

SPHS STUDENT RESEARCH DAY 2026



School of Medicine

AGENDA

12:00	-	12:30pm	Registration & Poster Set Up
12:40	-	12:50pm	Opening Remarks
12:50	-	1:15pm	PhD Oral Presentations
1:15	-	1:40pm	Featured Student Presentation
1:40	-	1:50pm	Peters Award
1:50	-	2:30pm	Adjourn to refreshments
2:30	-	3:00pm	Poster Session A
3:00	-	3:30pm	Poster Session B
3:30	-	4:55pm	David E. Yoder Symposium
4:55	-	5:00pm	Excellence in Research Communication Award

**April 27, 2026
12:00 - 5:00pm
Roper Hall
Active Learning Theatre**

PHD ORAL PRESENTATION



Audrey McMillion

**What Makes an AAC System
“Robust”? : Speech-Language
Pathologists’ Opinions**

Faculty Mentor: Dr. Karen Erickson

The overall purpose of this proposed study is to ask practicing pediatric speech-language pathologists (SLPs) to describe what they find to be “robust” in an augmentative and alternative communication (AAC) system. Overall, the research question being asked is “what makes an AAC system “robust”? The sub-questions that will be explored are: “What are features and examples of “robust” AAC systems? What speech therapist factors (e.g. training, experience, caseload) influence their opinions about the robustness of an AAC system?” Fifteen practicing pediatric SLPs who work with children aged 1 to 18 who use AAC will be recruited. Forty-five to sixty minute semi-structured interviews will be conducted with consenting SLPs. During the interviews, participants will be asked to describe important features of AAC systems that are “robust” or “not robust”, describe considerations they think are important when identifying and developing an AAC system for a client, and describe processes or features they use when introducing a robust AAC system. Participants will also be asked to review example AAC systems and discuss whether or not they find the systems to be “robust” and explain their responses. The interviews will be transcribed and analyzed using constant comparison and thematic coding. Resulting preliminary themes and findings will be subject to member checking.

PHD ORAL PRESENTATION

Krystal Speights

**Supporting Clinician Implementation
of the FOURC Model in Outpatient
Neurorehabilitation: A Mixed
Methods Intervention Study**



Faculty Mentor: Dr. Katarina Haley

This study will examine how training speech-language pathologists (SLPs) in the FOURC model influences clinical practice in outpatient neurorehabilitation. Emotional factors such as anxiety and depression are highly prevalent following stroke and are associated with reduced participation and poorer rehabilitation outcomes. Although SLPs recognize the importance of addressing psychosocial factors, many report limited confidence and lack structured approaches for integrating these elements into therapy. The FOURC model, grounded in self-determination theory, provides a framework for incorporating skills and abilities, intentional strategies, environmental supports, and motivation and confidence into participation-focused care. A convergent mixed methods intervention design will be used. Licensed SLPs working in outpatient neurorehabilitation will participate in baseline surveys and semi-structured interviews examining current practices, perceived barriers, and clinician confidence. Following baseline data collection, participants will complete a structured FOURC training program and engage in a 12-week implementation period. Post-intervention, surveys and interviews will be repeated to assess changes in clinician knowledge, confidence, and self-reported use of participation-focused practices. This study aims to evaluate whether FOURC-based training supports more holistic, participation-driven clinical practice and addresses a critical gap between theoretical frameworks and real-world implementation in speech-language pathology.

FEATURED STUDENT PRESENTATION

Soomin Kim

**Nonmainstream American English
Features in Conversational Speech
of Left-Hemisphere Stroke Survivors**

Faculty Mentor: Dr. Katarina Haley



Background: Nonmainstream American English (NMAE) dialects, including African American English and Southern English, have linguistic rules that are distinct from Mainstream American English. The differences include phonology and grammar. Understanding clients' dialect use is crucial for aphasia care because some NMAE features resemble aphasia symptoms, making accurate diagnosis challenging. **Objective:** This study examined the NMAE dialect density measures to describe to what extent left-hemisphere stroke survivors produce NMAE features. **Methods:** We analyzed conversational speech samples from 100 left-hemisphere stroke survivors stratified based on race, geographical origins, education levels, and aphasia severity levels. NMAE features were coded at the utterance level using a checklist of 12 phonological and 23 grammatical features. Dialect density was quantified using two measures: number of distinct NMAE feature types per 100 utterances, and total number of NMAE feature tokens per 100 utterances. **Results:** On average, participants use 5.15 distinct NMAE features and a total of 14.85 times per 100 utterances. Race, geographic origins, and education levels influenced the degree of producing NMAE features. People with mild aphasia produced more NMAE features than people with moderate or severe aphasia. Phonological NMAE features were more variously and frequently used than grammatical NMAE features. **Conclusions:** Left-hemisphere stroke survivors preserve NMAE features in their speech, though dialect density varies substantially across individuals. The variance can be explained by race, geographic origins, education levels, and aphasia severity levels. These findings inform the importance of dialect-robust aphasia assessment.

