UNIVERSITY of WASHINGTON

Undergraduate Research Symposium May 17, 2019 Mary Gates Hall

Online Proceedings

POSTER SESSION 1

Commons East, Easel 80

11:00 AM to 1:00 PM

Self-Disclosure and Physiological Responses among Adults who Stutter

Sulema Rodriguez, Senior, Speech and Hearing Sciences, General Science, Portland State University
    McNair Scholar
Mentor: Megann McGill, Department of Speech and Hearing Sciences, Portland State University

Stuttering is a fluency disorder which is characterized by prolongations, repetitions, and blocks, which disrupt the flow of speech (Guitar, 2014). There are multiple factors affecting stuttering, including physiological, psychological, environmental, and linguistic (Guitar 2006; 2016; Kang et.al, 2010; Sitek et.al; Smith & Weber, 2017). Self-disclosure has been shown to improve listeners' perceptions and attitudes towards people who stutter in a positive manner (e.g., Byrd, McGill, Gkalitsiou, & Cappellini, 2017; Byrd, Gkalitsiou, McGill, Kelly & Reed, 2016; Lincoln, Brinker-Katz, 2017). Yet, limited research has explored the physiological and affective changes that speakers who stutter experience when they self-disclose (or do not self-disclose) their stuttering. Bowers and colleagues (2012) examined the relationship between anticipatory autonomic arousal and stuttering during reading tasks. They found that people who stutter presented with decreased skin conductance when stuttering was eliminated. They also reported that people who stutter exhibited increased final heart rate deceleration when a skin conductance response occurred. Bowers et al. (2012) concluded that physiological responses were best determined by the anticipation/possibility of stuttering, rather than speech outcome (fluent or stuttered). These results suggest the importance of further exploring the anticipation of stuttering and its effects on the speaker who stutters in a variety of contexts (other than reading). In the proposed study, we will ask participants to report speaking situations in which they feel least to most comfortable and we will monitor their physiological and affective responses within those situations. Participant self-report of speaking situations will enable ecological validity and inform our clinical practice. We hypothesize that speaking situations participants rate as "least comfortable" will elicit increased heart rate deceleration during a stuttering moment and decreased skin conductance when stuttering moment is finished.

POSTER SESSION 1

Commons East, Easel 49

11:00 AM to 1:00 PM

Measuring Public Perception of Smartphone Based Language Learning Applications and Their Effectiveness in the Language Development of Dual Language Learners

Shina Jinn Cook, Senior, Speech and Hearing Sci (Com Disorders)
Jiaharn Choo, Senior, Speech and Hearing Sci (Com Disorders)
Celine Chien, Fifth Year, Speech & Hearing Sciences
Mentor: Amy Pace, Speech and Hearing Science

In the last two decades, the number of dual-language learners (DLL) in the United States has increased dramatically, with a significant portion being children. With the growing ubiquity of smartphones and tablets in a technology-driven society, there has also been a rise in the popularity of smartphone-based language learning apps, such as Duolingo. As a newer concept in the field of language acquisition, there is a lack of research on the effectiveness of using a language learning application to aid in a DLL's language development. The purpose of this project was to evaluate how individuals utilize language learning apps, and predict the applicability of Octo, a language app designed for caregivers of Mandarin-English DLLs. Differing from the format of traditional language learning apps, Octo is designed to be a way for caregivers, who have little to no exposure to Mandarin at home, to add Mandarin into the learning environment of the DLL during daily interactions. By surveying the general population using an online survey, we had discovered the range of perspectives regarding parental use of language learning apps with their children. The survey also provided data regarding the user interface and content of the Octo app itself, which will provide additional information on the applicability of this particular app. By evaluating the general views of language learning apps and the user experience of Octo, we were able to predict the likelihood of use for caregiver-implemented language learning apps for children, specifically Octo. By understanding the public views surrounding language learning apps and their use with young DLLs, there can be a deeper understanding of the applicability of DLL language learning applications as well as the general patterns of development in bilingual children.

POSTER SESSION 2

Commons East, Easel 50
1:00 PM to 2:30 PM

Methods for Improvement of Bone Conduction Auditory Brainstem Response Measurements
Aoi Anne Hunsaker, Senior, Speech and Hearing Sci (Com Disorders)
    Mary Gates Scholar
Mentor: Andrew Brown, Speech & Hearing Sciences

