning to take shape.

The focus of the convention is **the best of scientific psychology**. Do you have a new finding you might be able to present, say, in a poster? Or how about participating in a symposium, or giving a major talk that synthesizes the research in a particular area? We'd like to hear your ideas and so will other people. The deadline for submitting a proposal is December 6. Details can be found in the Call For Proposals, which was sent last month to all APS members and which also appeared in the September 1991 issue of the *Observer*. If you need another one, the APS central office will be glad to send one to you (tel.: 202-783-2077).

And don't forget your family. As usual, we'll be having a Bring-The-Family address, this year Paul Rozin will discuss the topic of eating. Bring the entire family, including children who might enjoy hearing this entertaining and informative talk. After the convention, why not take the family to the world-famous San Diego zoo, or Seaworld, or Disneyland, or perhaps even to Mexico? People attending the APS convention will receive a special room-rate of only \$89/night, a true bargain for a stay on Harbor Island.

So plan now to be in San Diego on June 20-22, and ride the scientific wave . . . for the best of scientific psychology!



ATTENTION . . .

APS Members Who Joined the Society Before October 1989 While Living in Canada . . .

When APS membership records were transferred to their permanent residence at the Washington, DC, office — at the end of September 1989 — some members with Canadian addresses were inadvertently lost. If you have not been receiving APS mailings and publications, or know of someone who is not, and had joined the Society prior to October 1989 while living in Canada, please contact the APS headquarters in Washington to alert the Membership Officer of this potential error in our records.

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for the price of
one . . .*

See details
On page 38

Child Institute to Fund APS/SRCD Minority Initiative

A joint effort by APS and the Society for Research in Child Development (SRCD) paid off recently as the National Institute of Child Health and Human Development (NICHD) announced plans to issue a Request for Applications (RFA) for a new research initiative on normative behavioral development in ethnic minorities.

This new initiative will allow scientists to address important issues of behavioral development in minority children without couching them in the context of some social problem or high risk behavior.

Congressional Encouragement

APS and SRCD enlisted the help of Representative Louis Stokes (D-OH) who raised the issue of normative research during legislative hearings on NICHD. "There's so much we don't know about the development of minority children," Stokes told NICHD. "Whether African American, Asian American, or Latino — what do they go through in growing up? What are the general norms for various aspects of development in ethnic minority groups regardless of any particular social or economic status? Are those who make it out of the ghetto so different from those who don't? This new initiative will allow scientists to address these and other important issues of develop-

ment in minority populations," he explained.

Subsequently, the initiative was contained in the House Appropriations Report for NICHD for Fiscal Year 1992. The Senate Appropriations Committee included similar language in its FY 92 report for NICHD.

The Appropriations reports noted that developmental research on minorities has focused disproportionately on high-risk groups and charged that this focus distorts the picture of normative development in these populations. The reports further recognized the scientific need for normative research in order to establish a basis for comparison when evaluating the effectiveness of early educational interventions and other childhood programs.

RFA in the Works

NICHD is now in the process of developing the RFA, and APS and SRCD are encouraging the agency to draw on the diversity of the developmental research community. The RFA should be out later this fall. Watch future editions of the *Observer* for up-to-date information on the development of the RFA, workshops, announcements, technical assistance and other information. ♦

Spotlight on Research

What Can Monkey Factors Tell Us About Human Factors?



David Washburn

Comparative psychomotor research on tracking, manual control, and hand-eye coordination reveal many similarities between humans and rhesus monkeys

Humans and rhesus monkeys shoot at the same targets on identical computer graphics at Georgia State University. And, in some conditions, the responses of the two species are indistinguishable, reports Research Associate David Washburn.

Humans and monkeys use identical equipment, manipulating a joystick to move a cursor toward moving targets on a computer screen. And, while previous studies have suggested that the performance of rhesus monkeys was not a good model of human psychomotor performance — due to the inability of monkeys to **predict** target movement — Washburn's work has revealed that both species respond predominantly to where a stimulus is **heading** rather than to where it **is**. The only difference between the conditions for the two species in Washburn's studies is that humans do not receive the 300-mg. fruit-flavored chow pellet that monkeys receive after successful trials.

Psychomotor Tasks

Three kinds of tasks are involved: tracking an on-screen moving target, contacting the target, or

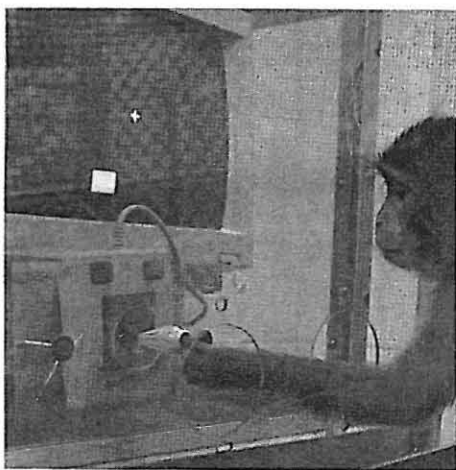
predicting its path. Prediction involves shooting with a line of light to where the target *is going* rather than where it *is*. The monkeys and humans move the joystick to a position corresponding to the angle and degree from which they want the beam of light to shoot towards the predictable target path and then "fire" the light beam.

Continuity of the Species

In the three types of experiments, rhesus monkeys evinced behavior that seems to place them on a continuum of competency alongside humans, Washburn reported, although below humans on complex and demanding tasks.

Rhesus monkeys do not predict target movement as accurately as humans do. But they were thought previously to be "unacceptable models" for any psychomotor performance

such as tracking, hand-eye coordination and manual control tasks, Washburn reported. His paper was read by co-researcher Duane Rumbaugh as Washburn was receiving his PhD from Georgia State on the day his research was presented at the 1991 APS convention.



Rhesus monkey manipulates joystick in psychomotor task.

Implications

The investigations have important implications for human factors psychologists, Washburn asserted to an audience composed primarily of industrial-organizational psychologists, because the results demonstrate a continuum between human and rhesus monkey behavior and performance.

"It is clear that many of the central issues of human factors psychology can be tested easily and accurately with nonhuman primate subjects," he stated. "Further, conditions under which nonhuman subjects can be exposed — particularly in terms of duration or degree — can be relatively exaggerated, within, of course, the bounds of ethical and scientific considerations."

Research with "relatively naive and experimentally controllable non-human primate species" can contribute significantly to understanding of the development of psychomotor competency, and thus to understanding tracking and other manual control skills, Washburn asserted.

Washburn and his colleagues tested 10 rhesus monkeys for memory, attention and motivation in the course of the psychomotor investigations. In some trials with monkeys, researchers made the target harder to contact and found this usually increased the accuracy of performance, possibly by eliciting greater attention. Trials with humans showed that increasing the difficulty resulted in both higher accuracy levels and faster response times.

Thus one product of the investigations is an environmental manipulation that reliably enhances performance across species and a strong hypothesis about other manipulations that may also enhance learning and performance, Washburn reported. **D.K.**

For the Grant Seeker . . .

Writing Successful Grant Applications

Writing a successful research grant application is one of the most daunting aspects of being a scientist. Graduate schools rarely train students in this process, even though it is vital to sustaining a program of productive research. Further, the competition for research support funds is stiff. This is true whether you are talking about university, private, or Federal research support. The purpose of this article is to help demystify the grant application process.

How to Begin

Begin with a research idea that excites you and is rich enough to keep your interest over the long haul. An application may take six months to fully plan, write, and submit; six months to receive the review results; and one to five years to actually conduct. This is a significant amount of professional time, and the research idea should warrant such a long-term commitment.

Another reason to wait until you have an outstanding research idea is that few granting agencies have the resources to fund anything other than research applications with significant methodological, conceptual, or applied interest. This means that Federal agencies and private organizations may not have enough money to fund applications that are methodologically sound but offer only moderate conceptual or applied interest.

Market the Research Idea

Marketing research may sound crass to academic psychologists, but part of the grants game is to maximize your chance of success by working-up the same idea for different agencies. Each Federal or

private agency has specific goals for its grant money. If your research meets these goals or can be tailored to meet both the funding agency's goal and your research needs, you can increase the probability of getting money.

We want to be clear, applying to multiple agencies or organizations with the same idea is fine (e.g., NIMH and the National Science Foundation (NSF)). *Taking money* from more than one source for the same work *is not*. Neither is it acceptable to apply to two programs within a Federal organization (e.g., two programs within NIMH) or within the same review structure (e.g., National Institute of Child Health and Human Development and NIMH).

Identifying Funding Sources

You can find out about private resources in *The Foundation Directory* and Federal resources in the *Catalogue of Federal Domestic Assistance*. Both of these books should be in your University's or College's Office of Grants Management or in the Chair's Office. These books describe granting programs and provide names of contact people and telephone numbers.

Once a list of possible funding sources is developed, you can begin to make telephone calls to each contact person. As a warning, you should know that contact persons frequently change between the time the *Directory* or *Catalogue* compiled the information and your call. Do not be concerned; simply ask to speak to another professional staff member.

Be prepared with a three-sentence description of your project. This brief abstract will allow the contact person to determine how best to help you. Do not

launch into a lengthy explanation of your proposal unless asked. Take notes during the call and be sure to ask for a decoding of acronyms you do not understand. Ask each potential grantor the following:

- 1. Is this research idea fundable? Does it fit within the scope of the granting institution? If not, can it be made to fit the institution's needs?** For example, some grantors are less likely to fund descriptive or qualitative investigations. Others prefer to fund small-scale pilot or preliminary research. A research question being asked about children might be fundable from a particular grantor while the same question asked about adults might not.
- 2. Will the contact send any special announcements, applications, and the review and funding criteria?** For example, researchers interested in conducting applied research on persons with severe mental disorders might be interested in one or more of the following NIMH program announcements: [Research on Disabilities and Rehabilitation Services for Persons with Severe Mental Disorders](#), [Research on Services for Severely Mentally Ill Persons](#), [Research on Effectiveness and Outcomes of Mental Health Services](#), [Public-Academic Liaison \(PAL\) for Research on Serious Mental Disorders](#). All of these program announcements — and more — are available through NIMH. Each program announcement specifies application receipt dates, review criteria, and eligibility requirements.

In contrast to an on-going program announcement, some Federal organizations offer time-limited Requests for Applications (RFAs). The RFA has a single receipt date and may have set-aside funds for projects.