DAVID E. YODER

SYMPOSIUM

**Dave Eddins,
PhD, CCC-A**

**Engagement in research
and discovery in SPHS:
broad opportunities,
environments, roles,
support, and
collaborations**



Clinicians and scientists in communication sciences and disorders have wide array of opportunities for engagement in research and discovery. The possibilities are only limited by our imaginations. Exciting and meaningful research can be conducted in nearly every environment in which an SLP, AuD, or related discipline is employed. Examples from several diverse environments are considered, including clinical, laboratory, and commercial environments. These examples will illustrate the many diverse funding sources that can support individual and collaborative research programs. Descriptions will highlight the variety of roles that professionals can play in research, as well as differing levels of effort and commitment. Those descriptions will reflect experiences of the presenter as well as observation of notable interprofessional research programs that are impacting the field and shaping the future. An emphasis will be on interprofessional collaborations among audiologists, speech-language pathologists, and engineers. These will include topics such as: development and implementation of evidence-based diagnostic and outcome measures for use by the voice clinician; discovery and development of affordable and accessible tools for assessing respiratory function; neural bases of benefit from AI-driven hearing aid noise reduction.

POSTER PRESENTATIONS

POSTER SESSION A

(POSTER NUMBERS 1 - 10)

2:30 - 3:00PM

POSTER SESSION B

(POSTER NUMBERS 11 - 20)

3:00 - 3:30PM

POSTERS WILL BE PRESENTED IN THE ACTIVE
LEARNING THEATRE IN ROPER HALL.



Poster Session A

1. Individual and Therapy Level Factors: A Critical Review of Impact on Neurocognitive Outcomes Following Pediatric mTBI

Elise Bourdeau, Anne-Estelle Strawn, & Emma Tomlinson

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Background: Neurocognitive outcomes for children who sustain mild traumatic brain injury (mTBI) are dependent on a variety of factors. These can include individual child factors such as a prior mTBI, preinjury behavioral problems, co-occurring conditions, and intervention related factors such as assessment and treatment intervention.

Question: The purpose of this literature review was to explore school aged children who sustain a concussion and how individual based factors (e.g. prior mTBI, behavioral problems) compared with therapy-based factors (e.g. assessment choice, treatment choice) affect neurocognitive outcomes? Methods: A literature review was conducted via PubMed, a database of allied health literature. The database search yielded 443 results. After conducting a preliminary abstract review, we ended up with 96 articles. After researchers reviewed articles as a team, 10 articles were determined to contain relevant information pertaining to the research question. Key Findings: Intervention-based studies showed a general improvement in neurocognitive outcomes. Some studies looking at individual based factors showed improved outcomes but not all. Credible research has been found to support both individual and intervention-based factors having an impact on neurocognitive outcomes and post concussive symptoms.

Conclusions: This review indicated that clinicians cannot separate individual and treatment-based therapy when looking at neurocognitive outcomes because they inherently impact each other. Holistic therapy approaches are important in all domains within the SLP scope of practice. Importantly, this critical review revealed the importance of holistic approaches in mTBI treatment, and that clinicians should not just rely on individual factors or a single therapy to maximize outcomes.

2. Inclusive Hearing Care: Language Accessibility in Audiologic Evaluation

Hayley Krush, Amelia Saccomandi, Kia Simms, & Mia VanDeurzen

Faculty Mentors: Dr. Hannah Siburt, Dr. Hannah McLean, & Dr. Nancy Quick

Developmental disabilities are prevalent among pediatric patient populations receiving audiological care, and developmental disabilities frequently co-occur with hearing impairment. There is limited research and guidance for accessible language in audiological testing for patients with reduced language processing skills. This can result in exclusion from accessing medical information. Additionally, inaccessible language can compromise a patient's ability to participate effectively in testing leading to misdiagnoses, over reliance on sedated testing techniques, and an unnecessary delay

in receiving care. Our project examines the accessibility of language in audiological instruction scripts used by healthcare professionals. Employing intentionally accessible language promotes accurate and efficient testing outcomes, reduces anxiety and confusion for the patient, and strengthens trust in patient-provider relationships. To assess current practices, existing sample scripts for standard audiometric assessment were analyzed and systematically coded based on predetermined accessibility criteria for written language. For this study, accessible language is defined as presenting information about the test battery using terms and language structures understandable to someone with a third-grade reading level. This study proposes a new perspective on how audiologists can ensure test instructions are accessible and designed to support the specialized needs of patients with intellectual and developmental disabilities. This project is led by four LEND trainees in the Doctor of Audiology program at UNC Chapel Hill, with mentoring provided by faculty.

