

NCRAR Newsletter

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SPECIAL POINTS OF INTEREST:

- Article by Gabrielle Saunders: Dual Sensory Impairment - A Review
- Perspectives of Four Au.D. Students on the 2007 NIH Summer Traineeship Program at NCRAR

INSIDE THIS ISSUE:

- Au.D. Summer 2 Research Program
- Community Lecture 2 Announcement
- Au.D. Student Poster 3-4
- Upcoming NCRAR 5 Events
- NCRAR News 5
- NCRAR Publications 6 10/07 to 12/07
- Meet Patty Saub, 7 NCRAR Budget Analyst
- Message from the 7 Director (cont. from Page 1)
- Dual Sensory 8 Impairment (cont. from Page 1)

Message from the Director: Stephen Fausti Ph.D.



The new year holds great promise for the NCRAR as we venture into exciting new areas of education to benefit veterans, students, and the community. Education continues to be a significant component of the Center's mission to alleviate the problems associated with auditory system dysfunction, and we strive to develop, disseminate, and implement information to achieve these goals. Hearing loss and tinnitus have reached critical levels among veterans requiring over \$1.2 billion annually in compensation costs - an 18% increase in one year. The majority of hearing loss is caused by exposure to harmful levels of noise both in military and civilian environments. Education to prevent hearing impairment and in hearing conservation are essential to stop this alarming increase in auditory dysfunction.

The NCRAR is committed to the promotion of hearing loss prevention and hearing conservation including work with the VA and the military to reduce noise-induced hearing loss. Successful hearing conservation programs must focus on education, protection, and compliance. Individuals must be informed about noise exposure and how hearing should be monitored. It is also important to make appropriate hearing conservation equipment available, and to educate individuals on proper use to maximize its benefit. Finally, education to motivate individuals to (Continued on p7)

DUAL SENSORY IMPAIRMENT - A REVIEW

Gabrielle Saunders Ph.D.

Individuals with Dual Sensory Impairment (DSI) have both hearing loss and vision loss. The majority of the veteran population with DSI have acquired their hearing and vision loss as a result of age-related processes, or from factors such as noise exposure and diabetes. The number of people with acquired or late-onset DSI are increasing. In 1995 Goodrich¹ estimated that 179,000 veterans had DSI, and that this number would increase to almost 294,000 by the year 2010. Similar projections have been made for the non-veteran population².

DSI is a poorly researched field that lacks diagnostic, clinical and rehabilitation guidelines. Self-report studies have shown that people with DSI are less able to function in daily life in terms of preparing meals, shopping, and using the telephone. They are also less independent than similarly aged individuals with single or no sensory impairment. People with DSI show earlier cognitive decline and higher morbidity than their single- and non-sensory impaired counterparts, they are often depressed, have poor mental and social well-being and participate less socially than people without DSI. When DSI arises late in life, these problems are exacerbated by the presence of (Continued on p8)

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Announcing the 2008 Summer Research Program for Au.D. students

Last year the NCRAR was one of three programs in the US awarded a five-year T-35 Predoctoral Short-term Training Grant from the National Institute on Deafness and other Communicative Disorders (NIDCD) . The grant provides



The sun does shine in Portland! Eric, Justin, Kelly & Anna outside NCRAR.

funds for students enrolled in an accredited Au.D. program to spend 3 months over the summer at

a research institute to learn about and conduct auditory research .

Last year four students participated at the NCRAR. Their experiences are summarized on Pages 3 and 4 of this newsletter. These summaries originated from a poster they presented jointly at



Those involved with the NIH pre-doctoral training grant, enjoying the view from the VA.

the NCRAR Biennial Conference of 2007. All four students are also presenting a poster describing their specific research projects at the upcoming American Auditory Society (AAS) meeting in Scottsdale Arizona on March 6-8.

If you would like more information about the program and instructions on how to apply for funding for summer 2008 please go to:

www.ncrar.research.va.gov/Education/Mentoring.asp

Applications are due March 15th 2008.