Ask your contact person about the various funding mechanisms (i.e., type of award programs) that might be suitable for your proposal. For instance, within NSF's Behavioral and Neural Sciences Division, the most common funding mechanism is

by Jane Steinberg and Cille Kennedy

the regular research grant awarded to an individual principal investigator. The three most commonly used research mechanisms at NIMH are small grants, FIRST awards, and regular research grants:

Small grants are for newer, less experienced researchers, investigators at institutions without a well-developed research tradition, or for more experienced investigators who wish to study a new area of investigation or apply a new methodology. A small grant is limited to two years of funding at \$50,000 per year in direct costs. Small grants are not renewable.

FIRST awards are for newly independent researchers. They are for up to five years and a maximum of \$350,000 for the grant period, and may not exceed \$100,000 in any one year. If fewer than five years of funding is requested, the total amount of direct costs is prorated at \$70,000 per year. FIRST awards may not be renewed either.

Regular research grants have no limit on the amount of funding, may be awarded for up to 5 years, and may be renewed if a *competing continuation application* is successful.

Other funding mechanisms exist within NIMH and other Federal and private funding sources. Ask your contact.

3. How much money is available for new applications? This question is important because some research programs may have committed all of their funds to continuing applications. There is no point competing for new money that does not exist. Some programs, due to the vagaries of the budget process, may not be able to tell you an exact dollar amount. Get their best guess on whether new money will be available after they have met their commitment base (i.e., after they have paid their current grantees).

4. Will the contact person critique a draft of the application? Pre-application consultation is frequently available and encouraged. For example, in the NIMH's Services Research Branch, staff request prospective applicants to send a four- or five-page concept paper for critique and

then at least one draft of the application sufficiently prior to submission to incorporate feedback. Some NSF programs encourage submission of pre-application proposals as well. Staff comments can be quite helpful since they are based on years of experience observing the review process. Staff comments are, of course, only advisory and the applicant must decide whether to incorporate the suggestions or not. Since not all programs have the staff resources to provide this kind of pre-proposal service, however, be sure to inquire about their ability to give such pre-application feedback. At a minimum, they will be willing to provide significant technical advice.

5. Will the contact send a list of the reviewers who may review the application? In some funding agencies (e.g., NSF, NIH, NIMH), standing advisory panels or review committees exist and their names are available. You will, however, remain blind to the specific individuals who are eventually assigned as reviewers of your application. When you review the names, check to see if the committee has sufficient expertise in the important areas of your research. If not, you may wish to call the individual organizing the review (a Scientific Review Administrator at NIMH and NIH) and discuss your concern. You may find that an ad hoc reviewer can be added to the standing committee or that another standing review group is appropriate. While it is members of the review committees at NIH and NIMH that actually review applications, NSF also sends each application to six or so outside reviewers who are not part of the NSF panel. These peer reviewers make recommendations to the committee which makes the final decision regarding funding.

If during your review of the names of the committee members you discover an

The authors are affiliated with the National Institute of Mental Health. Jane Steinberg is Associate Director for Policy and Analysis in the Division of Extramural Activities, and Cille Kennedy is a Psychologist in the Division of Applied and Services Research.

individual with a conflict of interest with you (e.g., a past mentor, a relative, an individual who has taken public issue with your work or genre of research, or someone who is suing your university), let the person organizing the review know this before the review takes place.

6. Can the contact think of other funding agencies that might be interested in this idea? Grantors attempt to keep abreast of funding priorities in other granting sources with similar areas of research interest. They may be the best source of knowledge on whom to contact in another agency.

Follow up With a Pre-proposal Submission

After you have made all the telephone calls, cull through the information you have and identify the most promising organizations and programs. Then, you should follow up and provide the concept papers and draft applications to program staff who have offered to read them. Another good idea is to call the program person four or five days after you submit the draft document to be sure it arrived and to arrange a telephone call for feedback. Be sure to take notes during the feedback call. The Federal program staff often call this type of help "technical assistance." You might find this phrase helpful when making your calls.

Special Requirements

Here is another bit of advice. As you read over the program announcements and requests for applications, you may find a perfect source for your project. The only problem is that in the eligibility section, you see that all awards will be made to institutions in Nebraska and you are in Iowa. Do not fight a losing battle. If an announcement or application kit states requirements that you do not meet (e.g., years post-degree, requisite sample size, or position at a non-profit institution) do not bother to apply. Call your contact person and see if there are other similar opportunities available to you.

SEE GRANT WRITING ON PAGE 18

Cognitive-Behavior Therapy Effective for Panic Disorder

NIMH-NIH Consensus Panel Endorses Behavior Therapy In Treatment of Panic Disorder and Aims to Increase Awareness of Disorder

Effective therapies are available for panic disorder, a condition that will affect 1 in 75 Americans during their lifetime, concludes a consensus panel of the National Institute of Mental Health (NIMH) and the National Institutes of Health (NIH). Recent research shows that cognitive-behavior therapy, as well as certain medications, can effectively reduce or eliminate the panic attacks associated with panic disorder.

The panel's conclusions drew on critical research by David Barlow (SUNY-Albany), Distinguished Professor of Psychology and Director of the Center for Stress and Anxiety Disorders, which indicates that cognitive-behavior therapy outperformed drug therapy in reducing or eliminating panic attacks in patients. In a controlled long-term follow-up study of 41 panic disorder patients, Barlow's research showed a success rate of 81% at 24 months after the behavioral treatment. This low relapse rate compares very favorably to the moderate relapse rate obtained immediately at the end of a second study involving double-blind administration of alprazolam. A 50% success rate was obtained with this benzodiazepine drug in this latter study comparing groups of patients in cognitive-behavior therapy vs "waiting-list" vs placebo conditions. Better yet, the behavior therapy treatment success rate was 87%.

"The research results were strongly supportive of psychological approaches to treating this disorder, and the panel was very supportive of the clinical research that underlies the development of new powerful psychological therapies for emotional disorders," said Barlow. "These therapies are a direct application of the principles of psychological science to clinical problems, he stated.

Three classes of drugs are beneficial for persons with panic disorder: tricyclic antidepressants, monoamine oxidase inhibitors, and benzodiazepines. Cognitive-behavioral therapy is designed to change mistaken beliefs about panic and help the patient re-enter feared situations. A majority of these patients, however, are not receiving treatment for the condition. "We want people to know that this disorder occurs in large numbers and that only 1 of 4 people receive appropriate therapy, even though treatment is available, affordable, and effective," said Layton McCurdy, Dean at the Medical University of South Carolina and chair of a panel of experts convened by the National Institutes of Health (NIH) to assess the treatment of panic disorder.

Many patients see 10 or more doctors before being accurately diagnosed. Thus, to increase awareness of panic disorder and available treatments, the panel called for an aggressive national educational campaign to acquaint clinicians, patients and their families, and the public with the disorder.

Typically a chronic condition, panic disorder is characterized by episodes of intense fear accompanied by multiple

physical symptoms (e.g., shortness of breath, dizziness, palpitations, nausea, or abdominal distress). "Attacks" occur in the absence of any real threat and cause individuals to think they are having a heart attack and are about to die, or, alternately, are "losing their mind."

Women are twice as likely as men to develop the disorder. At least one-third of panic disorder patients develop agoraphobia. Many patients also develop anticipatory anxiety, a fear of the fear that attacks bring, and patients also may shy away from situations they think cause attacks.

The panel emphasized the importance of thoroughly assessing and evaluating each patient to determine the most appropriate treatment. The presence of coexisting conditions such as depression and alcohol use, the patient's history of attacks, and the impact of the disorder on the patient's life all play a role in selecting proper treatment.

Future research, noted the panel, should focus on determining the optimal treatment approaches for individual patients and conducting further basic studies to define the cause of the disorder.

This 3-day consensus development conference was sponsored by NIMH and the NIH Office of Medical Applications of Research. ♦

APS Has Moved! Our New Address Is:

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Conferences and Special Projects Director
Lauren Butler

APS Welcomes New Conferences Director, Administrative Assistant

This year the APS annual convention will have the benefit of a new Director of Conferences and Special Projects: **Lauren L. Butler**, an experienced meeting planner comes to APS from the National Council on the Aging, Inc., where she was Acting Manager of its Conference Department. Previously, Butler was the Assistant Conference Manager and Exhibits Manager for the Archaeological Institute of America in Boston, MA.

Now in her fifth year in the field, Butler says she thrives on the variety and fast pace of meeting planning, and she takes pride in the important role played by meetings in many professions and disciplines. "The immediacy of face-to-face discussion is especially important when colleagues may be spread out across the nation or globe," she said, adding that her "contribution as a meeting planner is to provide the best possible forum for the learning and networking process as well as to improve the flow of information to the media."

Impressed that the APS Convention has become a landmark educational and networking event for psychological scientists in such a short time, Butler says she is pleased to be working for such a young and dynamic society. "It gives me more of a chance to be innovative rather than just follow a stock format. It's a wonderful challenge, and I hope my skills and experience as a meeting planner can enhance the APS Convention for all its participants and for the discipline as well."



Administrative Assistant
Wanda Watson

Many APS members already know **Wanda Watson** from her recent calls or faxes regarding any number of administrative matters. As APS' new Administrative Assistant, Wanda works closely with Membership Officer Allen Walker, helping to update the APS membership database and member records.

Given the ever-growing size of the database, this is no small task, especially with the heavy influx of 1992 dues renewals that flood the office daily. Watson's knowledge of computers already is proving invaluable.

Watson comes to APS from the U.S. State Department where she worked for the past five years as a Senior Data Processing Operator in the Agency for International Development. A native Washingtonian, she also is an accounting major at the University of the District of Columbia (UDC), something that also has been a great benefit to APS.

"Joining the staff at APS represents an unequalled opportunity for me to be part of a growing and exciting scientific organization," says Watson, who plans to do a little membership recruitment networking for the society among her "psychologist friends at UDC."

These two new staff joined the APS Washington office this past September. They replace outgoing administrative assistant Dorothy Anderson and convention director Beverly Hitchins. The total number of APS staff is nine.

1992 Dues Renewal . . .

By now you should have received your 1992 Dues Renewal letter in the mail. Return your renewal form to APS in time for the **December 1, 1991, postmark deadline, and you will receive a free copy of the 1992 Membership Directory** of APS when it is published.

If you haven't received the dues renewal form or can not locate it, contact the APS headquarters office immediately, so we can forward another renewal form in time to avoid an interruption in your receipt of APS publications and mailings.

As an APS Member, you can take pride in the fact that APS' exceptionally high renewal rate of about 95 percent ranks APS among the top of non-profit membership societies!

APS Welcomes PSI BETA as an Affiliate



PSI BETA, the national honor society in psychology for community and junior colleges has become an organizational affiliate of the American Psychological Society. Coincident with PSI BETA's tenth anniversary, this is a significant event in the Society's history. APS welcomes PSI BETA as the most recent addition to APS' 20 other organizational affiliates.