Humans hear sound through two main pathways: air conduction (AC) and bone conduction (BC). The AC pathway is dominant under normal listening conditions, but conductive hearing loss (e.g. outer/middle ear diseases) impairs one's ability to hear by AC. BC hearing aids can improve hearing under such conditions. To determine the presence of a conductive hearing loss, BC hearing thresholds must be compared to AC thresholds. For populations that cannot respond reliably to behavioral audiometric testing (e.g. infants, elderly, individuals with cognitive impairments), clinicians instead record sound-evoked brainstem activity through the auditory brainstem response (ABR) test. While AC ABR test results are clinically reliable, BC ABR test results suffer from electrical artefacts generated by the BC transducer and variable ABR waveform morphology. Therefore, determining the presence of a conductive hearing loss by comparing AC and BC ABRs is often unreliable. This study aimed to (1) reduce the severity of electrical artefacts present in the early BC ABR waveform (Wave I/II) by shielding bone-vibrating transducers (Radioear B81) with MuMETAL and (2) improve the quality of the ABR signal by using 'chirp' stimuli (ascending frequency sweep) to enhance the summating amplitude of auditory neural responses. Ongoing measurements leverage three transducer types in total (shielded and unshielded BC, earphone AC) and three stimulus types (chirps, constant-frequency tone bursts, and broadband "clicks") to evaluate main and combinatorial effects of the transducer and stimulus on BC ABR data quality. Early indications show that shielding the BC transducer does not materially change its frequency response. Therefore, any observed changes in the BC ABR waveform can be attributed to electrical shielding and/or stimulus modifications per se and not to unintended changes in transducer acoustic output. Data will inform efforts to improve the clinical reliability and utility of BC ABR measures for detection and treatment of conductive hearing loss.

POSTER SESSION 2

Commons East, Easel 78
1:00 PM to 2:30 PM

The Effect of Age on Spectro-Temporal Modulation Sensitivity
Erica Joanne Eng, Senior, Speech and Hearing Sci (Com Disorders)
Mentor: Christi Miller, Speech and Hearing Sciences

Individuals with hearing loss have a much greater difficulty understanding speech in noisy environments than their normal hearing counterparts, leading to reduced participation in communicative activities and a lower quality of life. Audibility explains some of the difficulty this population experiences, but even with audibility recovered by hearing aid amplification, impairments exist in spectral and temporal processing. The extent of spectral and temporal processing impairment is captured in detection of spectro-temporal modulations, which is closely related to speech understanding in noise. This study explores the potential effect age has on STM sensitivity, while controlling for severity of hearing loss. In order to investigate, we measured STM sensitivity in participants with a hearing loss across a wide age range. In the STM test, they are asked to listen to two sounds, a broadband noise and the same broadband noise with spectro-temporal modulation applied, and identify which sound contained modulations. The modulation applied will adaptively change based on response accuracy until the listener can no longer discriminate between the two sounds. A multiple linear regression model is used to analyze the data, with predictors of hearing loss severity and age. We expect to see a decline in STM threshold with age, independent of hearing loss status. The results are discussed in terms of potential for future clinical application and the ability to better the quality of hearing aided listening.

POSTER SESSION 4

Commons East, Easel 47
4:00 PM to 6:00 PM

Preliminary Reliability of an Instrument to Measure Patient-Provider Communication During Simulated Medical Interactions Involving Patients with Communication Disorders
Aj Sherman, Senior, Speech and Hearing Sci (Com Disorders)
Mentor: Michael Burns, Speech and Hearing Sciences
Mentor: Carolyn Baylor, Rehabilitation Medicine

While medical education currently teaches students effective patient-provider communication, it lacks specific training for effective interactions between healthcare providers and patients diagnosed with communication disorders (PCDs), such as dysarthria from Parkinson's disease. Poor patient-provider communication involving PCDs results in negative patient outcomes. PCDs are at increased risk for medical errors, often report a loss of autonomy, and are less satisfied with their healthcare services compared to those without commu-

nication disorders. To address this potential gap in medical education, a training program focused on improving patient-provider communication involving PCDs was conducted with second-year nursing students at the University of Washington. Pre- and post-training simulated medical interactions between nursing students and standardized patients trained to portray dysarthia from Parkinson's disease were video-recorded. The purpose of this study was to evaluate preliminary inter- and intra-rater reliability of a newly developed rating tool designed to evaluate specific aspects of nursing student communication demonstrated pre- and post-training during these interactions. One speech-language pathologist (SLP) and two SLP graduate students volunteered to each rate a randomized series of twenty, 10-minute video-recorded interactions between nursing students and standardized patients portraying dysarthria. After watching a brief orientation video on how to use the instrument, the participants rated twenty videos, blinded to whether each video was pre- or post-training. Additionally, they were given two final videos to re-rate in order to assess intra-rater reliability. Data collection is still underway. However, after four initial videos were rated by all three raters, preliminary inter-rater reliability calculations have suggested a high level of reliability (ICC = .93). If the instrument demonstrates a high level of inter- and intra-rater reliability, we can use the results of these ratings in future research to validate the instrument and determine the effectiveness of the training program on improving patient-provider communication during medical interactions.