Sarah Melamed Ph.D. of the NCRAR will be presenting a talk in the NCRAR Community Lecture Series January 31st 2008 in the Portland VAMC auditorium titled

“Audiological Assessment: Making Sense of Your Test Results”

This talk is aimed at veterans and other members of the community.

The talk will be recorded on DVD so if anyone would like a copy for their clinic contact Gaby Saunders at Gabrielle.saunders@va.gov

Perspectives of Four Au.D. Students on the 2007 NIH Summer Traineeship Program at NCRAR

The clinical degree in audiology was expanded recently to incorporate the wide range of clinical topics within the scope of practice of an audiologist. However, this change prompted some programs to reduce students' exposure to audiology research. In order to address this concern, the National Institute on Deafness and Other Communication Disorders (NIDCD), one of the National Institutes of Health, developed a multi-site summer traineeship to provide clinical audiology students with research experience. The NCRAR hosted four pre-doctoral audiology students in a 3-month summer research training program funded by the NIDCD program. Each student worked with a mentor on an individual research project related to that mentor's research program. Perspectives from each student on their traineeship experience and preliminary reports of research in progress will be presented, as well as a description of the various educational opportunities students received working in a highly collaborative research center.

Anna Diedesch Wichita State University



Why I participated in the summer traineeship at NCRAR:

When I began to apply to graduate audiology programs in 2004, I learned that the Master's degree in audiology was slowly being phased out. At that time I decided to enroll in an Au.D. program to obtain the best possible education and training. I am currently in my fourth year in an Au.D. program at Wichita State University (WSU) in Kansas. While obtaining my Au.D. I have become aware of the need for research in our field and have noticed the number of students going into Ph.D. programs declining. When the opportunity was mentioned to me that I could spend some time at the NCRAR I was interested in the opportunity to gain the experience of working first-hand with top researchers in the field of rehabilitative audiology, as well as pursuing the idea of returning for a Ph.D.

Why I chose my supervisor: At the time I applied for this summer traineeship, I was very open to whom I would be able to work with. At NCRAR, there were many researchers willing to be mentors. One of the research experiences I had at WSU was working in a psychoacoustic lab with Dr. Chang Liu, and I was excited to learn that I would be able to work with Dr. Marjorie Leek to add to my knowledge about psychoacoustic



research. Being mentored by Dr. Leek has been a very inspiring experience in many ways. I have been very fortunate to work with such a knowledgeable and notable researcher in our field.

What I worked on over the summer: I was fortunate to have a unique experience at NCRAR by being part of a research project throughout all stages of the research process. I chose to work on an existing idea of Dr. Leek's, pertaining to temporal and spectral contrast in the identification of complex sounds. Along with Drs. Michelle Molis and Erick Gallun, I assisted in writing the program for the experiment in MATLAB. My goals are to collect data on at least 5 normal hearing and 5 hearing impaired subjects, write a publishable article, and present my data at a poster session in March 2008 at the AAS conference.

How I benefited from this traineeship: My time spent at the NCRAR included hands on experience working with several well established researchers on a variety of rehabilitative auditory topics. This summer I have furthered my knowledge in the areas of testing human subjects, the process of grants, and the role institutional review boards play in the research process.

I also benefited from seminars and lectures that were given during my time spent at NCRAR, including a course in scientific integrity. In addition, I met individuals performing audiological research that had training in psychology and other disciplines outside the field of audiology, and benefited from working with three other Au.D. students from around the country.

Future career goals: After my experience of the summer traineeship at the NCRAR I am now considering how a Ph.D. in addition to my Au.D. would benefit me. A Ph.D. would allow me to function as a researcher with a strong clinical background. I am excited to learn that this is a viable option for my future. Being in a research facility is a great option to consider because it will allow me to continue learning throughout my career.

Eric Hoover University of Washington



Motivation to participate in traineeship: As an Au.D. student, I learned that the field of audiology is in dire need of researchers. I considered pursuing a Ph.D. in audiology after my clinical degree, but the additional years of commitment to school made that decision difficult. A desire to learn about the auditory system drew me to the field initially, so research is an alluring career choice. This traineeship at the NCRAR provided me with the opportunity to test drive research for a summer.