3. Influence of Mapping Procedure on the Performance of Adult Cochlear Implant Users with Unilateral Hearing Loss

Madison E. Broome, Margaret E. Richter, Amanda D. Sloop, Samantha P. Scharf, Andrea B. Overton, Nicholas J. Thompson, Morgan Selleck, Matthew M. Dedmon, Kevin D. Brown, & Margaret T. Dillon

Faculty Mentor: Dr. Margaret Dillon

Cochlear implant (CI) users with unilateral hearing loss (UHL), including cases of single-sided deafness, experience significant improvements in speech recognition and spatial hearing when listening with the CI as compared to preoperative abilities or when in an unaided condition. Outcomes vary across individuals, which may be due to various factors including the CI mapping procedure used to assign bandpass filters. The default mapping procedures used clinically often result in frequency-to-place mismatches, which are differences in the frequencies allocated to a channel filter and the natural tonotopicity of the cochlea for the specific electrode. Previous research has found that larger frequency-to-place mismatches are significantly associated with poorer performance. We hypothesized that individualizing the bandpass filters for CI users with UHL would result in better performance than default maps early after device activation, and the performance gap would decrease over time due to acclimation. CI users with UHL were randomized at device activation to receive a default or place-based map based on postoperative CT imaging. Participants completed measures of speech recognition and spatial hearing during the first 6 months of CI use. At the 1-month interval, the place-based group had significantly better sound source localization than the default group, with no group differences in speech recognition. At the 6-month interval, the place-based group had significantly better vowel recognition with the CI alone and masked speech recognition in the bilateral condition. These results demonstrate the influence of mapping procedure on outcomes for CI users with UHL and the benefits of individualizing the bandpass filters to support individuals in achieving their own best outcomes with the device.

4. Speech-Language Outcomes and Risk Factors in Healthy Preterm Infants

Grayce Simpson, Haley Sinclair, & Ava Richardson

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Background: Infants born prematurely (before 37 weeks of gestation) are at increased risk for a range of developmental delays, including deficits in speech and language. While these delays are often associated with co-occurring developmental conditions, it is important to isolate prematurity as an independent risk factor to better understand language outcomes in otherwise healthy preterm infants. Aim: This literature review aimed to answer the question: Among healthy pre-term infants, is the risk of developing speech-language disorder higher compared with full-term infants? Method: A systematic search of the PubMed database initially yielded 121 articles. After applying a publication date filter, 96 articles remained. Following abstract screening and the exclusion of systematic and literature reviews, 10 studies met the inclusion criteria and were selected for analysis. Results: Synthesis of findings across these global studies suggests that, on average, healthy preterm infants demonstrate reduced language abilities relative to full-term children when assessed at comparable adjusted gestational ages. Several secondary risk factors for language delay were consistently identified, including male sex, lower socioeconomic status, and extremely low birth weight (<1000 g). Overall, these findings underscore the increased vulnerability of preterm infants to language delays and highlight the importance of ongoing developmental monitoring. Early identification of at-risk children is critical to facilitate timely speech-language intervention and optimize long-term communication outcomes.

5. Beyond the Bumps: How Binary and Holistic Stuttering Interventions Shape Psychosocial Outcomes in School-Age Children

Brooke E. Emerick, Rebecca C. Gould, & Malena Romero

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Background: Stuttering is an “interruption in the flow of speaking due to disfluencies characterized by whole or part-word and syllable repetitions, sound prolongations, blocks, and word production with excess tension” (ASHA 2026). Beyond dysfluent speech, negative psychosocial impacts are associated with stuttering, specifically in the school-age population (Johnson et al., 2023). Aim: In this literature review, our aim was to answer our research question, "How Do Binary and Holistic Stuttering Interventions Compare in Influencing the Psychosocial Outcomes of School-age Children Who Stutter?" Methods: We searched PubMed, CommDisDome, and The Journal of Fluency Disorders using predetermined search terms to identify articles that answered our research question. The three search engines yielded 91 articles total. Utilizing established inclusion and exclusion criteria, we identified 11 articles. Results: Through

article appraisals and data synthesis, we concluded that across studies, direct, indirect, and holistic interventions demonstrated statistically significant improvements in psychosocial outcomes. Direct approaches showed significant reductions in stuttering severity and psychosocial impact; likewise, fluency-based treatments reported reductions in percent syllables stuttered, as well as improved speech satisfaction. Indirect approaches targeting affective and cognitive components also yielded significant improvements in quality of life and peer relationships. Holistic interventions showed consistent reductions in stuttering impact. Notably, several studies found psychosocial gains even when fluency improvements were limited, suggesting that benefits exceed speech outcomes.

