Symposium Takes a Fresh Look at Language
By Sharon Ricks

Do brains learn like lungs breathe and hearts pump blood? How do you know that you can “fasten” and “unfasten” but not “hug” and “unhug”? How does your brain accomplish syntactic processing?

New Perspectives in Language Research, a symposium series, took a new look at the neural and computational bases of language recently. Speakers were Dr. Elizabeth Bates of the University of California, San Diego; Dr. David Caplan of Massachusetts General Hospital; and Dr. Mark S. Seidenberg of the University of Southern California.

Seidenberg challenged the standard view that language involves grammar and that grammar is unlike other aspects of human knowledge. He presented an approach to language that involved forms of knowledge representation, learning and processing that are not specific to language; rather they are general capacities that underlie many aspects of cognition.

"The standard view is that language learning is possible because children are born with knowledge of the universal properties of grammar," he said. "This idea is inconsistent with facts about brain organization and development. It leaves..."
unexplained how the child actually converges on the grammar of his or her language and doesn't provide a productive framework for thinking about how language is used.

Caplan, a professor of neurology at Harvard Medical School, discussed brain functional imaging studies of syntactic processing. He presented PET scans of studies that asked younger and older right-handed, proficient males and females to do plausibility judgment tasks. For example, volunteers were asked whether certain statements make sense, such as, "It was the tenant that irritated the leak," or "The child spilled the juice that stained the rug." He contrasted blood flow when the sentences were syntactically more complex with blood flow when they were less complex. The scans show that, during these tasks, blood flow increased in the Broca and medial inferior lateral frontal regions of the brain in proficient persons. He then presented PET scans of studies asking younger and older, right-handed, nonproficient males and females to do the same task. Surprisingly, these scans showed an increased blood flow in a different region of the brain, the superior and inferior parietal lobe and the medial frontal lobe. Other brain regions, especially medial frontal structures, were also often activated in all groups of subjects. The results suggest a specialization within the brain for one aspect of syntactic processing, and variability in that regional specialization depending on the degree of proficiency in the task.

Speaking on the brain and language in children and adults, Bates, a professor of psychology and of cognitive science, argued that grammar or language resides not only in the Broca region of the brain, but is broadly distributed throughout the brain. She presented studies involving cross-linguistic grammaticality judgment scores in individuals with a language disorder called Broca's aphasia. She found these individuals are better at catching word order errors than agreement errors and that those abilities differ with different languages having different rules. For example, English-speaking aphasics are better than Italian-speaking aphasics at noticing word order violations; Italian-speaking aphasics are better than English-speaking aphasics in noticing agreement errors. The point? Even when the Broca region is damaged, some language ability is preserved. When studying the brain and language in children and adults, Bates urged listeners to move beyond a phrenological framework that asserts each of the mental faculties is located in a definite part of the cerebral cortex.

Her presentation also emphasized the plasticity of the brain and noted as evidence for plasticity how well children learn language despite early lesions that damage or destroy what are thought to be the "language areas" of the brain.

"We are born with a richly articulated brain," she said. "Brains learn like lungs breathe and hearts pump blood. Language is a distributed dynamic skill system overlaid on a sensory motor brain that evolved for many things."

The next seminar, "Developmental Disorders and Language," on Mar. 29, 2001, will focus on autism, William's syndrome and specific language impairment in children. The seminar series is hosted by NIDCD, NINDS, NIMH, NICH and NIA. For more information, contact Dr. Judith Cooper, 496-5961.

Dr. John Dickson was recently named director of the Division of Computer System Services (DCSS) for the Center for Information Technology. Previously, he was associate director of DCSS, and prior to that, he headed the DCSS high performance scientific computing section. He was the trail boss for the NIH-wide CERTAN IT procurement project from 1994 to 1999. Dickson has worked for NIH since joining NINCDS (now NINDS) in 1979 as a senior staff fellow in the Laboratory of Neuro-Otolaryngology. In 1981, he joined the Division of Computer Research and Technology, the predecessor to CIT, as a systems programmer. He holds a bachelor's degree in physics and a doctorate in physiology.
Team Unravels DNA Repair Protein Structure

Researchers from the National Institute of Diabetes and Digestive and Kidney Diseases have determined the structure of a bacterial protein vital to repairing DNA. The findings, which appeared in the Oct. 12 issue of *Nature*, could help scientists studying a comparable, but faulty, human protein associated with a hereditary colorectal cancer.