Why I chose my mentor: Dr. Erick Gallun collaborated with my advisor at the University of Washington, Dr. Pamela Souza, on a project relating amplitude modulation to consonant identification. Due to my interest in this topic, I was enlisted to help in the collection and organization of data. This is how I was introduced to Dr. Gallun, my NCRAR mentor. We share an interest in temporal aspects of audition, and a similar outlook on the field, which worked out well.

What I worked on over the summer: The focus of my studies at NCRAR was modulation perception in the human auditory system. A recent study by Gallun and Souza (submitted), showed that the amplitude modulation spectra predict errors in consonant recognition when spectral cues are not available. However, similarities in modulation spectra did not always generate the confusions expected. This indicates that some other cue was available to subjects not accounted for in the analysis of modulation spectra. In order to discover the source of this cue I studied several published auditory models. I was able to determine that current models of the auditory system do not account for the



modulation tracking demonstrated by Gallun and Souza (submitted). I look forward to continuing the search for this missing cue, which may lead to a new model of temporal processing.

How I benefited from this opportunity: The traineeship gave me a jump start toward my Ph.D., since it enabled me to work on projects of my choosing, under a mentor in my specialization. Perhaps the most important benefit was the opportunity to interact with the researchers, audiologists, and students at NCRAR. In addition to working closely with Dr. Gallun, I discussed my own work and other projects with Drs. Leek and Molis, and many other researchers to a lesser extent. I learned a great deal about psychophysical methods and experimental design. Much of what I learned during the summer traineeship I would not have had an opportunity to learn if I were not in this kind of environment. Not to mention I had a lot of fun! Portland, Oregon is a great place to live.

Future career goals: My future goals are very specific, which is a testament to the value I received from this traineeship opportunity. I am going to work on the temporal processing relevant to consonant coding in the peripheral auditory system. I will also study how temporal processing is affected by aging and peripheral hearing loss as it relates to consonant recognition. Working at NCRAR this summer enabled me to focus my general interest in impaired speech perception and generate research questions for my Ph.D.

Justin Howell Utah State University



Why I participated in the summer

traineeship at NCRAR: The Au.D. program is focused on clinical training. While I have had some exposure to research, I have not been able to explore my interests in pursuing a career in research. When I heard about the NIH summer traineeship I felt this opportunity would give me the ability to explore career



choices before I complete my doctorate. My decision to participate in the traineeship was based on my career goals and the opportunities I would receive working at the NCRAR I wanted to gain a better understanding of the research process in order to

focus my future goals. The NIH traineeship was a unique opportunity to experience research while still in my clinical doctorate program.

Why I chose my supervisor: I chose to work with Dr. Gabrielle Saunders because I have a strong interest in counseling and outcome measures. Dr. Saunders' current research projects sparked my interest in improving counseling clients. I am very fortunate to work with such an experienced and well known researcher in the field.

What I worked on over the summer: After discussions with my mentor, Dr. Saunders, and reviewing the literature on directional microphones I developed a pilot study. My question was how often are directional microphones not functioning. When the IRB approved my project, I developed a testing protocol using polar plots to measure the functionality of the directional microphones in the hearing instruments. Once the polar plots were measured, I analyzed the results from the four hearing instrument manufacturers. The results indicate a need for quality control checks in the clinical setting and further studies to expand the results of this study. I am currently in the process of publishing this study and I will be presenting my results at the American Auditory Society meeting in the spring.

How I benefited from this traineeship: The benefits that I received from this traineeship was the opportunity to work with professional researchers with a variety of backgrounds. Being able to work with and observe various professionals enabled me to see how research is a collaborative effort. I also benefited from being able to conduct a research project from beginning to end and gained a greater appreciation for using current research as a guide for best practice models in the clinical setting. The knowledge and experience at NCRAR will guide my future work in research.

Future career goals: My career goals are still focused on pediatric and counseling research. However, I now see the value of obtaining a Ph.D. in addition to my Au.D. A Ph.D. will assist me in developing future research within the field of audiology. I look forward to continually expanding my knowledge and sharing that knowledge with colleagues and those seeking to enter the field of audiology.