6. Impact of Bimodal Neuromodulation Therapy on the Self-Perceived Severity of Tinnitus for Adults with Chronic Symptoms

Hanna Brochinsky, Maggie Claghorn, & Joanna Lee

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Tinnitus is a chronic condition involving the perception of sound without any external auditory stimuli that many adults experience to varying degrees of severity. Previous research showed mixed findings regarding the efficacy of drug or cognitive therapeutic interventions, leading researchers to investigate novel approaches to alleviate symptoms, namely the use of bimodal neuromodulation processes. Bimodal neuromodulation is a FDA-approved treatment that pairs sound therapy with multisite electrical stimulation of the body to treat chronic tinnitus. The process of targeting auditory and somatosensory nerve pathways simultaneously, induces neuroplasticity to reduce the severity of symptoms. In this literature review, we asked the question: In adults with chronic tinnitus, how does bimodal neuromodulation impact self-perceived tinnitus and their quality of life? In our database search, English language articles from 2016 to 2025 containing the terms “bimodal neuromodulation” or “Lenire” and “tinnitus” were compiled. Additional articles were collected using a reference search across the studies obtained during the initial database query. The data collected across articles was measured using questionnaires that assess the participants’ subjective perception of their tinnitus, known as the Tinnitus Handicap Inventory (THI) and Tinnitus Functional Index (TFI). The responses collected from these questionnaires were used to conduct a systematic literature review of the subjective rating of how the participants’ tinnitus changed after implementing bimodal neuromodulation therapies. Based on the findings from the literature review, bimodal neuromodulation reduces tinnitus severity, with superior effects over sound-only therapy; however, current methods and limited long-term data necessitate standardized protocols and further research.

7. AI in AAC on the Open-Source Design and Programmer Interface

Hsiao-Ting Su

Faculty Mentor: Dr. Karen Erickson

This session explores the integration of artificial intelligence (AI) in augmentative and alternative communication (AAC) interfaces, focusing on using the Open-Source Design and Programmer Interface (OS-DPI) platform. The session demonstrates AI plug-in features on the OS-DPI, including predicting related words after entering a word, forming comments and questions after entering a few words, and predicting keywords and utterances related to the context of the photo after uploading a photo. The application of AI plug-ins within graphic symbol-based UIs supports AAC users who have not yet learned to read and write with letters and rely on symbols to communicate, enabling them to explore and interact with AI technologies. The OS-DPI platform makes it possible to co-develop AAC interfaces with AAC users from the early stages of design, ensuring the technology meets real needs and addresses ethical concerns. The session also reviews preliminary survey results comparing different large language models and their potential impact on AAC output. Join us to explore AI in AAC using the OS-DPI platform for more effective and inclusive AAC designs.

8. Hearing Loss as a Predictive Risk Factor for Sleep Disorder Diagnoses in Children with Neurodevelopmental Disorders

Brooke Willse

Faculty Mentor: Dr. Julia Drouin

Children with neurodevelopmental disorders (NDDs) experience disproportionately high rates of diagnosed sleep disorders. It is also well established that children with hearing loss experience sleep-related impairments at higher rates compared to age-matched peers. Moreover, NDDs are highly prevalent among children with hearing loss; it is estimated that 30–40% of pediatric patients with hearing loss have a co-occurring NDD. Autism spectrum disorder, attention-deficit/hyperactivity disorder, and Down syndrome show a particularly high prevalence of this co-occurrence. The goal of this study was to evaluate hearing loss as an additional risk factor for sleep disorder diagnoses among children with NDDs. This retrospective chart review leveraged TriNetX health research network to query electronic health record data from the University of North Carolina (UNC) Healthcare System. Pediatric patients (ages 0–18) with attention-deficit/hyperactivity disorder, autism spectrum disorder, and Down syndrome were identified and stratified by the presence or absence of comorbid hearing loss. Cox proportional hazards models were used to estimate comparative risk across cohorts, and additional analytic tools in TriNetX were used to assess each cohort's demographic characteristics. Across all three NDD groups, hearing loss was associated with a significantly increased risk of sleep disorder diagnoses, suggesting that hearing loss may be an important contributing factor to sleep disorder risk in children with NDDs.

