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Study Shows Variety of Approaches Help Children Overcome Auditory Processing and Language Problems

by Linda Joy

For children who struggle to learn language, the choice between various interventions may matter less than the intensity and format of the intervention, a new NIDCD-sponsored study suggests. The study, led by Ronald B. Gillam, Ph.D., of Utah State University is online at <http://jslhr.asha.org/cgi/content/abstract/51/1/97> (full text is available for a fee), in the February 2008 *Journal of Speech, Language, and Hearing Research*.

The study compared four intervention strategies in children who have unusual difficulty understanding and using language, and found that all four methods resulted in significant, long-term improvements in the children's language abilities. The aim of the study was to assess whether children who used commercially available language software program Fast ForWord-Language had greater improvement in language skills than children using other methods. This program was specifically designed to improve auditory processing deficits which may underlie some language impairments. Children who have auditory processing deficits can jumble the order of sounds that are heard in close sequence. Researchers believe that this deficit can interfere with vocabulary and grammar development.



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"These results show that any of a number of intensive educational approaches can make a tremendous difference for children whose language and auditory processing skills are lagging," says NIDCD director James F. Battey, Jr., M.D., Ph.D. "Even play with peers seemed to support the improvements the children in this study made."

"We had a very positive outcome," says Dr. Gillam. "Our results tell us that a variety of intensive interventions that we can provide kids will improve auditory processing and language learning."

Save the Date! NIDCD is planning its 20th anniversary symposium to be held in Bethesda, MD, Oct. 23, 2008.

To add your name to our e-mail list, visit www.nidcd.nih.gov/health/inside/

While most children are chattering easily by the time they are toddlers, about seven percent struggle to speak, read, and understand language despite having adequate hearing, intelligence, and motor skills. Children with language impairment have trouble learning language or expressing their thoughts through language. They often have difficulty learning new vocabulary words or sentence structures, comprehending what's said to them, holding conversations, or telling stories. These children tend to perform poorly on measures of auditory processing and standardized tests of language development. Many of these children are hindered academically throughout their formal education, explains Dr. Gillam.

To address auditory processing problems, a different group of language researchers developed the computer software package called Fast ForWord-Language several years ago. The program uses slow and exaggerated speech to improve a child's ability to process spoken language. As children advance through the program, subsequent language exercises use gradually faster and less exaggerated speech.

Dr. Gillam's team designed a study that would compare Fast ForWord-Language to three other interventions. He and colleagues at the University of Kansas, the University of Texas at Austin, and the University of Texas at Dallas enrolled 216 children in the trial. All were between ages six and nine and had been diagnosed with language impairment.

The children, from Northeast Kansas, Central Texas, or North Texas, were randomly assigned to receive one of four possible interventions. In addition to Fast ForWord-Language, the trial included another computer-assisted language intervention, an individual language intervention with a speech-language pathologist, and a nonlanguage academic enrichment intervention that focused only on math, science, and geography.

The other computer-assisted language intervention, which used Earobics and Laureate Learning Systems software, differed from Fast ForWord-Language in not using slow or exaggerated speech. Groups of children worked on the computer intervention exercises at their own pace wearing headphones and supervised by a speech-language pathologist.



Children assigned to the individual language intervention worked one-on-one with a speech-language pathologist for the duration of the trial. In their sessions, the children read picture books that contained a variety of age-appropriate vocabulary words.

In the academic enrichment intervention, children worked on educational computer games designed to teach math, science, and geography. This intervention was delivered in the same way as the language-focused computer interventions. It served as a comparison group against which the researchers could measure the results of the language interventions.

All of the interventions were delivered in an intensive, six-week, summer program that also included day camp activities such as arts and crafts, outdoor games, board games, and snack time. The children attended the program five days per week for three and a half hours per day. They practiced their assigned interventions for an hour and 40 minutes each day. The children took a standard language test—the Comprehensive Test of Spoken Language—and completed a variety of auditory processing measures at the beginning and end of the program as well as three and six months afterward. The children in all four groups demonstrated statistically significant improvement on the auditory processing measures and the language measures immediately after their six-week program.