Kelly Watts Arizona State University



Why I chose to participate in the summer research traineeship at

NCRAR: Prior to this summer, I had had limited exposure to research in the auditory realm. Through my pre-graduate school experiences in the neuroscience/neurology field, I had learned that there were good and bad sides to research. My ambivalence toward a career in research has continued throughout my Au.D. During my third year at Arizona State University, I was given the



opportunity to look at otoacoustic emissions with Dr. Bian as his research assistant. Having had my interest in research re-ignited, I jumped at the chance to participate in the summer research traineeship at the NCRAR.

Why I chose my supervisors/mentors:

I consider my traineeship experience to have begun with two fortuitous introductions at American Auditory Society (AAS) meetings. The first introduction was to Dr. Lilly in 2005 and the second was to Dr. Lewis in 2007. They both presented work on multiple sclerosis and the auditory system. As I had been involved in multiple sclerosis (MS) research prior to starting my Au.D. program, I was very excited to learn that two of my interests could and had been combined. Dr. Lewis told me about the traineeship opportunity and invited me to apply.

What I worked on over the summer: Over the summer, I looked for differences in full and limited range frequency sweep DPOAEs between subjects who had and who did not have MS. As the analysis is still in the preliminary stages, it is too early to discuss the results. Be sure to check the poster session at the upcoming AAS meeting as they should be highlighted there!

How I benefited from this traineeship: The benefits of having participated are not few. I worked and learned from excellent researchers, who I would have otherwise only known through their scholarly works. I was immersed in exciting auditory research. I met and became friends with peers from different schools. Lastly, I experienced living in the Pacific Northwest, which is unlike anywhere that I had lived before.

Future Career Goals: I would like to become an audiologist. As a fourth year Au.D. student, I am close to obtaining this goal. As an audiologist, however, I will not be putting the experiences that I have had over this past summer aside. Rather, I will incorporate these experiences into my practice and perhaps, one day, go on to get my Ph.D. The experiences I have had at the NCRAR have added to the positive experiences that I had before and are tipping the scales in favor of research.

Upcoming NCRAR Events



Most NCRAR seminars are broadcast live via v-tel to other VA facilities. Contact Gabrielle.saunders@va.gov for information.

January 31: NCRAR Community Lecture by Sarah Melamed Ph.D. of the NCRAR. Audiological Assessment: Making Sense of your Test Results. Lecture will take place from 12pm until 1pm in The VA Auditorium (2nd floor Building 100 Room 220). The NCRAR

Community Lecture Series is a learning opportunity for Veterans and the local community.

February 15: NCRAR Seminar by Fay Horak, Ph.D. Senior Scientist. Neurological Sciences Institute, OHSU. Auditory Biofeedback for Balance in Patients with Bilateral Vestibular Loss.

March 21 2008: NCRAR Seminar by Douglas Keefe Ph.D. Staff Scientist IV, Center for hearing Research, Boys Town national Research Hospital Omaha, NE. Title: TBA

April 11 2008: NCRAR Seminar by Brenda Lonsbury-Martin Ph.D. Research Professor, Division of Head and Neck Surgery, Loma Linda School of Medicine, Loma Linda, CA.

Title: TBA

May 21 2008: NCRAR Seminar by Kris English Ph.D. Scientist, Martinez VA, CA. Audiology and Counseling or, Listening with the Third Ear.

June 20th 2008: NCRAR Seminar by Sam Trychin Ph.D. Psychologist, Educator. Living With Hearing Loss: Psychosocial issues that need to be addressed

All NCRAR Seminars take place from 12 to 1 pm in PVAMC Building 101 Room 109. for v-tel broadcast unless otherwise noted.

NCRAR News

Welcome to:

Marc Caldwell Au.D. , a research audiologist who moved to Portland from Spokane with his wife and young children.

Patrick Tsukuda, Research Assistant, who has a Masters degree in non-fiction writing.