9. Impact of Age at Cochlear Implantation on Literacy Outcomes: A Literature Review of Current Evidence

Sophia Blessing, Isabella Lau, & Grace Payne

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

A cochlear implant (CI) is a surgically implanted neuroprosthetic device that bypasses damaged cochlear hair cells and directly stimulates the auditory nerve to provide access to sound for individuals with severe-to-profound sensorineural hearing loss. Early auditory access is widely recognized as a critical factor in spoken language development, which impacts phonological awareness, vocabulary, syntactic knowledge, and higher-order language skills. These skills are critical for literacy development and may be affected by timing of auditory stimulation. However, the extent to which age at cochlear implantation influences long-term literacy outcomes remains an area of ongoing investigation. Given this information, the purpose of his review was to explore how age of cochlear implantation (before 42 months of age compared to at or after 42 months) affects literacy outcomes among school-aged children. A literature review was conducted through PubMed and a thorough screening process resulted in 11 articles that were then critically appraised. These 11 articles support the notion that earlier cochlear implantation leads to better language and literacy outcomes, outcomes are highly variable and influenced by multiple interacting factors, and language (especially morphosyntax) remains a persistent area of difficulty.

10. UNC Student Veteran and Military Hearing Screening Program

Kip Crozier

Faculty Mentors: Dr. Devon Weist & Dr. Katie Roberts

Hearing loss and tinnitus are among the most common service-connected disabilities in the United States, affecting millions of Veterans and Active-Duty Service Members. These conditions carry significant functional consequences, including communication difficulties, listening fatigue, and reduced academic and occupational performance. Within university settings, military-affiliated students and faculty represent a population with substantial histories of hazardous noise exposure, yet they may not routinely access audiologic care. This project implemented a hearing screening program at the University of North Carolina at Chapel Hill to better understand the auditory needs of this community and to support long-term communication success. The screening protocol included an intake survey, otoscopy, pure-tone screening, and Distortion Product Otoacoustic Emissions (DPOAEs), as well as individualized education and future recommendations. Subjective survey findings indicated high rates of tinnitus, communication challenges, and sound sensitivity. Objective results further underscored the need for continued monitoring suggesting possible early or ongoing cochlear dysfunction even among individuals who might otherwise “pass” traditional screenings. These findings highlight the value of integrating comprehensive hearing-health

initiatives within academic environments. Brief, accessible screenings can effectively identify individuals who may benefit from diagnostic testing, tinnitus management, or communication counseling. As universities continue to serve growing numbers of military-affiliated individuals, proactive hearing-health programs may play a critical role in supporting academic achievement, professional performance, and overall quality of life.

Poster Session B

11. Derived-band masking of the chirp-evoked auditory brainstem response: Effect on Wave I vs Wave V

Bridget Gorman

Faculty Mentor: Dr. John Grose

A much-cited study by Don and Eggermont (1978) found that Wave V of the auditory brainstem response (ABR) receives substantially more cochlear apical contributions than does Wave I. Their finding of greater low-frequency contributions to Wave V was based on a derived-band masking approach using click-evoked ABRs. However, their procedure was not optimized for extracting Wave I. The purpose of the present study was to reconsider their findings by replicating their general approach but with better optimization for extracting Wave I. Here, the stimulus was a wide-band chirp, and both a true vertical montage (optimal for Wave V) and a horizontal montage (optimal for Wave I) were employed. A wide-band masker was generated that had the same spectrum as the wide-band chirp. The chirp was presented at 60 dB nHL and the wide-band masker was presented at a level sufficient to obliterate the chirp-evoked ABR. A library of high-pass maskers was constructed by high-pass filtering this wide-band masker at 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8 and 12 kHz. ABRs were collected for each high-pass masker presented in pseudo-random order, and derived-band ABRs were computed by subtracting waveforms across successive high-pass masker settings. Six normal-hearing young participants provided complete data sets. Analysis of the derived-band ABRs showed little evidence of substantially more low-frequency contributions to Wave V than Wave I; this pattern differs from that of Don and Eggermont (1978). [Don & Eggermont (1978). *J Acoust Soc Am* 63, 1084-1092]