PSI BETA hopes to expand its chapters and memberships over the next few years and thereby become more involved in regional and national meetings of psychologists.

For more information about PSI BETA, contact:

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Chattanooga, TN 37405
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Fax: 615-265-1529

Good Training Surpasses Conventional Wisdom

National Academy of Sciences Reports on Efficacy of Training Techniques

Training is one thing. And on-the-job performance is another. Sometimes they don't connect.

Long-term outcomes of widely-used training techniques that produce super performers during training simply may not carry over to the job.

Without thinking about it, trainers may assume that rapid progress and good performance during training translate into good performance on the job after training. And the trainers themselves may be rewarded for having their people reach some criterion as fast as possible.

But training for the real world requires attention to factors that will sustain performance — of the skill or knowledge — over periods of disuse. Learning, comprehension, and understanding are such factors, and they require perhaps more attention during training activities than does the simple improvement of performance.

In fact, trainers should abandon techniques that may enhance performance during training at the expense of later performance in the real world, a National Research Council (NRC) committee recommended in a far-reaching 291-page book released on September 24 [see September, 1991, *APS Observer* and pp. 13-15 of this issue for a summary of the committee's conclusions]. The report, *In the Mind's Eye: Enhancing Human Performance*, is the second of three NRC studies of human performance, with publication of the third study scheduled for two years hence. The first report of

the NRC Committee on Techniques for the Enhancement of Human Performance, *Enhancing Human Performance: Issues, Theories and Techniques*, was published in 1988 and was the result of a request by the Army Research Institute for the National Research Council to examine the utility of some "new age" techniques for which promising claims have been asserted with regard to improving human performance. [See the March 1990 *Psychological Science* for Bjork and

Swets' review of the report and public reaction to that report.]

Composed of 13 psychologists, the current committee points out functional training techniques and indicates some major research gaps that need urgent attention in areas such as team training and performance. "Our findings point up the need to revamp the way people are trained

in the military and many other occupations," said Robert Bjork, professor of psychology at the University of California-Los Angeles, and chair of the committee that prepared the report. "People learn by making and correcting mistakes," he added.

Another study committee member, Robert W. Christina of State University of New York-Buffalo, said, "Learning is what is left after training, when you pull back all the crutches and withdraw the feedback and the other help you might get in training and put the person on the job. How do they do there? The effectiveness of the training should be assessed on the job in the post-training task."

Variability Is the Key

The real world is messy — rarely repeating identical problems in similar situations — and training should reflect this variability, the committee concluded.



Daniel Druckman was the National Research Council Study Director for the Committee on Techniques for the Enhancement of Human Performance.

Learning and performance are not the same, the report concludes, and, hence, to "maximize the effectiveness of training, you have to do some things during training that pose some difficulties for the learner. You should, for example, introduce a variety of interfering conditions under which the tasks are performed, you should reduce feedback, and instead of providing answers you should have the trainees generate those answers," Bjork said. These techniques will have a positive effect on two main ingredients of effective long-term performance enhancement efforts, resistance to forgetting and good transfer of the training to real world situations, according to the report.

Just as important, training programs should foster the trainee's understanding of the tasks to be learned. Learners should get deeply involved in the process by such means as answering their own questions



Photo courtesy of SUNY-Buffalo

Committee member Robert Christina chairs the Department of Physical Therapy and Exercise at SUNY-Buffalo.

FROM PREVIOUS PAGE

and teaching each other, the report recommended.

Many training programs augment feedback in order to enhance learning. This often has the opposite effect. Reducing augmented feedback can improve long-term performance, the report said.

Training: How Much and How Often?

Daniel Druckman, a social psychologist who served as study director for the committee and co-editor of the report, summarized findings related to training regimens: "One of the counter-intuitive findings of the committee relates to performance during practice. One would think that those who perform better during training have necessarily learned a task better and will demonstrate this in real world situations. So while trainees can cram a lot of training time into a short period and boost their short-term performance to high levels in so-called massed practice regimens, it turns out that much better long-term performance is obtained from those who pace their practice in shorter practice sessions over longer time periods [spaced practice]," explained Druckman.

"So the main message in that chapter is that spacing and occasional feedback, involving people in the learning process activity, refresher courses, and reproducing some of the messiness and variability found in the real world are going to be functional for long-term retention even if they don't produce obvious gains in the short term



Photo courtesy of Army Research Institute

U.S. Army Special Forces recruits endure rigorous training exercises.

practice situation. Rather than crash training, you are better off doing it at a more gradual pace (spaced practice), making mistakes, and learning from these mistakes. I think this would apply to both motor and cognitive skills," said Druckman.

Bjork noted that "sometimes there is a false assumption underlying training that people are like some sort of recording

device such as a videotape recorder. But in almost every important respect we differ from a recording apparatus. We learn by processes of interpretation. We learn by actual practice. We learn by generating answers, by making mistakes and correcting them. We don't really record. It's something I see college students do very wrong in their own work. They will read a chapter several times, highlighting in different colors, as though one more reading would make that stuff write itself on their brain. But they don't do the kind of things that really pay off in terms of learning, such as mastering the structure of the chapter, summarizing, paraphrasing and noting relationships of concepts to their own life experiences. All of those things are remarkably more effective in terms of learning."

"The effectiveness of a training program should be measured not by the speed of acquisition of a task during training or by the level of performance reached at the end of training, but, rather, by a learner's performance in the post-training tasks and real world settings that are the target of training," concludes the committee.



Photo courtesy of Texas A&M University Sports Information Office

Track and field training exercises represent primarily gross motor and endurance training as opposed to procedural or cognitive training. Studies on physical exercise and aerobic fitness have found a reduction in psychological stress and anxiety; psychological and physiological mechanisms are thought to play a role.

SEE TRAINING ON PAGE 16

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GIVING FROM PAGE 2

be extraordinarily effective. Each of those techniques, however useless it may have turned out to be in the committee's eventual judgment, was supported by a large number of people willing to give sincere testimonials on behalf of that technique and by demonstration "experiments" notable for their lack of appropriate controls.

By the very nature of psychology's subject matter, we as behavioral researchers have had to learn — perhaps more than any community of scientists — the importance and need for rigorous experimentation. (One of the committee's contributions in its

first phase was to specify criteria by which techniques should be evaluated.) We are experts on selection effects,

confounding variables, experimenter effects, Hawthorne effects, statistical artifacts, belief systems, and the like. In fact, historically, and in the committee's experience, it often seems that those scientists most readily recruited to mystical or paranormal beliefs are *not* psychologists, but, rather, those who lack experience addressing these kinds of contaminating research effects. Such scientists often have "hard science" or engineering backgrounds.

Beyond our methodology, we do indeed have facts and generalizations to give away. Doing so, however, is not the trivial matter it may seem: We must see the practical implications of our results in the first place, and we must then convey our findings in practical and usable form to those who need and can use them. Even then we may encounter resistance; people with vested interests, who may be suspicious of psychologists to start with, are not likely to welcome our innovations with open arms.

Miller concluded his 1969 APA

presidential address by saying that he could imagine nothing "that would be more relevant to human welfare, and nothing that could pose a greater challenge to the next generation of psychologists, than to discover how best to give psychology away."

Now that 22 years have gone by, how well did we respond to Miller's challenge? Overall, I think we have made progress, but we could have done better. Our primary shortcoming may have been a failure to communicate. For example, when psychologists have known for decades that spaced practice enhances long term performance, but training programs around the country continue to be

virtually built on massed practice, something is wrong.

What has happened since 1969, in my

... the world has grown more receptive to what we have to offer . . . almost too receptive . . . the ball is now in our court.

opinion, is that the world has grown more receptive to what we have to offer, and we deserve some credit for that change. I say that not only on the basis of my committee experience over the past six years, but also on the basis of developments in sports, education, and industry. In fact, people concerned with human performance in real world settings may have become almost *too* receptive. If we do not give them the best we have to offer, they will try the magical solutions offered by entrepreneurs. In effect, the ball is now in our court. ◆

In the Mind's Eye: Enhancing Human Performance, National Academy Press, 1991, is available for \$29.95 plus \$3.00 shipping.

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How Do You Improve Human Performance?

Summary of Findings Released by the National Research Council Committee on the Enhancement of Human Performance

Robert Bjork, Chair
Daniel Druckman, Study Director

We are in an era when technological advances have expanded our capacities to communicate, to solve problems, to build, and to destroy. Tools are available to speed our work and enlarge our goals. We can now write, re-write, communicate, and respond with unprecedented speed — sometimes more rapidly than we can think, understand, or phrase our thoughts in coherent fashion. Planes fly with little or no help from human pilots, smart weapons can destroy enemy targets (and, occasionally, friendly forces) with awesome accuracy and destructive power, and other technological advances permit soldiers to fight rather than sleep at night.

Such technological achievements, based on progress in the physical sciences, computer science, and engineering, have not been accompanied by comparable advances in what might be referred to as human technologies. The demands on individuals and teams of individuals to learn and to perform have not, overall, been reduced by high-technology equipment of one kind or another. In fact, that equipment more often than not requires new training, a better educational background, and more rapid and complex problem-solving skills in actual performance situations. We have been slow to learn that technological innovations must be evaluated with the human in the loop, that technical specifications and “bench testing” can greatly overestimate how new equipment will perform in the hands of actual humans and organizations.

The foregoing general considerations are nowhere more apparent than in the U.S. Army. As the largest training institution in the world, the Army faces increasing demands for technical skills. Key Army staff were among the first to realize that psychological techniques to

enhance human performance deserve as much emphasis to as engineering techniques to enhance the hardware performance. The Army approached the

analyzed the scientific support, or lack thereof, for several such techniques, and its 1988 report was published by the National Academy Press. Reaction to the report was considerable, in public and professional sectors as well as within the Army, and it became something of a best seller by Academy standards.

With the release of this second report of the Committee on Techniques for the Enhancement of Human Performance we finished the second of three phases of the committee's activities, the agenda for which began to emerge well before the first report was completed. But by July, 1989, that agenda was set and we went to work for the next 18 months. The committee examined hundreds of relevant

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National Academy of Sciences seven years ago with a request that it assemble — under the auspices of its National Research Council — a committee of experts to evaluate the promise of certain techniques to enhance human performance. Initially, the committee was to focus on a set of unconventional “new age” techniques — claimed by their promoters to be extraordinarily effective, that in some cases had gained a degree of advocacy within the Army, and that had been developed mostly outside the academic research establishment. The committee (chaired by John Swets)

scientific papers, commissioning several review papers by outside specialists where necessary. We made site visits to military and non-military settings, invited consultants and advocates of various types to speak to the committee, and finally arrived at the conclusions summarized below.