The children showed even greater improvement when their language skills were tested again six months later. Even a subgroup of children with very poor auditory processing skills made improvements on the auditory processing tasks and





Photos Credit: photos.com

The researchers were surprised that such a large percentage of the children who worked on the math, science, and geography computer games improved their auditory processing and language skills.

the language measures. About 74 percent of children in the Fast ForWord-Language group made large improvements on the language measures. Sixty-three percent of children in the computer-assisted language intervention group made large improvements. Of those who worked with a speech-language pathologist, 80 percent made large gains, and in the general academic enrichment group, almost 69 percent made large gains. These gains are much larger than the improvements that have been reported in long-term studies of children who have received language therapy in public school settings.

The researchers were surprised that such a large percentage of the children who worked on the math, science, and geography computer games improved their auditory processing and language skills. They speculate that all the children may have benefited from the opportunities to listen carefully, to decide on an appropriate response based on what they heard, and to practice language skills with each other. The recreation and play time built into each day of the six-week program gave the children the chance to form friendships with peers who were functioning at similar language levels.

The intensive delivery of the interventions—500 minutes per week—may also have benefited kids in every intervention group. In comparison, school systems typically offer speech-language pathology services to students with language impairment for 30 minutes twice per week.

“I urge speech-language pathologists to engage children with auditory processing problems and language impairments in activities in which they have to listen carefully, attend closely, and respond quickly, and to do it in an intense manner,” says Dr. Gillam. “And clinicians should provide children with ample opportunity to converse, socialize, and interact with kids at their same developmental level.”

The language intervention trial was also supported by a grant from the National Institute of Child Health and Human Development to the Kansas Mental Retardation and Developmental Disabilities Research Center at the University of Kansas.

Recent News

NIDCD Grantee Wins PECASE Award

NIDCD grantee Bruce McCandliss, Ph.D., of Weill Cornell Medical College received a Presidential Early Career Award for Scientists and Engineers (PECASE) in a White House ceremony last November. Dr. McCandliss is a psychologist at the Sackler Institute for Developmental Psychobiology and associate professor of psychology in psychiatry. The award is the highest honor bestowed by the U.S. government upon outstanding scientists and engineers in the early part of their independent research careers.



Bruce McCandliss, M.D.

He was recognized for his research into the biological basis of speech and language development and dysfunction in disorders such as dyslexia. Nominated by NIDCD, Dr. McCandliss was one of 12 NIH grantees to receive the award. A total of 56 scientists and engineers was honored.

The PECASE Awards are intended to recognize scientists and engineers who, while early in their research careers, show exceptional potential for leadership at the frontiers of scientific knowledge. They also support the continued development of the award winners and foster innovative and far-reaching developments in science and technology.

Read the Weill Cornell Medical College press release at www.med.cornell.edu/deans/2007/12_03_07/article_02-12_03-2.shtml and see Dr. McCandliss' web page at www.sacklerinstitute.org/cornell/people/bruce.mccandliss/.

Judith has played a pivotal role in shaping the institute's strategic plan for research on the processes of voice, speech and language.

NIDCD Official Is Honored by ASHA

NIDCD Deputy Director Judith A. Cooper, Ph.D., received the 2007 Honors of the Association award during the American Speech–Language–Hearing Association (ASHA) convention last November in Boston. The Honors of the Association recognizes distinguished contributions to the field of speech, language and hearing and is the highest honor the association can give.

“Judith has played a pivotal role in shaping the institute’s strategic plan for research on the processes of voice, speech and language,” said NIDCD Director James F. Battey, Jr., M.D., Ph.D. “She oversees and administers a portfolio of literally hundreds of grants and contracts, and plays a central role in informing Congress and other agencies about progress resulting from NIDCD-supported research grants. She has also championed new initiatives to bring diversity to the scientific research community.”