Congratulations to:

Samantha Lewis Ph.D. was selected as Chair of the Program Committee for AudiologyNOW! 2009

Marcia Collins was awarded a Special Contribution Award for her courtesy and professionalism, going above and

beyond the call of duty, during the Privacy/Security Assessment held in the NCRAR Conference Room.

Sarah Melamed on her marriage and to **Matt Theodoroff** in October and to **Kim Owens** and her husband Philip on the birth of their daughter on New Year's Eve 2007.

Thank you to:

Beverley Wright, **Brian Gygi**, and **Bob Shannon** for presenting their research as a part of the NCRAR Seminar Series.



Photograph of Portland courtesy of Erick Gallun, an NCRAR Investigator

NCRAR Presentations & Publications 10/07 - 12/07

PUBLICATIONS:

Gallun FJ, Mason CR & Kidd G Jr. (2007) The ability to listen with independent ears. *Journal of the Acoustical Society of America*, 122, 2814-2825

Kidd G Jr., Mason CR, Richards VM, **Gallun FJ & Durlach**, NI. (2007) Informational Masking In Yost, W. (Ed.) Springer Handbook of Auditory Research, Vol. 29: Auditory Perception of Sound Sources. New York: Springer, pp. 143-190

Lauer A, Dooling R, **Leek M & Poling K**. (2007). Detection and discrimination of simple and complex sounds by hearing-impaired Belgian Waterslager Canaries. *Journal of the Acoustical Society of America* 122, 3615-3627

Lew HL, Guillory SB, Jerger J & **Henry JA**. (2007) Auditory dysfunction in traumatic brain injury and blast related injury. *Journal of Rehabilitation Research and Development*, 44(7):921-928

Lewis MS, Wilmington D, Hutter M, Lilly D, Bourdette D & **Fausti S**. (in press) Auditory function in individuals with multiple sclerosis. *MS Focus*

Saunders, GH & Echt KV. (2007) An overview of dual sensory impairment in older adults: Perspectives for rehabilitation. *Trends in Amplification*, 11(4), 243-258

SUBMITTED MANUSCRIPTS:

Gallun FJ, Durlach NI, Colburn HS, Shinn-Cunningham BG, Best V, Mason CR & Kidd G Jr. The extent to which a position-based explanation accounts for binaural release from informational masking. Submitted to *Journal of the Acoustical Society of America*

Gallun FJ & Souza P. Exploring the role of the modulation spectrum in phoneme recognition. Submitted to *Ear and Hearing*

Gallun FJ & Souza P. A model of consonant confusions based on envelope modulation similarity. Abstract submitted to *American Auditory Society* for Spring Meeting

Hoover E, Gallun FJ & Souza P. Evaluating Strobed Temporal Integration as a model of temporal processing using spectrally reduced speech. Abstract submitted to *American Auditory Society* for Spring Meeting

Leek MR, Molis MR, Kubli LR & Tufts JB. Enjoyment of Music by Elderly Hearing-Impaired Listeners. Submitted to *Journal of the American Academy of Audiology*

Lewis MS, Hutter M & McGuinness A. Spousal expectations of and satisfaction with hearing aids. Abstract submitted to *AudiologyNOW! 2008 convention*, Charlotte, NC

Lewis MS, Hutter M, Musiek F, Lilly D, Bourdette D & **Fausti S**. Temporal resolution and speech perception in MS patients. Abstract submitted to *AudiologyNOW! 2008 convention*, Charlotte, NC

Howell J & Saunders GH. Directional Microphones: Are they functioning properly when issued? Abstract submitted to *American Auditory Society* 2008 Spring Meeting as a mentored student poster

Summers V, Makashay M, Grassi E, Grant K, Bernstein J, Walden B, **Leek M & Molis M**. Toward an individual-specific model of impaired speech intelligibility. Chapter submitted to Dau et al. *Auditory Signal Processing in Hearing-Impaired Listeners*

PRESENTATIONS:

Gallun FJ. (2007) Hearing Loss and Informational Masking. *Aging and Speech Conference*, Indiana University, Bloomington, IN, Oct 7-9