In their paper, Wei Yang and Changill Ban of the Laboratory of Molecular Biology and Peggy Hsieh and Galina Obmolova of the Genetics and Biochemistry Branch describe the structures of the protein MutS and MutS combined with DNA that were isolated from the eubacterium *Thermus aquaticus*. MutS is one of several proteins that work together to correct mistakes that arise when the microbe's DNA is copied. Such repair proteins, with different names, exist in all living things.

Four bases make up DNA; when DNA replicates, mismatches sometimes occur. Normally, guanine (G) pairs with cytosine (C) and adenine (A) matches with thymine (T) along the helix. At the beginning of replication, the two DNA template strands separate and daughter strands are made to complement each template strand. For instance, if a string of bases on the parent strand reads GGATTC, the corresponding stretch on the daughter strand should read CCTAAG. If the wrong nucleotide slips in on the daughter strand, mismatch repair begins.

Scientists had long known that MutS's function in bacteria was to recognize mismatches and unpaired bases between the template and daughter strand. They found that MutS worked with another protein, MutL, to activate MutH, which then snips the daughter strand up to a thousand base pairs away from the error. MutH's cut allows a fourth protein called exonuclease to come in to take out bases, including the errors, much like a computer's backspace key. But until recently, scientists couldn't demonstrate how exactly the repair proteins worked at the molecular level because they had no crystal structures of them. With a crystallized molecule, scientists get a three-dimensional view of the curves, twists and indentations on a protein that indicates how and where it binds to another protein or DNA.

Yang and her colleagues plan to use what they've learned from microbial repair proteins to create models of human proteins and solve their structures.—Anna Maria Gillis

NIAMS Funds Grants in Osteogenesis

Research on osteogenesis imperfecta (OI), a genetic disorder characterized by bones that break easily, has received a boost from the award of five new grants by the National Institute of Arthritis and Musculoskeletal and Skin Diseases. The grants, which total $1.6 million, support research activities ranging from cutting-edge gene and cell therapies to testing drug treatments in mouse models.

The new studies include: Development of a Treatment for Osteogenesis Imperfecta, University of California, Davis; Alendronate Use in Models of Osteogenesis Imperfecta, Hospital for Special Surgery, New York City; Evaluation of Cellular Gene Therapy for Osteogenesis Imperfecta in an Animal, University of Pittsburgh; Mutational Effects on Collagen's Structure and Stability, Stanford University; Expansion of Stem Cells for Skeletal Tissues, Tulane University Medical Center.

Osteogenesis imperfecta is a genetic disorder affecting 20,000 to 50,000 adults, children and infants in the United States. Bones break easily, often from little or no apparent cause. There are at least four types of OI, representing extreme variation in severity from one person to another. There is no cure for OI. Current treatment is directed toward preventing or controlling the symptoms, maximizing independent mobility and developing optimal bone mass and muscle strength.—Anna Maria Gillis

NINDS Wins “Best Feds on the Web”

The NINDS web site—www.ninds.nih.gov—was recently selected as one of this year’s “Best Feds on the Web” by GovExec.com—the web site of *Government Executive* magazine. NINDS' site was one of 10 winners chosen from 55 nominations.

According to GovExec, “Visitors to [the NINDS site] will find invaluable information on neurological disorders, ranging from Parkinson’s disease to narcolepsy. It includes entire sections devoted to funding programs and patient studies. The site’s low-key design is more practical than eye-catching, but the depth of information—particularly on rare disorders—along with its accessibility, make it worth the visit.”