Areas of Research Examined

In its second phase, the committee's emphasis shifted from unconventional techniques toward a consideration of more basic issues of performance. We *did* examine a few unconventional techniques

SEE NEXT PAGE

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that have enjoyed recent success in the public or corporate marketplace, but our central focus was on innovative applications of basic research findings. The performance issues, though selected to be of concern to the Army, turn out to be relevant to civilians and soldiers alike. These issues fall into three broad categories: **training** to enhance post-training performance in real world settings, **altering mental states** to enhance performance, and **preparing to perform under pressure**.

In the training area, we considered innovations in training programs that might minimize the loss of access to critical skills and knowledge produced by long periods of disuse, or by changes in situational characteristics; we assessed the potential of using models of the expert as a guide to training complex skills; and we

Good intentions and dramatic claims are not enough. We should learn from scientific evidence and apply what has been shown to really work.

NRC COMMITTEE

evaluated self-assessment techniques that are designed to upgrade one's performance over time by fostering successful career development.

Within the domain of altering mental states to improve performance, we examined the efficacy of subliminal self-help audio tapes, meditation, psychological techniques of managing pain, and methods of detecting and hiding deception. Our analysis of deception was motivated by practical concerns within the Army, and by its relevance to understanding the physical manifestations of emotional and mental states. Finally, with respect to the preparation to perform, we examined a variety of sports-psychology techniques designed to sustain performance under pressure, and we took a broad view of issues and factors in team performance.



Major Conclusions On Techniques to Enhance Human Performance

So what did the National Research Council Committee conclude? First — though far from universally positive about the specific techniques surveyed — the committee felt overall that advances in basic research, particularly across the last decade or two, *do* provide a basis for improving certain aspects of training and performance. Given the expanding body of relevant research in the cognitive, social, and brain sciences, the potential for such improvements should be even greater in the future.

The conclusions likely to be of broadest interest include:

- ▼ With respect to **training**, a recurring problem is that skills and knowledge acquired by trainees are not durable or flexible. At the end of training, trainees may meet rigorous performance standards, but in post-training real world settings, those same individuals may perform poorly, especially when long intervals of disuse of that skill or knowledge have intervened, or when the real world situation differs in certain respects from that present during training. Long periods of disuse are commonplace, and it is probably the rule that real world situations will differ in important ways from the conditions of training.

What makes this problem especially significant is that what trainers typically see is performance of trainees *during* training, not their subsequent performance in the real world. That is problematic since the conditions of training that enhance performance during training are often *not* the conditions that enhance post-training performance in the long term, or in different contexts. In fact, certain conditions of training that appear to speed acquisition of skills and knowledge are among the poorest conditions in terms of long-term retention and ability to generalize one's training, and other conditions that impair performance during training can be optimal in terms of those criteria.

A few examples of conditions that retard performance during training but which pay off later include *spacing* rather than *massing* practice over time, inducing variability in the conditions of practice, and decreasing the frequency of external feedback following attempts to execute a given motor skill. These and related manipulations of training introduce difficulties for the learner, but the process of responding to those difficulties appears to produce more durable and flexible learning. [See story on pg. 10 on training.]

- ▼ Within the domain of techniques to **enhance career development**, the use of self-assessment instruments was given special emphasis owing to their popularity in the Army and marketplace. These instruments are used by career counseling programs to provide individuals with a way to view themselves in terms of certain intrapersonal and interpersonal styles. The Myers-Briggs Type Indicator (MBTI), for example, probably the most popular such instrument, classifies a given person — based on their answers to a series of questions — in terms of four different indices: Introversion-Extraversion, Sensing-Intuition, Thinking-Feeling, and Judging-Perceiving.

The MBTI is administered to an estimated 1.7 million individuals each year. Based on a survey carried out by the committee, taking the MBTI is reported to be a valuable experience for counselor and counselee alike. Unfortunately, such personal impressions are not supported by existing research. Until the efficacy of the MBTI is demonstrated in rigorous evaluation, the committee cannot recommend that it be used as the foundation for career choices and career counseling.

- ▼ In the domain of **altering mental states** to enhance performance, we examined subliminal self-help tapes, meditation, pain management, and deception detection.
 - ▼ Our analysis of **subliminal tapes** also was motivated, in part, by their success in the marketplace. By one estimate, 1988 sales of such tapes exceeded \$50 million. Our conclusion, however, is that claims that such tapes can alter behavior and attitudes in desirable ways are unwarranted on both theoretical and empirical grounds. [See the September, 1991, *APS Observer*.] Recent lab experiments *do* suggest that stimulus presentations under certain conditions can influence a subject's later performance in simple laboratory tasks — without the subject's awareness — but such results cannot be taken as evidence that long-term changes in complex actions, cognitions, or emotions (e.g., smoking, self-confidence, or depression) can be affected through subliminal suggestions. To the degree that such tapes do seem to the user to have positive effects, those effects are better explained at present in terms of sociopsychological phenomena such as effort justification and expectancy or placebo effects. The messages on some commercially available tapes, as a matter of fact, appear — upon spectral analysis — not to exist.
 - ▼ The committee could also not find support for any special properties of **meditation** as a technique to reduce stress, control arousal, enhance the sense of self-efficacy. That is, the effects of meditation do not appear to exceed those attributable to rest and relaxation training.
 - ▼ We were somewhat more positive about psychological **techniques to manage pain**. Available research suggests that people *can* be taught non-pharmacological ways to cope with physical pain; cognitive factors clearly play a role in how intense and manageable is the experience. Procedures known to reduce stress, such as relaxation, providing information about what to expect, and enhancing a person's sense of control, also reduce the subjective experience of pain.
 - ▼ With regard to the **detection of deception**, the committee concluded that people *can* learn to detect deception more accurately by monitoring several non-verbal cues from head to toe (e.g., fidgeting of the hands and excessive movement of other body parts). Contrary to intuition, confidence in one's ability to detect deception is not indicative of *actual* ability; experts claiming high ability but who are not aware of the non-verbal cues rarely perform better than chance. Also, it is easiest to detect deception in those who are highly motivated to deceive (e.g., a spy dealing with high stakes issues).
 - ▼ Finally, in the domain of techniques to optimize the **preparation to perform**, promising developments emerge from several types of research in sports psychology, neuroscience, and motor behavior. At issue is what one can do to perform well when it matters; that is, after training is complete and necessary skills have been acquired, what can be done to increase one's chances of performing well under pressure? Sports psychology suggests that preparation strategies, such as mental rehearsal and automating pre-performance motor routines, may prime or stabilize cognitive-motor programs that underlie performance. Studies of electro-physiological (e.g., heart rate changes) and neurophysiological correlates (e.g., changes in brain imaging and EEG patterns) of motor skills suggest that certain changes may be correlated with better and worse performance. It may be possible to use such measures during the preparatory period to evaluate the efficacy of different pre-performance routines.

In sum, there is reason to be skeptical of some of the performance-enhancement techniques being promoted to the American public, but there are opportunities to learn from a growing research body and take advantage of some of the effective techniques.

Good intentions and dramatic claims are not enough. We should learn from scientific evidence and apply what has been shown to really work. ♦

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TRAINING FROM PAGE 11

Train the Group or the Individual?

Group or team performance is the area raising the greatest number of issues critically requiring research: In a group do you have one person play only one role or do you need the flexibility of having each one know more than one job? Do you keep a group together or switch people in and out? Do you train them all in unison or one at a time?

Jerome E. Singer, chair of the Department of Medical Psychology at the Uniformed Services University of the Health Sciences and a member of the NRC committee, said, "You have a group of people that do different things. You've got to train each one in their specialties but then you've got to put the different people together as a group. There's a

"Logistic problems are just enormous with group studies," Singer said. "It's tough enough to run individuals through a complex task for extended studies. But if you have to run a group of four people, for instance — which is not a large group — you have to get the same four people each time and any one of them can mess it up by missing a session: you've wasted the time and money of the other three."

The Army and other military services *do* provide a setting for doing research on large numbers of comparable groups, and they provide the experimental subjects and conditions required for effective assessment of team training, decision making, and performance, according to the report. And, because military recruits are comparable to those entering the labor force in general, the results of military studies on group processes are also applicable to industrial and commercial contexts.

Training Expertise

One chapter of the study looks at modeling or how people learn by watching and imitating expertise, in tutoring, the classroom or by computer. An expert's knowledge

is complex, multifaceted and often tacit, and even when that knowledge can be elicited, a major problem remains: how to transmit it to a novice.

Michelene Chi, professor of psychology and senior scientist at the Learning Research and Development Center of the



Michelene Chi, professor of psychology and senior scientist at the LRDC-University of Pittsburgh.

Photo courtesy of LRDC-University of Pittsburgh

University of Pittsburgh and a member of the NRC committee, said, "When you ask a physicist to solve a simple physics problem, you can say they are not really solving the problem, they are just bringing to bear a prior generic solution, a sort of generic template that they have already

stored for solving that kind of problem. So you are looking at something very different with a novice who doesn't have that template."

A main problem, Chi said, is "How do you understand what the novice is understanding? How do you get clues about the novice's mental model?" The answer or solution is not close at hand, she said, but in the meantime some self-understanding may be gained by students themselves through what Chi and her colleagues call "self-explanation."

"What we found is a really dramatic effect when students stop after studying every line of an example problem and explain to themselves what it means and how it relates to the previous line and what might be the consequences. When they explain it to themselves they learn to solve problems much better. We are showing this in a very complex learning situation, not just in recall but actually in solving problems," she explained.

"This suggests that the reason peer tutoring, peer problem solving, and peer learning are generally more effective than other techniques is because in the former situations there is more opportunity for the learner to self-explain. That's an explanation that cuts across all the learning paradigms," said Chi.