Gordon J, Konrad-Martin D, Reavis K, Wilmington D, Bratt G & **Fausti S**. (2007) Comparing audiometric threshold shift definitions for ototoxicity detection. *Convention of the American Speech-Language-Hearing Association* in Boston, November 17

Henry JA. (2007) Best practices for TBI patients: Tinnitus. Association of Military Surgeons United States (AMSUS) Invited presentation at *113th Annual Meeting pre-conference workshop*, Battlefield Injuries & Illnesses of the OIF/OEF Warrior, Salt Lake City, UT, November 11

Henry JA, Zaugg T & Schechter M. (2007) Invited one-day training workshop for VA audiologists: Tinnitus Training Program. New York VA Medical Center; New York, NY, October 16

Henry JA. (2007) Invited presentation: Using Sound to Manage Your Tinnitus. Special event sponsored by the American Tinnitus Association, Dallas TX, October 17

Henry JA, Zaugg T & Schechter M. (2007) Invited one-day training workshop for VA audiologists: Tinnitus Management: Clinical Guidelines. Oklahoma City VA Medical Center; Oklahoma City, OK, October 23.

Konrad-Martin D, Reavis KM, Gordon JS, Helt WJ, Fausti SA. (2007) Relationship between ototoxic induced behavioral threshold changes and DPOAE changes. Podium presentation at the *American Speech-Language and Hearing Association*, November 17

Saunders GH & Griest S. (2007) A multimedia hearing loss prevention program for adults. Paper presented at the Institute of the *Academy of Rehabilitative Audiology*, St. Louis MO, October 20

Meet Patty Saub, NCRAR Budget Analyst



I am the budget analyst for the National Center for Rehabilitative Auditory Research. My younger sister was born with a severe hearing loss, so I have a great appreciation for NCRAR's mission and accomplishments.

I was born in Germany where my father worked for the Air Force and met my mother while he was serving a tour of duty. Because my father was in the military I was able to travel to many parts of the world. Unfortunately I was too young then to appreciate it. My father retired from the Air Force while we were living in the Washington, DC area.

That area was my home for about 17 years. I spent almost eight years of that time working as a fiscal accountant for The National Capital Planning Commission, which is a very small Federal agency.

I moved to Portland in 1986. Although I missed my family and friends, I quickly fell in love with Oregon and it's beautiful scenery and mild climates. I consider it to be home now and would like to convince my family of origin to join me.

My life's main ambition was to be a mother. I successfully achieved that goal and have a beautiful daughter aged 18, and two handsome sons aged 21 and 23. In addition to those cherished loved ones, I have two dogs, a cat and some tropical fish. One of the dogs recently gave birth to six adorable puppies. It was a lot of

work, but a very memorable experience.

I have a passion for gardening and a strong love for the outdoors. In the past few years, I challenged myself by doing some home improvement projects on my own. Some of these accomplishments include building a doghouse, tiling a bathroom floor and countertop, building a fence and reinforcing and enhancing the area under my deck!

Prior to returning to work for the Federal government, I worked in various accounting positions in the private sector. Over the last 2 years working at the NCRAR I have seen a lot of positive change and growth. It is a privilege to work with so many dedicated and intelligent individuals.

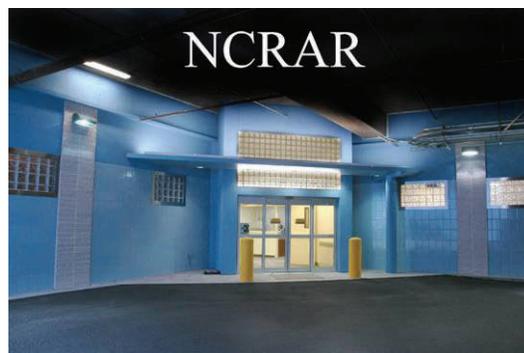
Message from the Director (continued from Page 1)

practice conservation techniques and to use protective equipment will lead to greater compliance, ultimately reducing auditory impairments. We look forward to the upcoming conference for the Military Audiology Association to be held in Portland February 18 - 20 to interchange ideas and concepts about hearing conservation with our Department of Defense colleagues and to the National Hearing Conservation Association (NHCA) meeting which follows, at which a number of NCRAR Investigators are presenting.

