

CATSS Newsletter - Center for Applied and Translational Sensory Science
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CATSS: Center for Applied and Translational Sensory Science

CATSS Newsletter
October, 2019

FROM THE DIRECTOR

Last week it was summer, and suddenly autumn is upon us. This summer students and faculty from CATSS presented data on vision and hearing loss at conferences around the world. We're all proud of the work they're doing and pleased to have CATSS recognized as an outstanding research center. We had a good time closer to home exhibiting at the State Fair (come visit our booth next year!) and now we're deep into the fall semester. New students in the laboratory bring new perspectives and great energy. In my own work, we are actively studying the social and personal interaction effects of hearing loss for persons and their families. We're learning about ways that sensory aids might be improved so that people can maintain their most important relationships.

We hope you'll visit our website, sign up for some of our studies, or stop by to see the work in progress. Send us your ideas and insights, as the perspective of consumers and family and friends are important to us. We can learn a lot from one another.

All the best for a great fall season,

Peggy Nelson

INTRODUCING JORDAN BEIM

Dr. Jordan Beim has taken over for Andy Byrne as the CATSS/MSP lab coordinator. In addition to supporting the CATSS and MSP labs, Jordan also works as a postdoctoral research associate with Dr. Andrew Oxenham. Jordan's postdoctoral work is sponsored in part by Advanced Bionics, where he works to provide open-source software tools for an upcoming cochlear implant hackathon. Jordan is also working on other projects measuring frequency selectivity in cochlear implant users and making wideband measurements of the middle-ear-reflex. Jordan received his PhD in Psychology from the University of Minnesota working with Dr. Andrew Oxenham and Dr. Magdalena Wojtczak. His thesis work focused on examining the effects of selective attention on cochlear processing. Jordan is a Minnesota native and lives in St. Paul with his wife Dr. Michelle Chen. Together they enjoy spending time with friends and family, exploring the world through travel, and raising their cat Bella.

NRT TRAINING PROGRAM DEVELOPS SCIENCE COMMUNICATION PARTNERSHIP WITH ABIITAN MILL CITY RETIREMENT HOME

Abiitan Outreach Doctoral students in the NRT training program in Sensory Science have developed a science communication partnership with residents at Abiitan Mill City, a retirement community in downtown Minneapolis. NRT students conduct a "journal club" that meets regularly to discuss pre-selected scientific articles from the popular press. Students help residents explore ways of determining the credibility of stories through focused discussions and by providing more in-depth background on the topics, with the goal of enabling residents to better determine what constitutes "good" science.

The Abiitan outreach program initially began as an opportunity for students to give presentations on their research, but it has gradually evolved into a forum that allows residents to ask questions and discuss

scientific literature relevant to their own lives and interests.

SPATIAL LOCALIZATION IN OLDER ADULTS WITH SINGLE AND DUAL SENSORY IMPAIRMENT

- By Yingzi Xiong and Doug Addleman

The ability to locate visual and auditory stimuli is important in many everyday tasks. While localization may be taken for granted in many healthy adults, many forms of sensory impairment result in difficulty localizing stimuli in the impaired modality. Diseases like macular degeneration, for example, can lead to missing stimuli in certain locations, and hearing loss can make it hard to accurately locate sounds of interest. Less well understood, however, is how sensory impairments affect localization of stimuli in other sensory modalities or of multisensory objects. For instance, does visual impairment prevent accurate localization of a car that can be both seen and heard, or can the sound of the car be used to compensate for poor visual localization? A group of researchers including Dr. Gordon Legge, Dr. Peggy Nelson, Dr. Yingzi Xiong, and graduate student Doug Addleman are addressing this and related questions with an audiovisual localization task conducted in CATSS in populations of older adults with hearing loss, visual field loss, and dual sensory loss.

Spatial Localization

Spatial localization is largely intact in healthy older adults.

A group of older subjects with normal vision and hearing had similar localization performance with a control group of young subjects. When localizing a multisensory object, the older and young groups utilized the same strategy, which was to primarily rely on vision. Interestingly, older subjects appeared to rely more on their visual sense even when localizing a purely auditory stimulus - they make more errors and were more uncertain about their responses when localizing sounds while blindfolded.

In addition to the impairments in localizing stimuli caused by sensory loss, dual sensory loss causes problems not seen in either vision loss or hearing loss alone.

Subjects with hearing loss made larger sound localization errors, and were more variable in their responses, compared to their age-matched peers with normal hearing. Subjects with vision loss were still fairly accurate in reporting the location of visual targets, but they became more variable in their responses as visual acuity deteriorates. Besides these deficits in vision and auditory localization, subjects with dual sensory loss also exhibited more "source confusions" - they showed larger discrepancies in their perceived locations of a sound and a light that essentially came from the same location.

Impaired vision is still valuable for facilitating auditory localization.

As in older subjects who had normal vision and hearing, subjects with sensory impairment also localized sounds better when they were not blindfolded. This encouraging finding indicates that despite reduced visual acuity, impaired vision is still valuable for distant tasks such as determining the whereabouts of sounds.

Ongoing projects

Inspired by these findings, the research team is conducting several projects to further explore the impacts of sensory impairment on spatial localization.

- Ongoing project 1: Extending current findings to real-life contexts. In collaboration with clinicians and occupational therapists, the research team is designing real-life localization tasks in residential areas.
- Ongoing project 2: Exploring the impact of the "source confusions" on social interactions. Do people with dual sensory loss, who exhibit such source confusions in lab tasks, "mismatch" the speaker and the voice when talking to multiple people in a real-world setting?

EMAIL: catss@umn.edu
PHONE: 612-624-7846

catss.umn.edu

S39 Elliott Hall
75 East River Parkway
Minneapolis, MN

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