"Most of what novices do in self-explaining," Chi said, "is provide justification for action steps and for the consequences of actions. And, second, by articulating it tacitly or overtly, they are creating conditional action rules that they can remember. The creation of these rules allows them to access them and use them on other problems." **D.K.**

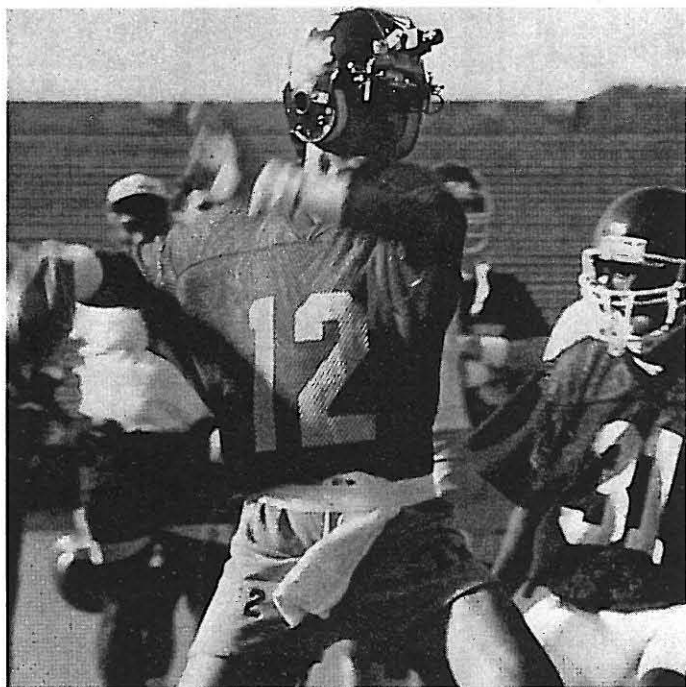


Photo courtesy of Texas A&M University Photographic Services

A high-tech eye-tracking helmet lets researcher Charles Shea, Director of Texas A&M's Human Performance Lab, learn about eye movements of skilled quarterbacks. The device has potential for training as well as for monitoring human nervous system activity during visually dependent, high-pressure and skilled psychomotor tasks. It allows study of how eyes may be used to control computers and robotic systems and has medical and military training potential.

tradeoff between how much individual training you have and how much group training. And do you train them to work as long as possible as a unit, or to be as interchangeable as possible and you won't be disturbed when one person drops out of that well-oiled unit?"

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Univ of Iowa	109	Temple Univ	38
Indiana Univ	106	Univ of Utah	38
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* The number following the school name is the number of APS members who received their PhDs from that particular institution.

GRANT WRITING FROM PAGE 7

Preparing the Application

The best tip is to read the application instructions and then follow them. Most experienced funding officials can tell you that very few people do this. Failing to read the instructional material can result in an application that is incomplete or not in compliance. Either outcome means delays for you and possibly being ineligible in the case of one-time-only RFAs. For instance, at NIMH and NIH, failure to submit appropriate human or animal protection materials may cause delays up to four months until the next Initial Review takes place. Applications that exceed stated page limits can be returned to the applicant without review.

Allow yourself plenty of time to prepare the application. Previously, six months was mentioned as an appropriate developmental phase. The more "up front" time you spend working through the details of the sample selection, methodology, and data analysis, the more likely you are to receive a favorable review. This includes enough time for University sign-offs, proofing, and human or animal subject approvals. Your ability to apply for a grant in an organized and timely fashion reflects your ability to orchestrate a research project.

Components of a Quality Application

Significance. Be sure that your literature review provides a crisp synthesis of the crucial literature and justifies your hypotheses. Explain how your results (whether the hypotheses are confirmed or not) will significantly advance or integrate the field.

Feasibility. If there is space for a progress report, insert material that demonstrates the feasibility of the project such as pilot data. Be sure that your pilot data actually do support your case. If you have no pilot data and have not conducted a preliminary study, you may want to pause and consider whether you have another way to demonstrate: (1) the reliability and validity of procedures, (2) the feasibility of the project, and (3) your ability to oversee a project of this scope.

Strategy. Adherence to page limits can be difficult if you are describing a series of experiments. Sometimes applicants offer brief snapshots of designs for 10 to 20 studies. This can be inadequate and confusing. Another approach is to fully describe one prototypical study and then discuss the conceptual and methodological permutations in the other studies as space permits.

Another difficulty is proposing a series of studies in which each study is predicated on confirming the expected hypotheses of the previous study. The applicant must make the reviewers understand that if the expected hypotheses are not confirmed, equally exciting alternative research directions will emerge.

Sampling. Determination of your sample size, sample selection procedure, and assignment to study condition need to be clearly specified. Increasing numbers of funding sources require a statistical power analysis as a means of determining the required sample size to permit a meaningful analysis of important hypotheses.

If your study involves human participants, address where your

study's subjects will be obtained and the criteria upon which they will be selected. If you can supply some demographic characteristics about your sample, do so. For NIMH and NIH, be sure to indicate whether women and minority groups will be represented in your sample and why.

Document how subjects will be assigned to study conditions. Decide how you will handle information about individuals who refuse to participate in your study, and how you will handle subjects who drop out once the study has begun. In calculating how long it will take you to draw your sample, estimate the number of refusals and dropout rate. If it is not possible to randomly assign subjects, as in some applied research, justify the assignment procedures and the type of quasi-experimental design you will use.

Methods. The current literature will assist you in identifying the most recent instruments for your study. Be aware of the psychometric properties of the instruments. Your contact person may know of other instruments or modifications to instruments which are being used in ongoing research but have not yet appeared in the literature. Ask the contact person for the names and numbers of other investigators currently using instruments that may be appropriate for your study. Connecting your study to others via instrumentation assists in the generalizability of your study results and increases your contribution to the field.

Analytic plan. In preparing an analytic plan, it is mandatory to show how the hypotheses will be tested. A laundry list of high-tech procedures is irrelevant if you have a Chi-square question. Other problems to avoid are: an uncritical use of change scores, unspecified data reduction plans, and designs with inadequate statistical power.

You may find that adequately testing the proposed hypotheses is beyond your level of statistical proficiency. Consider adding a statistical consultant to your staffing plan. Ask this individual to assist in designing the research and drafting the application. Consultation after the data are collected is much less useful than prior consultation.

Budget plan. The budget should reflect the ebb and flow of the work. For instance, if all data coding takes place in years two through three of a project, do not ask for a data coder's salary in year one. A task analysis can be a helpful exercise in planning your budget. That is, identify every task that needs to be done, who needs to do it, and how long it should take.

In justifying equipment purchases, the task is to explain why a particular piece is needed for the proposed studies, not why it is the finest available. For instance, although the graphics capability of a particular software package is better than anything else on the market, why is it necessary for the completion of your particular project?

Investigate whether your campus provides assistance in preparing budgets for grants. Typically, staff in your Office of Grants Management are available to advise grant applicants on the financial aspects of a proposal. Your department Chair can also be quite helpful.

If the type of grant you are seeking has a budget limit, be sure that you can effectively complete your project within these limits.

Final Check. Ask a colleague to read the application for clarity. Pick a researcher you trust, who is not part of your research team. If this person understands the application, you can be sure the reviewers will.

Application Review

Review procedures vary dramatically across Federal agencies and private organizations. Be sure that you understand the review criteria that will be used to evaluate your application. Many Federal and private funders use some form of peer review to evaluate applications. That is, outside experts are asked to review your application and discuss its strengths and weaknesses to determine the application's scientific or applied merit. The process of voting and assigning an index of merit for an application is specific to an agency or organization.

Reviewers may decide that no determination of merit can be made without a site visit. Their willingness to come indicates significant interest in the project, but they do have important questions. A dry run with colleagues role-playing the visitors can be helpful preparation.

One of the best ways to learn about the peer review process is to accept invitations to serve as a reviewer. Anecdotally, first-time reviewers report surprise over the high degree of consensus among reviewers.

After the Review

If the agency does not automatically provide feedback (NIMH, NIH and NSF do, private agencies often do not), call your contact person for information after the scheduled review has taken place.

If it becomes clear that your application will not be funded, review the agency feedback to decide if the application can be fixed to address the reviewers's concerns. If so, revise and resubmit. Reviewers welcome thoughtful response to the critique, and revisions often do very well. At NIMH, 20% of first time applications were funded and 30% of revised applications were funded during Fiscal Year 1990.

If the application did well in review, you may want to prepare for budget negotiations with the agency and establish a feasible start-date for the project. Do not expect to start immediately after you have received word of an outstanding evaluation. Applications may need a second

level of review by advisory boards, agency budgets may not be finalized, and initiating payment takes time.

Another possibility is that it may not be clear if the application will or will not be funded. Ask your contact person for a best guess or at least a time frame for making the decision.

Finally

The best bit of advice in this article is the importance of making contact with the various funding sources. Many opportunities exist for meeting Federal and private funding officials. For instance, APS has sponsored a Federal Poster Session at each of its conventions. The Poster Session affords researchers a chance to discuss their research ideas with 20 to 40 different Federal funding officials. Also, many of the specialty research societies offer intensive workshops on grant writing that involve Federal and private funding officials.

If, after all this encouragement, you still feel uncomfortable making that first call, contact either author for assistance (Jane Steinberg at 301/443-0000 or TFF@NIHCU and Cille Kennedy at 301/443-1330). Good luck in your grant writing activities.

Observer Reprints Available

Past issues of the *APS Observer* have published very popular "How To" articles such as the one on this page on successful grant writing tips. Single reprint copies of the following *Observer* articles along with the current article (**Writing Successful Grant Applications**) are available as reprints from the APS office in Washington:

- ◆ **Writing Your Vita** (May 1989);
- ◆ **How to Apply to Graduate School** (September 1989); and
- ◆ **A Short Course on APA Style for Psychology Students** (September 1989)

To request a copy of the article(s) of your choice, just write, call, fax, or email APS headquarters:

APS
1010 Vermont Ave., NW
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Be sure to notify the Membership Officer at APS Headquarters:

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Include a copy of your mailing label to speed processing.

The Student Notebook

by Michael Patterson

1992 APS Convention: Mark Your Calendar, Get Set to Go . . .

Students are encouraged to submit a poster for presentation at the fourth annual APS convention to be held on June 20-22, 1992, in San Diego, California [see the Call for Proposals insert in the September, 1991, *APS Observer* and in the mail]. Students also are encouraged to submit a paper to the APS Student Caucus Research Competition (see details under Student Research Competition in this section of the Student Notebook).

Posters

Poster and paper presentations give students valuable experience and provide them with the opportunity to make contacts and become personally involved with the APS. Students are able to meet other undergraduate and graduate students, as well as other psychologists from across the nation.

For either the student with little or no

experience presenting research or the veteran of conference presentations, APS poster sessions provide students with a relaxed atmosphere that allows more personal contact with individuals who are interested in, or perhaps just curious about, our individual work and ideas. Student posters are presented alongside the posters of more senior psychologists. In this way, we are able to experience what it is like to a member of a scientific organization.

