Research on Hearing Communication and Health Gets Center Stage at NIDCD

October 04, 2011

Behavioral Research at NIDCD

NIDCD supports hearing, communication, and health research in multiple disciplines

By William Yost

The National Institute on Deafness and Other Communication Disorders (NIDCD) at the National Institutes of Health (NIH) supports research and research training on a large and diverse range of topics dealing with human communication and health. These topics include the senses of hearing, balance, taste, and smell, but also speech production and voice, speech perception, and language. While many of these areas deal directly with issues related to human communication, NIDCD also supports research and research training related to disease prevention and health promotion in areas like balance, taste, and smell. This research includes investigations of, for example, the relationship between salt intake and obesity or the severe disruptions to sense of balance and equilibrium suffered by many American soldiers who have sustained blast injuries.

In addition to the diversity of topics supported by NIDCD, the range of techniques used to study deafness and other communication disorders covers the gamut of those used in modern behavioral, engineering, and biological sciences. A wide range of behavioral approaches are being supported by NIDCD, and a significant proportion of the research and training grants supported by NIDCD use behavioral approaches.

The research supported by NIDCD is becoming increasingly interdisciplinary in nature, relying on the application of several techniques in obtaining new information. Thus, behavioral measurements are often made in concert with electrophysiological measurements taken from the peripheral or central nervous systems. Behavioral measures can also be related to the genetic profiles of organisms. Finally, behavioral measures can be used to assess the effectiveness of surgical or pharmacological interventions. Theories of behavior provide the basis of many theories of hearing, speech perception, and language, and behavioral measures are still the most common way to define the functional significance of hearing, maintaining balance, tasting, smelling, speaking, and communicating. As such, it is not surprising that behavioral approaches and theories of behavior play a significant and substantial role in the research supported by NIDCD.

Examples of Funding for Behavioral Science Research at NIDCD

Accessible and Affordable Hearing Health Care

NIDCD invites grant applications that focus on the acquisition of knowledge that can be rapidly translated into new or enhanced approaches for service-delivery systems, assessments or intervention leading to accessible and affordable hearing health care (HHC) for individuals with hearing loss. The goal is to help improve healthcare access and outcomes and to identify solutions that are effective, affordable, and deliverable to those who need them. This includes
the development of low-cost technologies (e.g., hearing aids, handheld hearing screeners), research on access and possible new delivery systems (e.g., telehealth, internet hearing-aid fitting and management, convenient care clinics), research on system barriers for HHC access (e.g. availability of services, cost, location, insurance coverage, referral network) as well as behavioral research at the individual patient level (e.g., variables influencing one's perceived need for HHC). Solutions should be implementable and sustainable in settings beyond the research environment and should have the potential to address disparities in health care.

Improved Diagnosis and Treatment for Spasmodic Dysphonia

NIDCD seeks to support innovative collaborative research project grant applications (R01) designed to improve our understanding of the origins and physiological basis of spasmodic dysphonia (SD), a voice disorder caused by involuntary movements of muscles involved in voice production. The ultimate goal is to enhance both prevention and treatment options for those with SD. NIDCD hopes to stimulate progress in SD research through encouraging and facilitating transdisciplinary interactions across such fields as otolaryngology, speechlanguage pathology, neurology, genetics, and the neurosciences.

Research on Autism and Autism Spectrum Disorders

NIDCD, along with other institutes at NIH, supports research that examines diagnosis, treatment, and service delivery related to autism spectrum disorders (ASD). This research portfolio includes research on the epidemiology of ASD; research on screening, early identification, and diagnosis of ASD; research on differences in affect, social behavior, and cognition that manifest early and may serve as markers for ASD; research on communication skills and communication deficits in ASD; research on psychosocial interventions for children diagnosed with ASD; and research on the organization, delivery, coordination, and financing of services for people with ASD and their families.

Detailed descriptions of the research programs and staff contact information can be found on the NIDCD website at:

www.nidcd. nih.gov/funding/programs

More information about NIDCD-issued funding opportunities can be found at:

www.nidcd.nih.gov/funding

Harnessing the Human Factor in Hearing Assistance

By David G. Myers

APS Fellow and Charter Member David G. Myers is an author and a professor of psychology at Hope College. Myers is the author of 17 books including the popular textbooks Psychology, *9th ed.,* Exploring Psychology, *8th ed.,* Social Psychology, *10th ed., and* Exploring Social Psychology, *5th ed., which have been translated into 12 languages. Myers' scientific writings have appeared in three dozen academic periodicals, including* Psychological Science, Science, *the* American Scientist, *and the* American Psychologist. *His research and writings have been recognized by the Gordon Allport Prize, by an "honored scientist" award from the Federation of Associations in the Brain and Behavioral Sciences, by the Award for Distinguished Service on Behalf of Personality-Social Psychology, and by three honorary doctorates. His latest essays, in* Sound and Communications *and* Hearing Health and Technology Matters, *explain his advocacy for transforming assistive listening for people with hearing loss.*

As a person with hearing loss, I often find lectures, plays, and PA system announcements indecipherable. But who else notices? Unlike someone visibly left outside because of wheelchair inaccessibility — which would leave others appalled — inaccessibility due to hearing loss is invisible and thus often unremedied.