Dr. Cooper’s career began as a speech-language pathologist in medical and clinical settings. Later she came to the NIH as a health science administrator with the National Institute of Neurological, Communicative Disorders and Stroke. When NIDCD was created in 1988, she came to the institute in a similar role. After serving in several other positions at NIDCD, she was named deputy director in 2004. Currently, she is responsible for



NIDCD Deputy Director Judith A. Cooper, Ph.D.

overseeing the management of more than 1,000 grants and contracts annually in hearing, balance, smell, taste, voice, speech, and language; also, she is the director of NIDCD’s Division of Scientific Programs, where she manages the institute’s language portfolio.

Dr. Cooper was honored for her significant contributions to the discipline of communication science and disorders, in the areas of research, administration, and her service to state and national organizations.

Read the American Speech-Language-Hearing Association press release at www.asha.org/about/news/2007/cooper.htm.

NIDCD Postdoc Receives ‘Best Paper’ Award for Discovery of Key Protein’s Function in Hearing

Saima Riazuddin, Ph.D., a research fellow in NIDCD’s Laboratory on Molecular Genetics, received the C.W. Cotterman Award at the 57th annual meeting of the American Society of Human Genetics. Every year, the editorial board of the *American Journal of Human Genetics*, the society’s monthly scientific journal, selects the two best papers published by pre- or postdoctoral trainee members.

Dr. Riazuddin is the first author of the paper titled “Tricellulin Is a Tight-Junction Protein Necessary for Hearing.” An international effort involving researchers from England, Pakistan, and the United States, the paper describes how a genetic mutation caused deafness in four Pakistani families. The researchers found that the protein tricellulin, which is encoded by the *TRIC* gene, is present at the point where, under normal conditions, three



Saima Riazuddin, Ph.D.



Photos Credit: photos.com

cells meet to form barriers between compartments in the inner ear. One hypothesis is that a mutation in that gene causes a breakdown of these barriers, altering the ionic composition of fluids in the inner ear, and causing deafness.

The research was conducted under the supervision of Thomas Friedman, Ph.D., chief of the NIDCD Laboratory on Molecular Genetics, the unit responsible for studying

hereditary hearing loss in humans and mice. Read about Dr. Friedman at www.nidcd.nih.gov/research/scientists/friedmant.asp.

The C. W. Cotterman Award is named after the first editor of the monthly journal, and it was presented in San Diego, Calif., on October 27, 2007. Other authors included: Zubair M. Ahmed, Ayala Lagziel, Shin-ichiro Kitajiri, Parna Chattaraj, and Inna A. Belyantseva from NIDCD's Laboratory of Molecular Genetics; Alan S. Fanning and James M. Anderson, University of North Carolina, Chapel Hill; Khushnooda Ramzan, Shaheen N. Khan, and Sheikh Riazuddin, University of the Punjab, Lahore, Pakistan; Penelope L. Friedman, National Institutes of Health; and Andrew Forge, University College London Ear Institute.

Author of Newborn Hearing Screening Legislation to Retire

Rep. Jim Walsh (R-NY), a champion of newborn hearing screening and strong supporter of NIDCD's mission, announced that he will be retiring from Congress at the end of his term in January 2009 after 20 years in the House of Representatives. Rep. Walsh authored and shepherded through Congress legislation creating the federal government's Early Hearing Detection and Intervention (EHDI) program within the U.S. Department of Health and Human Services. This legislation was passed in 1999.

When Walsh began working on this issue, only about three percent of U.S. babies were being screened at birth, and fewer than a dozen universal newborn hearing screening programs were in existence. Today, 93 percent of all infants in America are screened within one month of birth, and EHDI programs have been established in every state.

In 2001, Walsh was a founding co-chair of the Congressional Hearing Health Caucus, a bipartisan effort dedicated to hearing health issues, and he has remained the group's co-chair.

Read Rep. Walsh's retirement announcement at http://walsh.house.gov/list/press/ny25_walsh/pr_080124A.html.

Walsh was a founding co-chair of the Congressional Hearing Health Caucus, a bipartisan effort dedicated to hearing health issues.