The winning web sites—which hail from a variety of federal agencies and cover a wide range of topics including public health, air traffic control and patents—were chosen based on the following criteria: provides excellent customer service to the public by having a well-designed site that includes a large amount of useful information; uses the web to improve business practices in their agencies or across government; and/or makes use of new technologies that other federal sites should consider emulating.

*Government Executive* is a monthly business magazine for senior executives and managers in federal departments and agencies. For the full list of winning web sites, visit http://www.govexec.com/bestfeds/.
Wild mushrooms flourish in a forest in Belarus.

Poppy plants grow in a dacha garden; such plants are illegal in the U.S. as they are a source of opiates.

disaster in the Ukraine fell in the southern part of Belarus, Simpson explained. The contaminated territory was marked off and evacuated, but people, out of sheer necessity, have farmed on land they know is harmful. Forests closed to the population due to health risks have been broached by folks harvesting mushrooms and berries, which absorb cesium from the soil, Simpson said. “Cows, which every family has, forage on grass that’s been contaminated, so it gets into the meat and milk,” she continued.

Although there is a good system in place for evaluating the safety of food, many products are sold outside of the system, she observed. “Street vendors—little old grannies selling mushrooms—are very common. But there has been very little in the Western press about ingestion of radiation. The pediatricians in the region are very concerned. Already there are serious signs of problems.”

An article in the British Journal of Medicine has reported on the health of Jewish emigres from Belarus who have settled in Israel, and Simpson says the U.S. is trying to support doctors and scientists who are studying the radiation issue. “The U.S. goal is to encourage the private sector to create independent NGO’s (nongovernmental organizations) and public health associations like the American Cancer Society, which they don’t have, or advisory groups like the Susan G. Komen Breast Cancer Foundation.”

Simpson lectured all over the country on public health, introducing the concept of focus groups to the nation. “The old Soviet system was
top-down; nobody ever went from the bottom up,” she explains. She designed a new community health services project for a Chernobyl-contaminated area in Gomel Oblast (oblast is state); the project focused on introducing new disease prevention and early detection measures. Her other activities included helping develop an iodine deficiency eradication project for Brest Oblast, assisting the U.S. military’s effort to provide Belarus with hospital renovation funds, and working with NGO’s to develop health programs.

But her work took place against a frightening backdrop. “The politics there are very scary. The KGB there is large and very active. There are militia dressed in fatigues on every corner in Minsk. It feels like a police state,” she said.

Alcohol abuse is a major problem. Because the government subsidizes the production of vodka, it is “cheaper than soda and juice, and sold in every store,” reports Simpson. “Beer is also very popular, and the alcohol content is higher than in the U.S. Teens openly carry drinks on the street. There is a lot of drunkenness in the evening on the streets—it’s very, very common.”

There is very little knowledge of fluoride’s benefit to children’s teeth, she said, and there is a serious deficiency of iodine in the diet because the salt is not iodized.

That such common public health interventions, not to mention concepts such as budgeting and cost-effectiveness, are absent in Belarus astonishes Simpson. “They are a highly organized society with well-educated people—it’s really an anomaly.”

It was the U.S. ambassador’s wife, a psychologist, who offered insight that made the best sense to Simpson: “She said they are a ‘traumatized population.’ One in four of their people died in World War II; they’ve never recovered from it—memorials are everywhere. One of Hitler’s largest death camps, Trostnyets, where at least 250,000 people died, is located on the outskirts of Minsk. And Stalinization hit hard; most families lost members in the thirties and early forties in killing fields such as nearby Kurapaty and in the gulags of Siberia. Then there was Russia’s war with Afghanistan—many Belorussians were lost there. Then you add Chernobyl to that. Sometimes I would feel like I was in hell. I would look at my husband and say, ‘Where are we? Where are we?’”