Travel Funds

There are a number of sources from which students can receive funding, so the lack of monetary resources should not prevent you from participating in the 1992 APS convention. Organizations such as the APS Student Caucus, Psi Chi chapters, or psychology clubs help send members to national conventions such the APS convention each year. For example, during the past two years, the Student Caucus has been able to provide Travel Awards to more than 45 students. These awards help students attend the conference, and some even provide students with housing assistance. Information concerning APSSC Travel Awards for the 1992 APS Convention will be presented in an upcoming issue of the Student Notebook. The APS Student Caucus looks forward to seeing you in San Diego!

The APS Student Caucus represents all the Society's student affiliates. It is not an honor society. All chapter chairs are additionally recognized as members of the APSSC national Advisory Committee. Students or faculty wanting information about APSSC school chapter applications should contact:

Dianna Newbern
Department of Psychology
Texas Christian University
Fort Worth, TX 76129
Tel.: 817-921-7415

When applying, student chapter founders are asked to provide information about the institution, department, and students, and to designate a faculty sponsor.

Student Research Competition

The APS Student Caucus (APSSC) would like to invite all student members to submit an entry to the second annual APSSC Research Competition. The Research Competition is designed to encourage and acknowledge outstanding student research. Three graduate students and one undergraduate student will be selected to present their research at the APS Convention, and each will receive a cash award of \$250.

The competition is open to graduate and undergraduate student members of APS. The student applicant must be first author on the project, and an additional version of the entry must be submitted in accordance with the procedure outlined in the APS Call for Proposals (see the insert in the September, 1991, *APS Observer* and in the mail). The deadline for both the Research Competition and the regular APS proposal submission is **December 6, 1991**.

Application

The application for the APSSC Research Competition differs from the APS Call for Proposals. Each applicant must submit an entry of his/her project, not to exceed 1,500 words. Entries should be doubled-spaced. The project's title, without the applicant's name, should appear at the top of each page for anonymity during the judging. Entries must include the following:

Page 1:

- (1) a title page with the applicant's name, school, address, and phone number;

To enter the Student Research Competition, send four copies of the entry and letter of recommendation to: Zografos Caramanos, Department of Psychology, McGill University, 1205 Dr. Penfield Avenue, Montreal, P.Q., Canada H3A 1B1. Those students chosen will be contacted in early April. Any inquires should be directed to Zografos Caramanos at 514-956-5894.

Pages 2 and beyond:

(2) the purpose and rationale of the study; (3) the methodology; (4) important results (with appropriate statistics and reliability values); and (5) conclusions and implications.

A one-page letter of recommendation from a faculty member involved in the project is also required. This letter should include the following points:

(1) the purpose or goal of the project; (2) the student's role and extent of his or her involvement in the project; (3) the student's significant contribution to the project; and (4) the student's general understanding of the research topic.

Research Evaluation

Judging will occur in two phases. Initial judging will be based on the project itself. Applicants will be kept anonymous at this phase. The top ten entries will then be re-evaluated with the letter of recommendation. Awards will be given to the top three graduate projects and to the top undergraduate project.

APSSC Mentorship Program

The APSSC has instituted a program of mentorship that involves two types of individuals: those who provide guidance (mentors) and those who receive guidance (mentees). The three natural constituencies for which the mentorship program is designed are undergraduate students, graduate students, and young faculty/scientists. Each of these groups's needs are different, and consequently, each group can become involved in different ways.

A Unique Program

The mentorship program is not intended to interfere with or replace the contacts within an academic institution. It is designed to supplement internal avenues for advice and support, specifically with regard to the larger scholarly world outside a particular institution. The Student Caucus hopes that the mentorship program will be a valuable service to the APS in general, and to its membership in particular. Each student chapter is encouraged to talk with its faculty sponsor and other APS members to solicit their participation as mentors.

More Information

If you would like more information, or if you are interested in becoming involved in the mentorship program, please contact John Newman at the Department of Psychology, Mount Saint Mary's College, Emmitsburg, MD 21727.

APSSC Officers Executive Council 1991-1992

All the officers welcome students and others who wish to contact them about concerns particular to their own offices. Contact Secretary Paul Reber for general inquiries, regional student conference information, and other requests. Correspondence, inquiries, and submissions to the Student Notebook should be directed to Editor Michael Patterson.

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Travel Awards

Lisa Fournier
University of Illinois

MUSEUM FROM PAGE 1

million persons a year, about half of them under age 18.

The California Museum of Science and Industry in Los Angeles, for example, receives 2.9 million visitors a year, the National Air and Space Museum in Washington, DC, 8.5 million, and the Franklin Institute in Philadelphia 1.2 million. There are about 200 other science museums, large and small, throughout the country, and they will soon be joined by 40 more science museums now under development and expected to open their doors in the next few years, according to the NSF.

One of these new museums is the Liberty Science Center, a \$50-million facility now being built in New Jersey across from the Statue of Liberty. Other science museums are growing, like the Los Angeles museum with its \$40- to \$70-million capital expansion.

In addition, millions of children and adults are regularly involved in other types of informal science education through television and a broad range of hands-on science learning activities in out-of-school recreational settings.

"Yet very little psychological research has focused thus far on what children and

adults get from visiting science museums and from other types of informal science education processes," said Robert L. Russell, a developmental psychologist who is program director of the NSF's Informal Science Education Program.

"Now NSF wants to help fill this research gap," Russell said.

Research Proposals Invited

He wants APS members to contact him and his colleagues with research proposals — and he welcomes telephone inquiries in advance of preliminary proposals or grant proposals themselves, for which the deadlines are February 1 and August 1.

There is an urgent need for psychological research, he says.

"Millions of people are participating in these informal education programs and billions of dollars are being spent on them, yet we really understand very little about what is going on there.

"There has been some research done by museums' staffs — practical research in developing exhibits — but what many museum professionals don't have is an in-depth understanding of theories of learning and other theories of social science that might help them understand the processes going on.

The Basic Questions

"At the basic level, what effect does visiting a science center have on an individual or family group? What do they learn and how do they learn in museums? What short-term impacts are there, what long-term impacts?

"How do children explore the museum environment, what kinds of information do they get from it, and what effect does that experience have on the children insofar as developing their knowledge, their interest



"Pipes of Pan" demonstrate sound resonance to two young visitors to the IBM-sponsored exhibit at the New York Hall of Science.

Photo courtesy of New York Hall of Science



The popular lightning globe demonstrates how the human body conducts electricity that can light a fluorescent bulb.

in science?" asks Russell.

Members of the Association of Science-Technology Centers (ASTC) in Washington, an organization representing 297 science museums here and abroad, agreed on the "deep need to better understand the learning process" in these centers, said Andrea Anderson, Director of Teacher Educator's Network at the association. "It's hard to measure," she said, "because the experience in the science center sets up a process that goes on and on."

Russell said, "When you talk to prominent scientists, many of them report that visiting a science museum had a significant effect on developing their interest in science. What we'd like to know is: Is that true for lots of people?"

Russell suggested another set of research questions: "Some minority groups are seriously underrepresented in the scientific professions. And at the same time you look at attendance patterns of minority groups in science museums and find they attend at much lower rates than their proportion of the population. Why is that? Are there ways of making science museums more attractive places for

CONTINUED ON NEXT PAGE

FROM PREVIOUS PAGE

members of minority groups? Are there ways of developing exhibits that will be more meaningful to them?"

Monetary Scope of the NSF Program

NSF will spend about \$35 million in the current fiscal year on informal education projects that involve science museums, science broadcasting, science clubs and other out-of-school activities that promote informal science learning.

A yet undetermined part of the \$35 million will be used to carry out the "research to investigate the effectiveness of innovative techniques and programming to motivate and inform the public about science and mathematics topics" which NSF established as one of its goals in a policy statement earlier this year.

Outside the Museum . . .

Potential research areas reach well beyond museum walls, Russell points out. "There are questions such as how young

children develop an understanding of the various concepts of science and mathematics — questions like what roles do hands-on experiences have in developing an understanding of those concepts?"

One of the stated goals of the informal science education program focus is to increase the number of youth "who are excited about science, mathematics, and technology and who pursue courses in these areas in school curriculum and as a meaningful part of their out-of-school activities," particularly minority, disadvantaged and female youth, explained Russell.

Another goal of the NSF program is to stimulate parents and other adults to become informed advocates for higher quality science education. A fuller statement of objectives is available from Russell on request.

More Information . . .

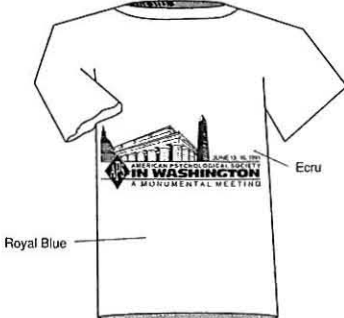
The grant proposal process can start with a telephone conversation with Russell or program officers Barbara Butler or Hyman Field at 202-357-7076 and a

request for the program announcement and proposal forms. The mailing address is Directorate for Science and Engineering Education, NSF, 1800 G St., NW, Washington, DC 20550.


Your first written submission is usually a preliminary proposal for NSF staff to review. This should be in the form of a letter of no more than six pages outlining goals and methodologies of the proposed project. The grant proposal itself then would follow feedback from NSF staff.

Other Programs

A closely related NSF educational program offering research opportunities of potential interest to psychologists is the Research In Teaching and Learning Program. It focuses on classroom learning but also on questions such as early development of cognitive competence and problem solving and factors that influence the cultivation of talent for and interest in science. The program officer to contact is Ray Hannapel at 202-357-7425, and his address is the same as that given above. **D.K.**



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Anatomy of a Directorate

For psychology and other behavioral and social science research disciplines, the early part of the last decade was a time of crisis triggered by deep cuts in National Science Foundation (NSF) funding and other federal programs on which these fields rely. Among other things, the cuts pointed up the lack of influence of these sciences in the political process. APS was established in late 1988 in part because many researchers believed the only way this situation could ever be improved was to have an organization in Washington devoted solely to concerns of scientific psychology.

Over the past two years, APS achieved results on NSF in Congress, including the introduction of legislation in the House and Senate and a commitment from the top congressional science policy leaders to support a separate directorate for behavioral and social sciences. Reports indicate that these were the critical factors in getting NSF, itself, to ultimately propose the change. Better to change from within than to have change forced upon you from without. But don't just take our word for it. Take a look at the following chronology of events. Then congratulate yourself for being a member of the "Little Society That Could" . . . and, more to the point, *did!*

Summit Vote

January 28, 1990

At the APS-sponsored Summit of Scientific Psychological Societies, representatives of more than 65 behavioral science groups voted that establishing a separate directorate at NSF for behavioral and social science research would be a priority. The vote took place during a two-day meeting convened by APS to begin the process of developing a national behavioral science research agenda.