The Americans with Disabilities Act does, however, mandate hearing assistance in public settings with 50 or more fixed seats. Such assistance typically takes the form of a checkout FM or infrared receiver with earphones. Alas, because well-meaning sound engineers fail to consider the human factor — how real people interact with technology — most such units sit unused in storage closets.

To empathize, imagine yourself struggling to carve meaning out of sound as you watch a movie, attend worship, listen to a lecture, strain to hear an airport announcement, or stand at a ticket window. Which of these hearing solutions would you prefer?

1. Taking the initiative to go locate, check out, wear, and return special equipment (typically a conspicuous headset that delivers generic sound)?
2. Pushing a button that transforms your hearing aids (or cochlear implant) into wireless loudspeakers that deliver sound customized to your own needs?

Solution 1 — the hearing-aid-incompatible solution — has been America's prevalent assistive-listening technology. Solution 2 — the hearing-aid-compatible solution — has spread to Scandinavian countries and

across the United Kingdom, where it now exists in most cathedrals and churches, in the back seats of all London taxis, and at 11,500 post offices and countless train and ticket windows.

Twelve years ago I first experienced this hearing technology at Scotland's Iona Abbey. As the spoken word reverberated off the 800-year-old stone walls, it was, for me, an unintelligible verbal fog. My wife then noticed a sign indicating a "hearing loop" — a magnetic communication system that transmits PA system output via a room-surrounding wire loop to a hearing instrument "telecoil" sensor. (Telecoils now come, cost-free, with most new hearing aids and all new cochlear implants.) Push a button to activate the telecoil and, voila!, the hearing instrument becomes a wireless in-the-ear loudspeaker for magnetic signals sent from hearing loops (as I discovered that day), as well as from many modern telephones.

The result was stunning: Suddenly I was hearing a clear voice speaking from the center of my head. The delicious sound (is this what others hear?) put me on the verge of tears. On returning home, I installed a $250 hearing loop in my home TV room. If someone watches TV with me, they hear sound from the TV while I hear it broadcast by my hearing aids (which can simultaneously pick up room conversation). My office phone likewise connects to a hearing loop, which transmits amplified phone conversation to both my ears, with greatly increased clarity. (When taking voice mail messages, I can leave the handset on the desk.)

Given how well this simple technology works in other countries and in my home and office, why not loop my community? So, with support from some local companies, foundations, and media, I introduced hearing loops to West Michigan. Nearly a decade later, we now have them in hundreds of locations, including most worship places, many school and senior citizen center auditoriums, the convention center and airport in Grand Rapids, and even Michigan State University's basketball and special events arena.

The response has been gratifying, with use of hearing assistance multiplying and with words of appreciation flowing from audiologists ("Never in my audiology career has something so simple helped so many people at so little cost"), audio professionals ("After installing our first loop system and seeing the reaction from the individuals with hearing loss, we immediately shifted our sales focus to loop systems"), and consumers ("The experience of actually hearing such clear sounds was thrilling and hard to describe").

A California audiologist, Bill Diles, has installed hearing loops in the TV rooms of more than 1,800 patients. His patient surveys reveal markedly increased satisfaction, given the hearing loop, with both their TV listening and their hearing aids.

Given the appreciative response to this user-friendlier technology, why not "loop America?" I wondered. Why not effectively double the functionality of hearing instruments?

That ambition — my avocational passion of the last decade — presents a grand challenge in applied social psychology. How, given the cultural inertia supporting America's existing hearing-aid-*in*compatible assistive listening, does one effectively persuade hearing and audio professionals to consider the human factor — the practical benefits of simplicity and no-fuss ease of use?