Another tragedy struck while Simpson was in Minsk, but news of it made hardly a ripple in the West: Some 50 youngsters attending an outdoor rock concert died in a stampede outside the city’s subway system after a freak storm hit the area. “That was particularly sad because the birth rate in Belarus is dropping below the replacement level and here all these beautiful young people were lost.” Simpson says despite an oppressive history, the people are peaceloving and tolerant. “They look at you with a tear in their eye and say, ‘This is our life. What can we do?’” But they are also deeply cynical and pessimistic. “They don’t trust anyone or anything. They are used to hypocrisy. The culture has not been able to grieve all that it has suffered.”

Still, the land is beautiful and the citizens revere nature. “There are wonderful artists of all sorts,” Simpson said. Physicians there—two of whom she gave English lessons—are hungry for information; Simpson plans to inquire whether NIH can send excess computers their way.

Back in the U.S. since Sept. 10, Simpson has turned now to issues involving women and minority health in this country. But Belarus has marked her and she cannot forget the people she met or their needs. “They are so alone,” she said.

A sculpture of Christ shows what Simpson calls a sadness characteristic of the region.

Holiday Show Set, Dec. 14

For some joyful holiday spirit, plan to attend the 16th annual NIH Holiday Show presented by the Bethesda Little Theatre. The performance will be held on Thursday, Dec. 14 at noon in Masur Auditorium, Bldg. 10. Come and enjoy a variety of tunes in celebration of the holiday season. The Bethesda Little Theatre is an R&W organization whose proceeds benefit NIH charities. The show is BLT’s gift to the NIH community in thanks for their support throughout the year. For more information, visit http://www.repgov.org/r&w/blt/.
**Overweight Males Needed**

Overweight male volunteers are needed for a study comparing the effects of low fat and low carbohydrate diets on weight-regulating hormones. You must be between 25-40 years old and in good general health. You must be moderately overweight and following either a low-fat or low-carbohydrate diet for at least 2 weeks. Participation involves a clinic visit and a 24-hour admission to the Clinical Center for blood sampling.

Compensation is available. For more information contact Dr. Al Zubaidi at 496-7731 or Lori Hanton, 496-0862.

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**Former NHLBI Director Levy Dies**

Dr. Robert Levy, eighth director of the National Heart, Lung, and Blood Institute and noted lipid researcher, died of pancreatic cancer on Oct. 28. He was 63.

"He was an important figure in the treatment and prevention of heart disease," said Dr. Donald Fredrickson, former NIH director.

Dr. Claude Lenfant, director of NHLBI, described Levy as a "leader in the field of research on cholesterol, lipids, lipoproteins, atherosclerosis and heart disease. He will also be remembered for steering the institute toward a course of scientific excellence."

Levy joined the institute in 1963 as a clinical associate in the Molecular Disease Branch headed at that time by Fredrickson.

"Bob conducted pioneering studies to identify the metabolic defects associated with hypercholesterolemia. He was involved in developing a typing system that clarified the clinical disorders of lipid metabolism," said Dr. Bryan Brewer, current chief of the branch.

"This typing system allowed physicians to distinguish between different phenotypes. It eventually went around the world," said Fredrickson.

In addition to his work on the classification of lipid disorders, Levy was responsible for the development and national distribution of a dietary treatment program for the management of hyperlipoproteinemia, which was based on research conducted in the Clinical Center. In 1970, he became chief of the Lipid Metabolism Branch in the intramural program and conducted early research on the effect of cholesterol-lowering drugs on the risk of cardiovascular disease.

In 1973, Levy was named director of NHLBI's extramural Division of Heart and Vascular Diseases where he coordinated a network of Lipid Research Clinics (LRC) to carry out research on blood-lipid abnormalities.

"He was particularly interested in large-scale studies of diet and drug effects on cholesterol and he led a couple of studies that were important at the time," said Fredrickson.

Levy was project officer of the LRC-Coronary Primary Prevention Trial (CPPT), which was the first study to demonstrate conclusively that the risk of coronary heart disease can be reduced by lowering blood cholesterol. The CPPT study laid the groundwork for further research on cholesterol-lowering agents, including studies of statins, considered a major class of drugs for the treatment of high blood cholesterol.