BBS Advisory Panel

March 1990

An *ad hoc* panel established by the Advisory Committee of the Biological, Behavioral and Social Sciences (BBS) directorate, raised numerous questions about the effectiveness of the existing BBS structure and recommended that NSF consider a separate directorate for the behavioral and social sciences. Earlier, in response to an inquiry from Panel Chair, psychologist Linda Smith, APS helped frame some of those issues.

"I hope your Task Force considers a qualitatively different strategy — one that recognizes that decision making at the upper levels of NSF is a political process," wrote APS Executive Director Alan Kraut, "and that we cannot expect to be treated fairly in this political decision making until there is a behavioral or social scientist represented at the Assistant Director level — period. For me, our highest NSF priority should be a separate Directorate for Behavioral and Social Science."

CONTINUED ON NEXT PAGE

March 13, 1991

Alan Kraut met with Representative Rick Boucher (D-VA), chair of the House Science subcommittee, to request his support of the separate directorate and to discuss the task force recommendation. In a subsequent letter, Kraut told Boucher "... unless continued appropriate pressure is forthcoming, NSF will not take on the main recommendation of a separate directorate. As one [NSF] higher-up told me, he gives the separate directorate about a 5% chance. **And that epitomizes the problem!** In the last year there has been interest in a separate directorate from both the House and Senate, two NSF-sponsored Task Forces have recommended it, over 60 organizations testified in favor of it, and still NSF officials are giving it about a 5% chance."

FY 92 Appropriations

April-May, 1991

APS again presents testimony to the House and Senate Appropriations committees, asking for continued support of the separate directorate and informing the committees of the task force vote to approve a separate directorate.

In the FY 1992 Appropriations report for NSF (S. 102-107, dated July 11, 1991), the **Senate directed NSF to respond to the task force recommendation** and to notify the Appropriations Committee of its plans. Inserted under Senator Inouye's sponsorship, the report language again was a direct outcome of APS efforts.

March 28, 1991

George Brown, Jr., who became Chair of the House Science, Space and Technology Committee in January, visits APS President James McGaugh at UC-Irvine. During a tour of the Center for the Neuroscience of Learning and Memory, where McGaugh is director, Brown **reiterates his support for a separate directorate.**

May 9, 1991

Senator John Kerry (D-MA), sitting on the Senate Science Committee introduced S. 1031, the Behavioral and Social Science Directorate Act of 1991, similar to the Walgren-Brown bill. The bill was developed in conjunction with APS. In his introductory statement, Kerry appeared to be sponsoring the bill in part because "... NSF has been slow in publishing the task force's report and has taken absolutely no steps toward implementing their recommendation."

June 17, 1991

Alan Kraut and APS President Gordon Bower met with the new NSF Director Walter Massey and discussed the separate directorate. Massey indicated he would discuss the issue with the National Science Board.

June 20, 1991

The National Science Board reviewed an unpublished executive summary of the task force and discussed the recommendation for a separate directorate. The Board decided to defer the issue to Massey.

As a follow up to an unanswered inquiry during the June 20th discussion, **APS wrote to every member of the National Science Board to outline congressional activities** and to clarify some of the issues underlying the separate directorate.

August, 1991

APS visited all members of the House Science subcommittee to garner support for the separate directorate, and received indications of support from virtually all offices.

August, 1991

Chairman Boucher decided to support a separate directorate and **asked Massey to take action.**

October 11, 1991

Massey announced the establishment of a separate directorate during his report to the National Science Board.



Congressional Pressure: The Players

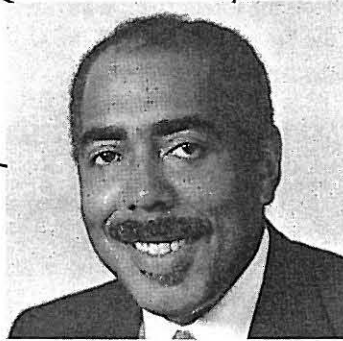
Senator Barbara Mikulski (D-MD), chair of the Senate NSF Appropriations subcommittee. Her subcommittee conveyed its support for a separate directorate for two years running.



Representative Rick Boucher (D-VA), chair of the House Science subcommittee on NSF. Conveyed his support for a separate directorate personally to NSF Director Massey. Said to be the final critical influence in Massey's decision.



Senator Daniel K. Inouye (D-HI), NSF Appropriations subcommittee. Had favorable separate-directorate language inserted in the NSF Appropriations report and independently conveyed his support to NSF.



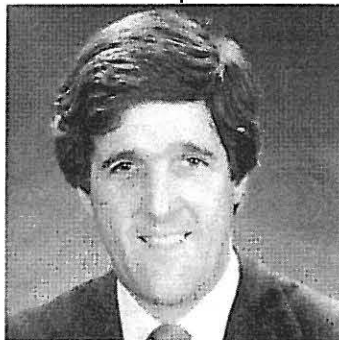
Walter Massey, NSF Director, announced the establishment of a separate directorate during his report to the National Science Board on October 11, 1991.



Representative George E. Brown, Jr. (D-CA), chair of the full House Science Committee. Introduced (with Doug Walgren) H.R. 5543, the *Behavioral and Social Sciences Directorate Act of 1990*. Thinks behavioral and social science research should "more than share" in proposed NSF budget increases.



Representative Robert Traxler (D-MI), chair of the House NSF Appropriations subcommittee. Called the idea of a separate directorate "excellent" and vowed to "see what we can do."



Senator John Kerry (D-MA), Senate Science Committee, introduced S. 1031, the *Behavioral and Social Science Directorate Act of 1991*, because NSF had not yet acted on the separate directorate.



Representative Doug Walgren (D-PA), past chair of the House Science subcommittee on NSF. Introduced (with George Brown) H.R. 5543, the *Behavioral and Social Sciences Directorate Act of 1990*. Continued to lobby for a separate directorate after he left Congress.

NSF FROM PAGE 1

U.S. House of Representatives and the Senate that ultimately made the difference in the drive for a new directorate.

See pg. 24 for a chronological recap of recent activities leading to the separate directorate.

**Chairman Brown:
'More Than Share'**

Beyond its symbolic importance, the separate directorate at NSF should lead to improved funding for behavioral and social science research, according to Chairman George E. Brown, Jr., (D-CA) of the House Science, Space and Technology Committee, which authorizes NSF's activities. Brown, who last year introduced legislation to establish the separate directorate, is seeking to double the overall NSF budget within a few years. He told APS he thinks behavioral and social sciences "should more than share" in this expansion to offset the underfunding they experienced in the past.

Hypothesis Rejected

In discussing the separate directorate with APS' Sarah Brookhart, Brown was quick to reject what he calls "the hypothesis that the biology programs were needed to protect" the behavioral and social sciences from political attacks, an argument made by opponents of the separate directorate.

However, he was just as quick to point out that "being in a separate directorate doesn't change the fact that behavioral and social science researchers need to continue to develop and improve their scientific methods and objective data collection, as do biology and the rest of the physical sciences."

Brown says behavioral and social science research should play a major role in addressing problems of "the human condition" as well as in achieving "a more scientifically literate population."

Deserve to Be Recognized

In addition to funding concerns, APS advocated for a separate directorate as a matter of self-determination.

"This issue has evolved to the point that even if the funding improved, the behavioral and social scientists in the field would continue to demand a separate directorate," Kraut told Representative Rick Boucher (D-VA), Chair of the House Science subcommittee with direct jurisdiction over NSF. "Nothing less would restore a good working relationship with NSF. We deserve to be recognized."

Earlier this year APS asked Boucher to continue in the vein of his predecessor, former Representative Doug Walgren (D-PA), by supporting the separate directorate.

Boucher personally requested Massey to establish the directorate, which finally tipped the balance in favor of the separate directorate.

APS' Work With Congress Cited

Now that the agency has decided to form the directorate, the national science and higher education press reports indicate congressional influence was a major factor and many of those reports credit APS with leading the advocacy effort in Congress.

"Steady lobbying and working on congressional friends also helped bring about the change," according to *Science and Government Report*. The influential Washington-based science periodical reported that APS, "a splitoff of researchers from the practitioner-dominated American Psychological Association," was in the "vanguard" of the movement.

A 'Proud Godparent'

This view is echoed by Walgren who while in Congress was a leading supporter of behavioral science research. Although defeated in 1990 after 14 years in Congress, Walgren remained committed to a separate directorate, and volunteered his time to work with APS to convince Boucher that the directorate should be established.

This issue has evolved to the point that even if the funding improved, the behavioral and social scientists in the field would continue to demand a separate directorate.

ALAN G. KRAUT
APS

Steady lobbying and working on congressional friends also helped bring about the change.

DANIEL S. GREENBERG
SCIENCE AND GOVERNMENT REPORT

CONTINUED ON NEXT PAGE

FROM PREVIOUS PAGE

According to Walgren, who introduced the separate directorate bill along with Brown, "APS should consider itself a proud godparent" of the new directorate.

"To my knowledge, APS is the origin of this movement towards a separate directorate. APS really created the legislation George Brown and I introduced, and that legislation gave critical momentum to the effort," he said.

Walgren, Brown, and Boucher all give credit to Massey, noting that the new head of NSF was more receptive to the separate directorate than his predecessor. This is confirmed by Kraut and APS President Gordon Bower who met with Massey last June, days before Massey brought the issue before the National Science Board. It is unlikely that the issue would have gotten so far under Massey's predecessor, engineer Erich Bloch.

Simon Said . . .

Walgren was chairing the hearing in which a Nobel Prize-winning psychologist announced his support for a separate directorate.

Herbert Simon, from Carnegie Mellon University, appeared before Walgren's subcommittee to recommend "the separation of the [BBS Directorate] into its two natural parts" so that social sciences can "participate in the highest levels of the organization, where allocation of funds are effectively made."

Commenting on the news that a directorate would be created, Simon said, "Over the long pull this is going to give behavioral and social sciences a channel to let people see what we are and what we can do. It is inevitable we will see improvements in funding."

Simon, who was the keynote speaker for APS' 1991 convention, also pointed out the importance of "the right of social and behavioral sciences to speak for themselves" rather than being "interpreted through others who, though well meaning, are not familiar with the disciplines."

"Having good people in there to run the directorate will make all the difference," he added.



Photo by David Halthcox

Rep. Rick Boucher (D-VA) (right), chair of the House Science Subcommittee, displays an APS jacket he received from APS Executive Director Alan Kraut as a token of APS' appreciation.