12. Treatment Options for Selective Mutism: SSRIs or Behavioral Intervention

Morgan Simmons, Camryn Torrence, & Lily Ware

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Selective mutism is an anxiety disorder characterized by a reduced ability to speak in specific social situations despite the ability to speak in other settings. Although behavioral and cognitive-behavioral interventions are considered primary treatments, pharmacological interventions such as selective serotonin reuptake inhibitors (SSRIs) have been explored as an alternative or complementary treatment option. In this clinical research project, we examined the research question: In children diagnosed with selective mutism, does treatment with selective serotonin reuptake inhibitors (SSRIs), compared to no pharmacological treatment or behavioral therapy alone, increase speech outcomes? We obtained articles through PubMed and APA PsycArticles to examine our research question and synthesize findings across studies. The literature indicates that behavioral, school-based interventions are effective in improving speaking behaviors and functional communication, indicating that individuals can express their wants and needs within their specific contexts and settings. Though pharmacological treatments may play a supportive role when used alongside these interventions, there is significant variability in how selective mutism is treated across studies with some evidence supporting the use of SSRIs, albeit these findings cannot be generalized to all individuals. Overall, the field would benefit from stronger empirical evidence and clearer, more consistent treatment guidelines for selective mutism.

13. Home Shared Reading Resources and Experiences of Children Who Need AAC in Taiwan

Hsiao-Ting Su

Faculty Mentor: Dr. Karen Erickson

The proposed session will present preliminary results from a sequential mixed-methods study designed to gain insight from parents about the home literacy experiences of their children with minimal speech. An online questionnaire was distributed to parents of children aged three to seven years who cannot rely on speech to be heard and understood in Taiwan. Parents answered questions about their child's use of spoken words, the availability of storybooks, and the frequency and duration of shared reading practices at home. These results were compared to the results of the Kids in Taiwan nationwide survey of 11,551 parents of children with no known disabilities in Taiwan. In addition, 10 parents of children who cannot rely on speech to be heard and understood volunteered after completing the survey to participate in semi-structured online interviews. These interviews explored how parents implement shared reading at home, the challenges and strategies they use during shared reading activities, and their expectations for their child's literacy development. Through a comprehensive and contextualized understanding of the resources, frequency, parental expectations, challenges, and strategies use in shared reading within these families, the study aims to promote further research on shared reading interventions for children who cannot rely on speech to be heard and understood in Mandarin-speaking contexts, ensuring that every child has the benefit of communication intervention supported through shared reading and an opportunity to learn literacy.

14. Anatomy-Based Versus Standard Cochlear Implant Mapping: Effects on Speech Perception in Adult CI Users

Madison Broome, Carnes Mathis, & Lily White

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Cochlear implants (CI) are indicated when sensorineural hearing loss is no longer adequately aided with hearing aids; however, speech perception outcomes vary widely among adult CI users. Standard CI mapping procedures often create a frequency-to-place mismatch, in which the CI's assigned filter frequencies do not align with the cochlea's natural tonotopic organization. Greater frequency-to-place mismatches have been associated with poorer auditory performance. This literature review investigated whether individualizing map parameters to cochlear place improves speech perception outcomes compared to standard mapping in adult CI users. Following a targeted database search that initially yielded 112 articles, rigorous screening for clinical relevance, and addition of commonly cited references, 12 studies were selected for final inclusion. Synthesis of these studies demonstrated that place-based mapping effectively reduces frequency-to-place mismatch. Furthermore, this individualized mapping approach was found to enhance speech perception outcomes in noisy environments and is associated with improved overall sound quality, without compromising speech perception outcomes in quiet environments. Future research is needed to delineate patient-related variables that contribute to the interpretation of speech outcomes associated with place-based mapping procedures.

15. Preschool vs. School-Age Traumatic Brain Injury: Differences in Long-Term Cognitive-Communication Outcomes

Ellie Beal, Sophia Gambill, & Jordan Goetze

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Childhood is a critical period for language development in the brain. There is an existing body of literature on cognitive-communication outcomes in adults with traumatic brain injury (TBI), but limited research focused on outcomes in pediatric populations. Specifically, outcomes based on age of onset of TBI have not been widely studied. Given the importance of brain development during childhood in cognitive and linguistic domains, we investigated how age of onset could impact cognitive communication among children who sustained a traumatic brain injury using a literature search. An initial database search yielded 4,224 articles. Further filtering yielded 87 articles that we narrowed down to 3 relevant articles. Through outside database searches and expert review of literature, we selected 12 articles to appraise. While no study specifically analyzed differences in outcomes across age groups, this project summarized results within each age group to better understand potential differences. Appraisal results revealed three main points of synthesis: Across ages, children with severe TBIs show

the greatest verbal and language deficits, with school-age children exhibiting persistent higher-level language impairments over time and preschool children demonstrating notable difficulties in expressive language, pragmatics, and social communication. These results illustrate that long-term follow-up is critical to monitor individual cognitive-communication outcomes associated with pediatric TBI. This information has relevant implications for speech-language pathologists as it informs proper assessment and intervention planning for children with TBIs.