In 1975, Levy assumed the position of NHLBI director where he strengthened clinical trial research while continuing to be active in intramural research. During his time as director he helped to implement the National High Blood Pressure Education Program (NHBPEP), which had been created in 1972. The NHBPEP became the first of several successful health education programs administered by NHLBI.

Colleagues at NHLBI remember not only Bob Levy's command of science but also his good humor and kindness. "He had a real ability to communicate with people," recalled NHLBI Nutrition Coordinator Nancy Ernst, who worked with Levy in the intramural program. "He was warm and caring with his patients. He would talk with them about their home, their conflicts...it was part of understanding how to help them comply with medical treatment," she said.


Levy was the author or coauthor of more than 300 scientific publications. He was a member of the Institute of Medicine of the National Academy of Sciences and belonged to many honorary and professional societies including Phi Beta Kappa and the American College of Cardiology.

He graduated from Cornell University and Yale University School of Medicine. Levy is survived by his wife of 42 years, Ellen Feis Levy of Morristown, N.J.; a son, Dr. Andrew Levy of Israel; three daughters, Dr. Joanne Levy of Boston, Karen Gooen of Randolph, N.J., and Patricia Zuckerman of Washington; his mother, Sarah Levy of West Orange, N.J.; and seven grandchildren.

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**Calling Computer Users**

Do you work in an office environment full time? Do you work on a computer at least 4 hours a day? Are you between ages 20-67? If you answered yes, you are needed for a research survey study about computers and health. Volunteers with symptoms of pain, numbness or tingling in their fingers, hands, wrists, forearms, elbows, shoulders and/or neck and volunteers without any symptoms are needed. Participants will be compensated. For more information, go to www.work-health.net or call Stacey at (202) 687-2392.
NCI Launches Web Design, Usability Site

In an effort to improve the usefulness and accessibility of federal government health information on the World Wide Web, the National Cancer Institute has launched a new site called Usability.Gov. The site will serve primarily as an online resource for those involved in web site design and management at NCI, NIH and other federal agencies. However, anyone wishing to access the latest news, research-based guidelines and methods on how to design and test the usability of web sites is welcome.

“This is the first time an entire web design and usability package is presented on a single government site,” said Susan Sieber, director of communications at NCI. “While the site is specifically designed to help NCI staff improve the way we present cancer-related information to the American public and cancer researchers, we’re enthusiastic about also helping others improve the way they communicate through the web.”

With more patients, researchers and health care professionals seeking information online, it is critical that government web sites are highly intuitive, easy-to-use and accessible to ensure success, according to Sieber. Research has shown that nearly 60 percent of users couldn’t find the information they were looking for even though they were viewing a site where the information existed. “When patients or family members are looking for health information online, they can’t afford to waste precious time sifting through a poorly designed web site,” Sieber said. “Usability.Gov offers web site designers the information and tools they need to help ensure users find information quickly and easily.”

NIH Team Wins ‘Hammer’ Award

Vice President Al Gore’s National Partnership for Reinventing Government bestowed one of its Hammer Awards on Dec. 5 to a team of NIHers who, in league with several other departments and agencies, developed, improved and maintained the NIH Contractor Performance System. This is a large database that stores information about contractors’ actions under awarded contracts. The CPS is widely acclaimed and is now used by most federal agencies.

The awardees include, from the Office of Acquisition Management and Policy: Diane Frasier, Shelby Buford, Zäiga Tums, Mary Armstead, Mike Payne, Merle Tigert, Phyllis Donoghue, JoAnn Wingard, Paulette Smith; from the Center for Information Technology: Renee Edwards, George Dunham, Nan Miller, Tom Coyne, Leigh McCuen; and from the CPS users’ group: Olga D’Onofrio of OD, Karin Eddy of NIAID, Nancy Hurd of NIDA and Robert Barnie of NIMH.