Senator Kerry's Bill

Several APS-initiated steps taken in the Senate also contributed to the overall momentum of the effort.

Earlier this year, Senator John Kerry (D-MA) introduced separate directorate legislation similar to the Walgren-Brown bill at the request of APS. Kerry is a member of the Senate Commerce, Science and Technology Committee, which has jurisdiction over NSF.

"I'm encouraged that the NSF is taking this step toward solving the perennial funding problems that have plagued the behavioral and social sciences at the agency," Kerry said. "The country as a whole will certainly benefit from the advances in research that will be forthcoming in these areas."

"I also want to commend the American Psychological Society," Kerry said, "for its active role in bringing about this important change."

Enter the Appropriators

APS brought the separate directorate issue to the attention of the House and Senate Appropriations subcommittees that have responsibility for the annual NSF budget.

Noting the Society's strong support of proposed funding increases for the NSF as a whole, APS at the same time pointed out in testimony before the House and Senate panels that behavioral and social science research would once again not be given an equitable share of those increases.

"This will continue to be the case as long as the current structure of the directorate that houses behavioral and social sciences remains," Kraut told congressional appropriators and asked them to support a separate directorate in order to "ensure that critical decisions about research and funding are being made by those most familiar with the science."

Kraut detailed NSF's resistance to changing the status quo at the agency, and said the time had come to make this a

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To my knowledge, APS is the origin of this movement towards a separate directorate. APS really created the legislation George Brown and I introduced, and that legislation gave critical momentum to the effort.

DOUG WALGREN
REP. OF PENNSYLVANIA

Over the long pull this is going to give behavioral and social sciences a channel to let people see what we are and what we can do.

HERBERT A. SMON
CARNEGIE MELLON UNIVERSITY

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priority for Congress. House NSF Appropriations Subcommittee Chair Robert Traxler (D-MI) pronounced the concept "excellent" and promised to "see what we can do."

Impact in the Senate

At the request of APS, Senator Daniel Inouye (D-HI), long-time psychology supporter and a member of the Senate Appropriations subcommittee with jurisdiction over the annual budget of NSF, authored a portion of the NSF's FY 1991 bill asking the Foundation to "examine . . . recommendations that NSF create a separate directorate and increase funding for psychology, behavioral science, and social science" and report back to the Appropriations Committee in January, 1991.

In January, a task force established by BBS voted — with only a single dissent — to recommend the establishment of a separate directorate. However, it would be several months before a report containing this recommendation (described below) would be published.

Inouye, rather than letting the issue drop, pressured the agency to act on the task force's recommendation, both in a January letter and later, in the FY 1992 Appropriations report for NSF when he sponsored language directing the Foundation to respond to the task force recommendation.

The Announcement

The announcement to establish a Social, Behavioral and Economic Sciences (SBES) directorate, was made on October 11, 1991, without fanfare, during a routine report to NSF's National Science Board by Walter Massey, who became Director of NSF in September, 1990, just as the issue was achieving a critical mass. But despite the lack of fanfare, the announcement is reverberating through the behavioral and social science research community.

To many, this action is seen in the context of a darker point in recent history. In the early 1980's, the Reagan Administration and some members of Congress,

taking advantage of a general lack of awareness of behavioral science, were able to slash — or in some cases eliminate — funding for behavioral and social science research programs throughout the federal government by equating such research with social engineering.

Glass Ceiling

NSF's programs in those disciplines have never recovered from setbacks experienced in that era even though the rest of NSF prospered by comparison. Funding for psychology research and other behavioral and social science disciplines ran into a glass ceiling of sorts, never rising in proportion to increases received by the directorate as a whole, and receiving more than their share of decreases.

For years, NSF maintained that Congress, not the agency, was responsible for the funding problems and that the BBS structure "protected" behavioral sciences from further cuts.

According to Kraut, it is typical that "NSF as an executive branch agency, tried to cast the blame on Congress." But a closer look revealed "the critical funding decisions were being made not by Congress, but by agency officials," he said, noting that in fact, behavioral and social science research enjoyed increased congressional support while NSF continued its pattern of second-class funding in those areas.

A Chip from the Old Bloch

The clearest statement of NSF's position — also a clear illustration of the problem facing behavioral and social sciences within NSF — was made in March, 1990, by former NSF Director Erich Bloch, who told the House Science committee that NSF would not create a separate directorate because "organizational changes usually do not correct problems, either real ones or problems of perception."

In reality, Bloch saw the behavioral and social sciences as subordinate to other areas of science and engineering. He tried to justify this position by euphemistically claiming that "the social and behavioral sciences should not be isolated either

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I'm encouraged that the NSF is taking this step toward solving the perennial funding problems that have plagued the behavioral and social sciences at the agency.

SENATOR JOHN F. KERRY

[T]he Task Force came to the conclusion that the scope of the present directorate is far too broad to give sufficient attention to the social, economic and psychological sciences while still encompassing the full range of fields within the biological sciences.

NSF TASK FORCE

Most gratifying was the emergence of voices from all sides acknowledging the substance and richness of research in the social, economic, and psychological sciences.

NANCY CANTOR
PRINCETON UNIVERSITY

organizationally or intellectually. They have too many interfaces with other sciences and engineering that represent real opportunities for scientific advances. It is through this interplay that the behavioral and social sciences can gain the recognition that is our ultimate goal," Bloch told Congress.

Not Science Philosophy

Acknowledging the importance of interdisciplinary activities, Kraut nevertheless says that the behavioral and social sciences were included with biology programs for administrative reasons, and not for intellectual principles or reasons of science philosophy.

Consequently, the drive for a separate directorate was not "a case of scientific conflict, or a matter of 'psychology against biology.'" But, he said, "we finally saw that behavioral science would always be at a disadvantage as long as the current structure continued. The BBS Directorate would always be known informally as the Biology Directorate, and would always be headed by a biologist."

BBS Task Force

The concept of a separate directorate was significantly advanced this year by the favorable recommendation of an NSF Task Force. The Task Force, comprised of outside experts, was convened in September, 1990, to study the organizational structure of the BBS directorate as well as future directions in research.

The composition of the task force — 12 biologists and 8 behavioral/social scientists — was seen as a guarantee that a negative finding would be forthcoming regarding the separate directorate.

Initially, it appeared that most of the biologists on the panel were leaning strongly in that direction. At the end, however, with virtual unanimity, the task force agreed there was no reason, scientific or otherwise, to keep behavioral and social sciences with the biology programs.

According to its report, aptly titled *Adapting to the Future*, "the Task Force came to the conclusion that the scope of the present directorate is far too broad to

give sufficient attention to the social, economic and psychological sciences while still encompassing the full range of fields within the biological sciences."

The turnaround that occurred has been attributed to the unified position of the behavioral and social science community, particularly as it was conveyed by the more than 50 organizations testifying during two days of hearings held by the task force. The solidarity of the behavioral science community was first in evidence at an APS-convened behavioral research summit in January, 1990, when representatives of over 65 organizations voted to make a separate directorate a priority.

APS Board Member Nancy Cantor of Princeton University was the only psychology representative to serve on the task force. Cantor, a social psychologist, was instrumental in persuading the task force to recommend in favor of a separate directorate. She says the research itself actually did the convincing.

"The diversity of research represented within the current BBS became very obvious," she explained. "Most gratifying was the emergence of voices from all sides acknowledging the substance and richness of research in the social, economic, and psychological sciences," she said, referring to the reaction of task force members many of whom were coming into contact with behavioral and social science research for the first time.

Cantor also said the task force gave "considerable thought" to interdisciplinary activities and noted the task force report contains a number of recommendations to protect fields that "fall at the inevitable 'sticky edges' between the behavioral and social sciences and biological sciences, as well as between these fields and sciences represented in other directorates."

Moving Quickly

Now that the NSF has decided to form a separate directorate, the agency is moving very quickly. The new directorate will include existing behavioral and social science divisions, plus portions of the Directorate of Scientific, Technological and International Affairs (STIA), which is being "disestablished" as NSF says.

A search is underway for an Assistant Director of NSF to head the directorate. ♦

Organizational Profile

Society for Mathematical Psychology

GOALS AND PURPOSES

The Society for Mathematical Psychology (SMP) promotes formal theoretical research in all areas of psychology. Members of the Society employ the language and tools of mathematics, including computer science, in developing and testing quantitative theories that explain and predict psychological phenomena. Active areas of research include but are not limited to cognition, measurement, decision making, learning, perception, sensation, and methodology.

MEMBERSHIP

The Society's approximately 300 members come from a number of countries. Regular member annual dues are \$12; dues for students are \$10 for up to five years. Members can receive the *Journal of Mathematical Psychology* at preferred rates.

The "Organizational Profile," a fairly regular feature of the *APS Observer*, informs the research community about organizations devoted primarily to serving psychological scientists and academics. It is difficult for anyone to keep abreast of the various organizations of potential personal interest. This section should help in that task. The Editor welcomes your suggestions as to organizations warranting coverage.

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BACKGROUND

The group that formed the Society for Mathematical Psychology began meeting in 1967 at Stanford University. The Society was formally incorporated in 1977 and will celebrate its 25th anniversary at its 1992 annual meeting. SMP produces the *Journal of Mathematical Psychology*, published by Academic Press.

The Society holds an annual meeting, usually in August or September. One need not be a member to present a paper at this meeting; papers are accepted on the basis of quality and suitability alone. Programs of the annual meetings are published in the *Journal of Mathematical Psychology*.

Recently, the Society has begun sponsoring an electronic bulletin board for persons interested in mathematical psychology. The bulletin board can be accessed by sending standard LISTSERV commands to MPSYCH-L@BROWNVN.BITNET. For further information, contact Robert Stout [see below].

The Journal of Mathematical Psychology

The *Journal of Mathematical Psychology* (JMP) was founded in 1964 in the belief that a psychological journal was needed that would present full proofs of theorems, derivations of predictions, or complete data sets upon which models could be compared. Comparisons of predicted and observed data in ways dictated by the models under consideration were to be considered at least as honorable methods of analysis as the more standard classical tests of significance.

Today, under the editorship of Thomas S. Wallsten, JMP continues the tradition set by previous editorial boards and invites the submission of in-depth theoretical, empirical, and review papers that contain, rely on, or relate to formal, mathematical, or quantitative theorizing in all areas of psychology. Criteria for an article's acceptability in JMP are its quality and interest level, not its length.

In addition to regular articles, the Notes and Comments section allows more rapid publication of short papers focusing on very specific and timely theoretical or empirical issues. Book reviews are published under the editorship of A. A. J. Marley who invites suggestions for books to be covered.

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