16. A Pause, Not a Stop: Language Regression in Toddlers with High Familial Likelihood of Autism

Margaret L. McAllister, Tyler McFayden, Shruthi Ravi, Jessica Girault, Lonnie Zwaigenbaum, Robert Schultz, Annette Estes, Meghan R. Swanson

Faculty Mentor: Dr. Clare Harrop

Language development, a core pillar of social communication, has variable trajectories in autism that includes a regression or loss of skills roughly 20% of the time (Tan et al., 2021). Language regression is most frequently identified through parent report but can also be observed as a decrease in raw scores on a repeated language assessment. School-age language outcomes after regression are highly variable, but not categorically lower than in children without a language regression (Pickles et al., 2022). The current study prospectively explores the prevalence of language regression in children at high familial likelihood of autism. Participants were retrieved from a prospective, longitudinal study of infants at high and low likelihood for autism called the Infant Brain Imaging Study (IBIS). Language regression was identified in children with a parent reported regression on the Autism Diagnostic Interview Revised (ADI-R; Rutter et al., 2003) or a decrease in language raw scores on the Mullen Scales of Early Learning (MSEL; Mullen, 1995). The association between regression and diagnostic outcome was assessed using odds ratio and likelihood ratio test. We compared the later language ability of regression groups and comparison samples using ANOVAs of expressive and receptive language t-scores at the final timepoint. Among IBIS participants with complete behavioral data across two or more timepoints (n=428), parent-reported regression on the ADI-R was observed in 2.8% (n=12) and measure-defined regression on the MSEL was observed in 8% (n=36). Only one infant evidenced both parent-reported and measure-defined regression. Infants with parent-reported language regression were 2.77 times more likely to receive an autism diagnosis compared to their high-likelihood peers without language regression, 95% CI [0.83, 9.3], $p = .09$, and infants with measure-defined regression were 1.21 times more likely, 95% CI [0.51, 2.5], $p = .69$, but neither of these elevated odds reached statistical significance. For each infant in the regression sample, two nearest neighbor comparison infants were selected—one high likelihood and one low likelihood—matched on sex, maternal education, and baseline visual reception score. Among the parent-reported regression group, expressive language ability at three years did not differ from comparison samples, $F(2,33)=1.65$, $p=.208$, but receptive language ability at three years did, $F(2,33)=4.12$, $p=.025$, with both regression, $p=.03$, and high-likelihood, $p=.07$,

groups falling lower than the low-likelihood group. Among the measure defined regression group, expressive language ability at three years, $F(2,52)=15.24$, $p<.001$, and receptive language ability at three years, $F(2,60)=23.43$, $p<.001$, were lower for the regression groups, $p<.001$ with no differences between the comparison groups, $p=.74$, $p=.49$. Taken together, our results show a low prevalence of concurrent language regression in high likelihood toddlers, in contrast to higher rates (~20%) reported retrospectively. Parent- report and direct measurements of regression capture unique aspects of child language development that may not be predictive of an autism diagnosis but may indicate delayed expressive or receptive language in early toddlerhood. These language outcomes support previous findings of wide heterogeneity among those with regression.

17. Exploring the Relationship Between Cognitive Decline and Hearing Aid Use

Madison Russell, Rachel Clark, & Peyton Norris

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Cognitive decline and hearing loss (HL) are thought to be associated in older adults. Hearing aids (HA) have been proposed as a mitigation strategy for cognitive decline for those with HL; however, evidence regarding their effectiveness remains inconsistent. In this review we explored this clinical research question, in older adults with HL who are at risk for cognitive decline, how does HL treatment with HA compared to no treatment affect cognitive impairment scores on standardized tests? We hypothesized that HA use would reduce progression of cognitive decline as indexed on standardized measures of performance. To explore this relationship, we conducted a database search using PubMed with relevant search terms which yielded 250 articles and after filtering and fielding for relevance we retained 15 articles. We examined research articles exploring the relationship between HL and cognitive decline and the potential impact of HL treatment via HA. During our research, three primary themes emerged: (1) hearing interventions may help reduce cognitive decline in high-risk individuals but show less benefit for those at lower risk; (2) people with more severe HL are more likely to use HAs which may confound links between HA use and cognitive decline, as effects likely reflect baseline severity; and (3) cognitive outcomes are influenced by a complex interaction of social determinants of health, depression, and HA use. When considering HA use as a preventative measure for cognitive decline, it is important to consider risk, adherence, and social and mental health determinants.