The Hammer Award is given to teams that have made significant contributions in support of Reinventing Government principles including putting customers first, cutting red tape, empowering employees and getting back to basics.
Wednesday
Afternoon
Lectures

The Wednesday
Afternoon
Lecture series—
held on its
namesake day at
3 p.m. in Masur
Auditorium, Bldg.
10—features Dr.
Christine
Seidman on Dec.
20, giving the
final talk of the
year in the series:
"Gene Mutations
That Remodel the
Heart." She is
professor of
medicine and
genetics at
Harvard Medical
School. After a
brief winter
break, the series
resumes on Jan.
3, 2001. For more
information or for
reasonable
accommodation,
call Hilda Madine,
594-5595.

Dr. Crystal Mackall (c), a principal investigator with
NCI's Pediatric Oncology Branch, has received the
Clinical Teacher Award for excellence in clinical training
of NIH fellows. It was presented by NEI's Dr. Grace
Clark (l) and Clinical Center director Dr. John Gallin at
a recent Grand Rounds. The award has been presented
annually since 1985; it recognizes excellence in clinical
training involving the direct care of patients by any
senior clinical investigator at NIH. Clinical associates
nominate individuals who, in their judgment, have
contributed significantly to the professional development
of clinical trainees. A panel of NIH fellows makes the
final selection.

The NIH Combined Federal Campaign and the R&W
had NIH'ers "jammin' to the oldies" of WJMN 99.5
FM. Disc jockey B.K. Kirkland (l) was spinning the
wheel of "Hoo-Ha" for fun, games and prizes. Trivia
games, singalongs
and dancing were also part of the festivities held on
the Bldg. 31
patio. Hot bowls
of chili were
provided by the
Hard Times Cafe,
and Microsoft
Corp. offered opportunities to win Office 2000 products
for home computers. Several charities funded by the
CFC had displays and people on hand to provide
information on donating.

Annual King Observance Set, Jan. 12

NIH's Dr. Martin Luther King, Jr., annual observance
will be held on Friday, Jan. 12, 2001, at noon
in Masur Auditorium, Bldg. 10. Speaking on the
theme, "Achieving the Dream, Health Parity in the
21st Century," will be Dr. Rodney Hood, president
of the National Medical Association.

The NMA, established in 1895, is a professional
and scientific organization representing the interests
of more than 20,000 African American physicians
and their patients; it is a leading force for parity and
justice in medicine and the elimination of disparities
in health. On several occasions, NMA has called
upon the federal government to institute a national
health care initiative because it believes quality
health care is a right of all Americans. King also
emphasized the need for parity in health care,
education and job opportunity.

The Morgan State University Choir will provide a
musical tribute in honor of King's memory. Also on
display will be a replica and information about the
newly designed King memorial that will open on the

Anyone interested in joining the Martin Luther
King planning committee or seeking more informa-
tion about the program should contact Tor Moore at
496-8980 or Jacque Ballard at 435-3793.

NIAID's Dr. Bernard Moss recently received the Bristol-
Myers Squibb Award for Distinguished Achievement in
Infectious Disease Research. Chief of the Laboratory
of Viral Diseases in the Division of Intramural Research, he
was recognized for his important contributions toward
understanding virus-host
interactions. The selection
committee cited his discovery
of the first of many
virally secreted immune
defense molecules, a class of
molecules for which he
coined the term virokine; his
characterization of the first
virus-encoded growth
factor; and his development
of the vaccinia virus into a
versatile and widely used
expression vector system.

He was also cited for
determining the structure of
the cap found at the 5'-terminus of all eukaryotic and
most viral mRNAs. Moss was selected for the annual
award, instituted in 1991, by an independent committee
of leading researchers. His numerous other awards and
honors include the Taylor International Prize for
Medicine, the ICN International Prize for Virology, the
Dickson Prize for Medical Research and election to the
American College of Microbiology and the National
Academy of Sciences; he is a fellow of the American
Association for the Advancement of Science and past
president of the American Society of Virology.