Rep. Jim Walsh

FDA Issues Notices on Risk of Bacterial Meningitis in Children with Cochlear Implants

The FDA notification stresses the importance of vaccination to prevent bacterial meningitis in children with cochlear implants.

The U.S. Food and Drug Administration (FDA) is urging doctors and families to review vaccination records and ensure that children with cochlear implants receive all recommended vaccines.

A recent FDA notification to health care providers was prompted by the deaths of two children with cochlear implants. Neither child had received all the recommended pneumococcal vaccinations. The FDA notification stresses the importance of vaccination to prevent bacterial meningitis in children with cochlear implants. The two children used cochlear implants with a positioner, a component that had been added to one type of cochlear implant to aid in the transmission of the electrical signal. This type of cochlear implant was withdrawn from the market in July 2002.

The U.S. Centers for Disease Control and Prevention has recommended vaccination schedules, available

online at www.cdc.gov/vaccines/recs/schedules/default.htm, for children, teens, and adults. Recommendations include pneumococcal vaccines for children at high risk, including those with cochlear implants. The pneumococcal vaccine can prevent meningitis caused by a type of bacteria known as *Streptococcus pneumoniae*.

All people with cochlear implants appear to have some heightened risk of bacterial meningitis, according to the FDA. However, children with cochlear implants are at the greatest risk.

For more information see:

Oct. 10, 2007, *FDA Advice for Patients with Cochlear Implants: New Information on Meningitis Risk*, www.fda.gov/cdrh/medicaldevicesafety/atp/101007-cochlear.html.

Oct. 10, 2007, *FDA Public Health Notification: Importance of Vaccination in Cochlear Implant Recipients*, www.fda.gov/cdrh/safety/101007-cochlear.html.

Potential Risk of Sudden Hearing Loss Prompts Label Changes for ED Drugs

The U.S. Food and Drug Administration (FDA) has approved labeling changes for erectile dysfunction (ED) drugs in the class that includes Cialis, Levitra, and Viagra, to give users a more prominent notice of the potential risk of sudden hearing loss, and to guide consumers on what to do if they experience sudden problems with their hearing.

The FDA asked manufacturers of these drugs to revise product labeling after a very small number of patients reported sudden hearing loss, sometimes accompanied by ringing in the ears and dizziness, after taking them. The FDA advised that

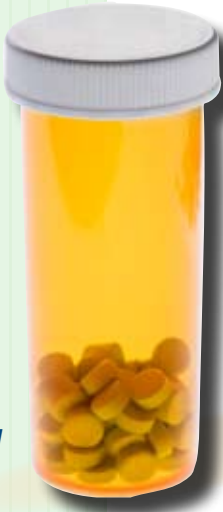
patients taking Cialis, Levitra, or Viagra who experience sudden hearing loss should stop taking the drug and seek medical attention.

A case report in the April 2007 *Journal of Laryngology & Otology* of sudden hearing loss in a man taking Viagra prompted the FDA to search its Adverse Events Reporting System for other cases. It found 29 other cases of sudden hearing loss, both with and without accompanying ringing in the ears, vertigo, or dizziness, reported after the drugs had been approved and marketed.



Photos Credit: photos.com

The FDA advised that patients taking Cialis, Levitra, or Viagra who experience sudden hearing loss should stop taking the drug and seek medical attention.



The FDA has also indicated that Revatio, a drug used to treat pulmonary arterial hypertension, may also be associated with sudden hearing loss and will also be subject to similar labeling changes. Pulmonary arterial hypertension is a serious medical condition in which continuous high blood pressure in arteries of the lungs weakens the heart muscle and often leads to right heart failure and death. Patients taking Revatio who experience sudden hearing loss should continue taking the medication and contact their health care provider for further evaluation.

Although it is not certain that these drugs caused sudden hearing loss, the FDA said that the strong relationship between the use of these drugs and sudden hearing loss in these cases warrants a more visible warning about the potential risk.