In addition to the use of conservation techniques to curb the growth of hearing disabilities, preventative measures are gaining attention to provide further protection to the auditory system. NCRAR investigators are currently exploring the role of pharmacological protectants to reduce the susceptibility of the ear to damage from ototoxic medications. This approach may also have potential as a way to prevent noise-induced hearing loss. Ultimately, our goal is to eliminate the

need for rehabilitation of the auditory system by preventing hearing loss and tinnitus from occurring. Prevention is the best form of rehabilitation.

Best wishes to all for a happy and prosperous new year!



Dual Sensory Impairment - A review (continued from Page 1)

other age-related challenges, such as diminished cognitive capacity, poorer manual dexterity, and changes in communication needs and lifestyle³. Diagnosis and definition of DSI is complicated by the fact that clinical convention dictates that hearing loss be defined for unaided listening, while vision loss is defined based on best-corrected vision.

If we are to better understand the impacts of DSI on daily function we need tools for measuring such. At present there are measures of hearing ability and of vision ability, but none that jointly assess the two. Therefore its not possible to determine how the combination of hearing loss and vision loss affect performance. We can hypothesize that DSI would be more detrimental than vision loss alone and hearing loss alone, and that the impacts would most likely be additive in some way because with single sensory impairment, the functioning sense can be used to compensate for the impaired sense, however, with DSI, this approach is compromised. We could address this hypothesis if we had a measurement tool that required the use of both hearing and vision for optimal performance, one that ideally is similarly sensitive to decrements in both senses. Such a tool could also be used to assess the effectiveness of an intervention. i.e. to measure rehabilitation outcome.

Back in September 2004, VA RR&D in conjunction with the NCRAR held a consensus conference on DSI. Experts in the fields of hearing and vision met to discuss the current state of knowledge about DSI, and to identify research and clinical needs. Attendees identified many unmet technological, clinical and rehabilitative needs and

made a number of recommendations. For example, they recommended that communication devices incorporate redundancies by, for example, providing tactile stimulation in combination with auditory and visual information, or by using signal processing to enhance visual cues based on incoming auditory input, or vice versa. They also considered that enhancement of sound localization as a means of improving way-finding and safety was a critical need. With sophisticated signal processing algorithms and the availability of real-time processing to extract and enhance localization cues, this is becoming a real possibility. The group also proposed that interconnectivity between hearing and vision devices be developed. This would permit the mutual information in the auditory and visual signals to be enhanced via signal processing. It would result in fewer settings for the user to navigate, and more dramatically, it could result in partnerships between hearing and vision device manufacturers which would likely lead to improved product design. Similarly, if clinical practice and rehabilitation of individuals with DSI is to improve, it is critical that there be interdisciplinary training of hearing and vision professionals if rehabilitation for dual sensory impairment is to progress from being provided by two independent services into a single integrated system.

Here at the NCRAR I am in the early stages of developing a measure of DSI in collaboration with Katharina Echt of the VA RR&D Center of Excellence for Aging Veterans With Vision Loss, in Atlanta Georgia. We aim to develop a measure that is differentially sensitive to vision loss and hearing loss, that a performance-based measure to assess

the functional abilities of individuals with age-related DSI that is ecologically valid, reliable and reflective of reported problems, that can be used by clinicians for assessing the relative impact of each sensory impairment and for evaluating the effectiveness of rehabilitation.

Brennan, M., & Su, Y. (2003, November). *Incidence and prevalence of dual sensory impairment in adults 70 years and older over 5 years*. Paper presented at the The Annual Scientific Meeting of the Gerontological Society of America, San Diego, CA

Goodrich, G. (1995). *Growth in a shrinking population: Visual impairment in the veteran population 1995-2010*. Palo Alto, CA: Psychology Service and Western Blind Rehabilitation Center. VA Palo Alto Health Care System

Saunders, G., & Echt, K. (2007). An Overview of Dual Sensory Impairment in Older Adults: Perspectives for Rehabilitation. *Trends in Amplification*,



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