18. Reading Comprehension Interventions for Adults with TBIs

Barbara Burns, Lauren Kelley, & Halden Levin

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Literacy, including reading and writing, is a critical skill across the lifespan because of its implications for day-to-day functioning, as well as general health and well-being. However, deficits in this skill can result from traumatic brain injuries and/or progressive conditions, while interventions to address these deficits remain lacking for adult populations in particular. Given this research gap, we investigated whether adults with traumatic brain injuries experience greater gains in reading comprehension from a strategy-based reading comprehension intervention relative to broader cognitive-communication interventions, using a literature review. We identified relevant research literature from five databases and appraised every article based on twenty criteria. From the appraised articles, three major patterns emerged: reading comprehension treatment should be highly individualized; pre-reading, reading, and post-reading strategies may increase reading comprehension; and text-to-speech may increase reading speed. Reading outcomes vary widely due to the heterogeneity of the TBI population (e.g., a subset of individuals with TBI experience alexia and/or agraphia), requiring treatments to be carefully tailored to the individual. A number of studies developed variable pre-reading, reading, and post-reading strategies to promote reading comprehension, and these strategies were generally shown to provide some reading comprehension benefits for individuals with TBI. Text-to-speech has been shown to increase reading efficiency in individuals with TBI while showing little to no impact on reading comprehension. Based upon the results and conclusions from the aforementioned articles, RCTs are a much-needed design for reading comprehension and TBIs in future studies.

19. Eating to Survive or Thrive: Rethinking Dysphagia Care for Head and Neck Cancer

Garrett Jasnicky, Grace Thomas, & Stacy Thornton

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Quality of life (QOL) is a critical consideration when working with patients diagnosed with head and neck cancer, specifically those experiencing dysphagia. Treatment approaches are highly variable, and research supporting specific dysphagia treatments, especially for patient-perceived QOL outcomes, is limited. We aimed to address this gap through the synthesis of evidence-based qualitative and quantitative outcome measures focused on patient and caregiver perspectives in head and neck cancer dysphagia management. To address this gap, we approached our research with the question: in head and neck cancer patients with dysphagia, does dysphagia management guided by patient preferences compared to standard of care increase patient and caregiver satisfaction? We searched EMBASE, PubMed, and Scopus for articles from 2016-2026 to retrieve eligible research studies. Search terms included dysphagia, head and neck cancer, speech-language pathology, quality of life, and QOL. We synthesized information through a standardized appraisal process, which resulted in a numerical score, as a percentage, indicating evidence strength. Three themes emerged from our synthesis of research: (1) gaps exist in patient education related to the long-term effects of head and neck cancer therapy, (2) dysphagia has a significant impact on QOL in head and neck cancer patients, especially long-term feeding and nutritional burden, and

(3) there is a significant need for a standardized, reliable protocol for dysphagia care that still honors patient autonomy. Findings indicate the importance of integrating patient education regarding long-term effects of treatment options in dysphagia care.

20. Speech and Language Outcomes in Pediatric Cochlear Implant Users: Comparing Auditory-Verbal/Oral and Total Communication Approaches

Grace Jacobi, Zakiya Morris, & Sierra Williams

Faculty Mentors: Dr. Julia Drouin & Dr. Kimberly Jenkins

Children with hearing loss who were implanted with cochlear implants pre-lingually demonstrate variable language outcomes influenced by multiple contributing factors. One crucial factor is the primary communication approach chosen by that child's family. The purpose of this clinical research project was to conduct a comprehensive literature review to assess the impact that different communication modalities — specifically auditory verbal/oral and total communication approaches— have on speech and language development. We conducted a database search, and after filtering for inclusion, we had 15 articles for the literature review. Following this thorough examination, we found that the majority of existing research shows that children using oral communication tend to have better speech articulation and intelligibility outcomes compared to those who utilize total communication. However, many studies highlight the advantages of total communication in supporting language and phonological memory, expressive vocabulary, and cognitive development. It is important to note, though, that a child's communication modality is not the only factor in determining their speech and language outcomes. Current research emphasizes the contributing impact of socioeconomic status, parental communication mode, parental level of education, and the child's educational environment.

ACKNOWLEDGEMENTS

**SPHS STUDENT RESEARCH
DAY IS MADE POSSIBLE
THROUGH GENEROUS
SUPPORT FROM THE
DIVISION AND THE DAVID E.
YODER FAMILY**

**ORGANIZING COMMITTEE:
DR. JULIA DROUIN
DR. KIMBERLY JENKINS
DR. KATARINA HALEY
DR. JESSICA STEINBRENNER
DR. ADAM JACKS**

**COMMUNITY SUPPORT:
DR. HANNAH SIBURT
KIMBERLY CAPRI
KAYLA RANKIN
ADAM SHIREY**