For more information, see the FDA's online *Questions and Answers about Viagra, Levitra, Cialis, and Revatio: Possible Sudden Hearing Loss* at www.fda.gov/cder/drug/infopage/ed_drugs/QA.htm.

NIDCD Highlights

Scientists Identify Pheromones that Trigger Aggression between Male Mice

NIDCD-supported researchers at Scripps Research Institute, La Jolla, Calif., and Harvard University are the first to identify protein pheromones responsible for the aggression response in mice. They describe their work in the Dec. 6, 2007, issue of *Nature* at www.nature.com/nature/journal/v450/n7171/full/nature05997.html. Pheromones are chemical cues that are released into the air, secreted from glands, or excreted in urine. Members of the same species can sense these chemical cues, which trigger various social and reproductive behaviors. Pheromones in insects have been extensively studied, but much

less is known about how they influence behavior in mammals.

Although humans do not produce the pheromones identified in this research, the brain regions responsible for behavior are similar in mice and humans. Consequently, with further research, this study may help contribute to our understanding of the neural pathways that play a role in human behavior.

Read the NIDCD news release at www.nidcd.nih.gov/news/releases/07/12_05_07.htm.

Researchers Find a Genetic Cause for Hearing Loss That's Inherited from Mother



Photos Credit: photos.com

NIDCD scientists have demonstrated that a specific mutation in mitochondrial DNA is a cause of deafness. While most DNA is found in the cell nucleus, DNA can also be found in the mitochondria, the energy-generating structures inside cells. This discovery is based on a study of a large North American family with maternally inherited deafness and is published in the January 2008 issue of *Clinical*

Genetics at www.blackwell-synergy.com/doi/abs/10.1111/j.1399-0004.2007.00913.x.

Experts estimate that genetic factors cause 50-60 percent of severe to profound childhood hearing loss in developed countries. Mitochondrial DNA carries genes that have been linked to hearing loss, heart disease, nerve damage, and epilepsy. Unlike DNA in the nucleus, which is inherited from both parents, mitochondrial DNA is passed only from mother to child.

These results will improve the genetic counseling of individuals with hearing loss after genetic testing. The mutated gene also provides researchers with clues that, with further research, could lead to drugs for treating deafness.

Read the NIDCD Story of Discovery at www.nidcd.nih.gov/research/stories/.

Meetings of Interest

National Hearing Conservation Association (NHCA)

Feb. 21-23
Portland, OR

The 33rd annual conference offers workshops, presentations, and exhibits. Topics to be covered range from hearing loss prevention to field verification of hearing protection and hearing loss prevention for kids. See www.hearingconservation.org/conf_info2008.html for more information.

Early Hearing Detection and Intervention Conference (EHDI)

Feb. 25-26
New Orleans, LA

The national meeting of the Centers for Disease Control and Prevention's EHDI program will provide a forum to present the most up-to-date information regarding EHDI programs and to promote information sharing and idea exchange between states, private industry, advocacy and partner groups, and education organizations regarding the implementation and enhancement of EHDI programs. See www.cdc.gov/ncbddd/ehdi/meeting.htm for more information.

Learning Disabilities Association of America 45th Annual International Conference

Feb. 27-March 1
Chicago, IL

This conference will provide the latest research and findings in learning disabilities, including specific workshops on medical and mental health, teacher preparation, public policy, adults, and more. See www.lidaamerica.org/conference/index.asp for more information.

California State University, Northridge, 23rd Annual International Technology and Persons with Disabilities Conference

March 10-15
Los Angeles, CA

This international conference addresses all technologies across ages, disabilities, and levels of education and training, employment, and independent living. See www.csun.edu/cod/conf/index.html for more information.

National Science Teachers Association National Conference

March 27-30
Boston, MA

Themed "Science: Bridge to the Future," the program will focus on four current topics: using and abusing data; sharpening the edge in science; cutting edge research—foundation for the future; instructional technology—research and applications for the science classroom. See www.nsta.org/conferences/2008bos/ for more information.