On behalf of Americans with hearing loss, my answer has been a persuasive message that shares the

vision and tells the story to every audience I can reach — via an informational Web site (www.hearingloop.org), through 30 articles for hearing and audio professionals and the general public, and by invited talks and nearly 9,000 e-mails to whomever will listen. Thanks partly to message repetition, and with the collaboration of energetic kindred spirits in other states, a grassroots movement is gaining momentum. New companies have formed to produce and market hearing loop products. Effective hearing loop advocates in Wisconsin, Arizona, New Mexico, Rochester (NY), Silicon Valley, and New York City (where hearing loops are being installed at 488 subway information booths) have undertaken initiatives in their locales and are networking through a national listserv. (This is prosocial group polarization.) Various national media — from *Scientific American* to the *AARP Bulletin* to NPR Science Friday and an upcoming issue of the *New York Times* — have featured our collective social entrepreneurship.

And, to my delight, the Hearing Loss Association of America ("the nation's voice for people with hearing loss") and the American Academy of Audiology have undertaken a joint campaign to "enlighten and excite hearing-aid and cochlear-implant users, as well as audiologists and other hearing health care professionals, about telecoils and hearing loops and their unique benefits."

Is this the ultimate wireless hearing solution? The cost, limited range, and power demands of alternative wireless technologies, such as Bluetooth, make hearing loops today's technology of choice for public access. But if some future wireless technology is similarly affordable, miniaturized for most hearing instruments, simple to use, inconspicuous, and able to cover a wide area with a universally accessible signal, then bring it on. Our advocacy is less for hearing loops per se than for hearing technology that appreciates the human factor — by enabling hearing instruments to serve an important second function, as simple, affordable, wireless loudspeakers. Happily, we are now approaching a cultural tipping point where that dream looks like an achievable reality.

Addressing the 'Cultural Inertia'

By Caroline M. Kobek Pezzarossi

David Myers asks a valid question about reaching out to professionals who work with sound:

"How, given the cultural inertia supporting America's existing hearing-aid-*in*compatible assistive listening, does one effectively persuade hearing and audio professionals to consider the human factor — the practical benefits of simplicity and no-fuss ease of use?"

To answer this question, one must first understand that many millions of Americans have some form of hearing loss. The numbers vary between 10 million to 20 million Americans (see Mitchell, 2005 for an

in-depth review of the statistics). The figure demonstrates that a significant percentage of Americans experience some form of hearing loss. One might infer that there would be ease of access to hearing, listening, and sound. Why, then, is accessibility to sound so variable and unreliable? Does the burden lie with hearing and audio professionals? They are the experts, after all.

The answer is not as simple as it may appear: We are all equally responsible for ensuring access for everyone. The person with the hearing loss is as responsible for self-advocacy and asking for access as the hearing/audio professional is for developing the latest technology and making it available to the consumer.

The question is, why aren't more people who have a hearing loss taking such responsibility?

Inaccessibility to the environment is a painful issue with which many people with disabilities wrestle. A person's environment has a significant influence in the experience of having a disability, and unfortunately members of marginalized or stigmatized groups almost always face the threat of discrimination (Crocker, Major, & Steele, 1998). Results from a survey conducted by the Disability Rights Commission (2004) in Scotland show that taunts, bullying, and negative attitudes are prevalent in the life of a person with a disability. Does this influence the fact that it takes the average person approximately seven years to seek help with a hearing impairment (Hearing Loss Association of America, 2011)?

Kramer, Kapteyn, and Festen (1997) found that people with hearing loss will avoid situations in which they "experience feelings of annoyance and frustration." It stands to reason that if the environment has consistently proven to be inaccessible or a hindrance, avoidance will occur. It is a never-ending cycle of inaccessibility and a lack of request for accessibility, because humans are constantly revising the future based on current events, imagining potential scenarios, planning the course of action, and making decisions based on an understanding of the facts (Bruininks & Malle, 2006).

If people know or anticipate potential discrimination, then why not do something about it? Research shows that visualizing a problem, creating possible scenarios and approaches, and deciding on an action does occur (Bandura, 1982; Carver & Scheier, 1990, 1998). However, research also shows it isn't as simple as visualization (Oettingen, 1996; Taylor et al., 1998).

Aspinwall (2006) noted in her literature review of future-planning strategies that the ability to generate tangible strategies causes a favorable outcome in the future and that the ability to avoid an aversive event depends on how much a person can control the outcome; further, Mallet and Swim (2005) found in the study of body size and discrimination that anticipating even potential severe discrimination propelled people to engage in proactive strategies to shore up psychic defenses.

The solution to engendering the ability to access resources appears to be in arming the consumer with the confidence to seek them, not in powers of persuasion.

Aspinwall, L.G. (2005). The psychology of future-oriented thinking: From achievement to proactive coping, adaptation, and aging. Motivation and Emotion, 29(4), 203-235.