Look for NIDCD at These Meetings:

The Association for Research in Otolaryngology Midwinter Meeting

Feb. 16-21
Phoenix, AZ

The primary annual meeting of the Association for Research in Otolaryngology (ARO) features lectures, symposia, workshops, short courses, a poster session, and exhibits relevant to current topics in otolaryngology research. See www.aro.org/mwm/mwm.html for more information. See also *Highlights of NIDCD-Supported Research at ARO* at www.nidcd.nih.gov/news/releases/08/02_13_08.htm.

Acute and Chronic Noise Exposure: Strategies for Preventing, Diagnosing, and Treating Hearing Loss

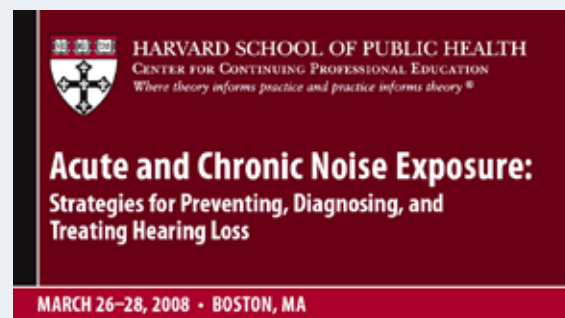
March 26-28
Boston, MA

Sponsored by the Harvard School of Public Health Center for Continuing Professional Education; see www.hsph.harvard.edu/ccpe/programs/ACNE.html for more information.

Audiology Now! 2008—American Academy of Audiology 20th Anniversary Meeting

April 2-5
Charlotte, NC

The American Academy of Audiology expects more than 10,000 audiologists to gather for its 20th anniversary meeting. Attendees will learn about new technologies, scientific discoveries, and procedures for diagnosing and treating hearing loss. See www.audiologynow.org/ for more information.



Beyond NIDCD: News from Other Organizations

New Publications about Deaf-Blind Children

The *Practice Perspectives* series by the National Consortium on Deaf-Blindness is designed to expand and broaden current information resources by presenting them in understandable and accessible formats. The first two titles of the series are *Harmonious Interactions* and *Children Who Are Deaf-Blind*. For more information, visit their Web site at www.nationaldb.org.

Updates from House Ear Institute

New Research Building—House Ear Institute recently completed its Wallis Annenberg Research Center. Located near downtown Los Angeles, the center will enable House Ear Institute scientists to expand upon current cellular and molecular research, studies in the genetics of hearing loss and other areas. Guided tours of the institute's research labs and educational facilities are available. Contact Nancy Hoffman at (213) 483-4431, ext. 7027, to schedule a tour or to learn more.

Ear Exhibit—The exhibit entitled *Journey through the Human Ear* is currently on display at House Ear Institute. When not on loan as a traveling exhibit, this exhibit is open to the public free of charge. For more information, call the marketing department at (213) 483-4431, ext. 7078.

Speechreading Workshops—House Ear Institute offers nine-week workshops on speechreading (lipreading) and coping skills three times per year for people with hearing loss. Choose from beginner or advanced programs. The next session is April 16 - June 11. For more information, contact Felice M. Kolda, M.A., at (626) 445-2074 or email info@hei.org.

Central Institute for the Deaf Announces Three Spring Workshops

Tools and Techniques for Assessing and Teaching Language—March 5-6. This workshop is designed to provide teachers and speech-language pathologists with the tools and techniques necessary to teach spoken language, through listening and talking, to children age 3 to 12 years with hearing loss.

Early Intervention for Children with Hearing Impairment—March 26. Widespread early identification laws have made it necessary for today's service providers to be trained to work with infants and babies who are deaf and hard-of-hearing in their natural environment. This workshop is designed to help speech-language pathologists, early childhood special education teachers and audiologists feel more confident when working with this very young population and their families.

SPICE Plus: Auditory Management of Children with Cochlear Implants and/or Hearing Aids—March 27-28. This revised workshop builds on the Central Institute for the Deaf's curriculum entitled Speech Perception Instructional Curriculum and Evaluation (SPICE). The course is designed to teach audiologists, speech-language pathologists and teachers how to develop auditory skills in children with cochlear implants, hearing aids or both. It features live demonstrations, video, classroom observation, hands-on practice and expanded activities, including new activities for older children and children whose skills have advanced beyond the scope of the basic curriculum.

For more information on each of the workshops, contact Dianne Gushleff at dgushleff@cid.edu or call toll-free at (877) 444-4574, ext. 133, or (314) 977-0133. You can register online at www.cid.edu.

Stuttering Foundation Offers New Resources

Cluttering, a 42-minute DVD, illustrates the essence of cluttering as well as the problems that often accompany it. Like stuttering, cluttering is a fluency disorder, but the two disorders are not the same. Cluttering involves excessive breaks in the normal flow of speech that seem to result from disorganized speech planning, talking too fast or in spurts, or uncertainty about what one wants to say. Strategies and suggestions for diagnosis and treatment of cluttering are provided.

Stuttering: Basic Clinical Skills, a 135-minute DVD, demonstrates speech management strategies to help professionals work effectively with children and adults who stutter. It showcases dynamic demonstrations of stuttering therapy techniques by experts from around the world.

Autism Spectrum Disorders and Stuttering is a brochure that answers questions and gives helpful tips to parents and professionals for a child who stutters and who has one of the autism spectrum disorders (ASD), including Asperger's syndrome.

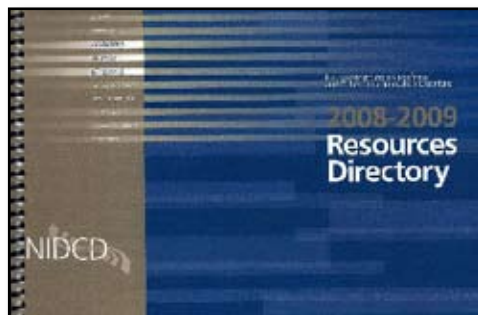
Trouble at Recess is a book written for children ages 6-10 by an 8-year-old girl who stutters. Children who stutter will relate to the main character as she copes with her stuttering and with teasing from others.

Tartamudez: Para niños, Por niños, a 12-minute DVD and online streaming video, is the Spanish-language version of *Stuttering: For Kids, By Kids*.

For more information on how to obtain these resources, call the Stuttering Foundation at (800) 992-9392 or (901) 452-7343 or go to www.stutteringhelp.org.

New Resources

Updated Version of NIDCD Resources Directory Available



The 2008-2009 *NIDCD Resources Directory* is designed to encourage networking among individuals and organizations with an interest in human communication and the diseases and disorders of human communication. Newly updated, it lists selected national organizations that provide information on NIDCD program areas—hearing, balance, smell, taste, voice, speech, and language. Entries identify the scope of each organization's materials or services and provide contact information. It is available in hard copy or online with a searchable database at www.nidcd.nih.gov/directory.

Updated Brochures Help with Research Career Planning and Grant Writing

NIDCD and Your Research Career is an updated brochure written specifically for pre- and postdoctoral investigators and junior faculty members. The brochure describes the award mechanisms for research training and career development support from NIDCD.



An updated companion piece, titled *How to Apply for an NIDCD Grant*, targets new investigators. The brochure provides brief descriptions of the research mechanisms NIDCD offers as well as tips on how to apply. Whether you're interested in conducting a small feasibility study or a large clinical trial, NIDCD offers a variety of funding mechanisms to support a broad range of research ideas.

To order copies of the *NIDCD Resources Directory*, *NIDCD and Your Research Career*, or *How to Apply for an NIDCD Grant*, contact:

NIDCD Information Clearinghouse
1 Communication Ave.
Bethesda, MD 20892-3456
phone (800) 241-1044
(TTY: 800-241-1055)
fax at (301) 770-8977
e-mail: nidcdinfo@nidcd.nih.gov

CELEBRATING 20 YEARS OF RESEARCH 1988-2008



National Institute on Deafness and Other Communication Disorders