

Bhavana Bhat - Research Statement

Research Goals

My long- term research goals are to understand the underlying deficits in developmental speech disorders through a comprehensive assessment of children with speech sound disorders (SSD). This is an applying a process-oriented method in diagnosis and use it to improve treatment planning and outcomes of various existing treatment techniques.

Traditional assessment processes primarily focus on behavioral symptoms, and current treatment strategies often address only these surface-level symptoms. Consequently, current approaches fail to address the heterogeneity presentation of symptoms in speech sound disorder. My research integrates behavioral, acoustic, and imaging methods to identify individual profiles of children with SSDs and use these findings to improve treatment outcomes

Past Experience

As a former speech-language pathologist (SLP), I gained first-hand experience working with children with speech sound disorders. This clinical experience provided valuable insights into the challenges faced by SLPs, children, and families, motivating me to pursue research in this area.

My previous research experiences include being the lead author of a study that focused on the impact of reduced speech intelligibility on the activity and participation levels of adults with oral and oropharyngeal cancers using a validated questionnaire that we developed [1]. Additionally, I co-authored a paper examining the practice patterns of speech-language pathologists using Videofluoroscopy in India [2]. Recently, I co-authored two papers investigating task effects and phonological error patterns in Australian English Dutch bilingual children [3] and intrinsic fundamental frequency in Dutch children with CAS [4].

Current and Ongoing Research

1. Data driven approach to understand speech sound disorders

Use of supervised machine learning statistical approaches and use a profile oriented approach to create a comprehensive profile of strengths and weakness of a child with speech sound disorder. We plan to study patterns of performance across subtypes of speech sound disorders and identify underlying deficits that could help in treatment planning of speech sound disorders.

2. Understanding somatosensory perception for speech motor control

For this, I am working on developing novel tasks that can assess somatosensory perception, specifically lingual proprioceptive acuity. This addresses a critical gap: methods to assess lingual proprioceptive acuity are limited, and research on the relationship between somatosensory perception and speech motor control is scarce.

For this, I am exploring correlations between behavioral (performance on somatosensory tasks) and imaging methods (such as ultrasound imaging of the tongue) to understand relationship between tongue shape complexity and somatosensory perception.

3. Investigating lingual differentiation

Another focus of my research is improving the feasibility of using ultrasound imaging of the tongue for assessment of speech sound disorders. I aim to identify covert articulatory errors and evaluate lingual differentiation across ages and population.

While previous research has analyzed tongue shape complexity in children with SSDs broadly, my research specifically investigates tongue shape complexity in children with childhood apraxia of speech (CAS) and in younger populations, allowing me to investigate developmental trends in tongue shape complexity as well.

4. Intrinsic pitch (CAS)

Intrinsic pitch, is a universal property of vowels and yet remains under-researched in children. Whether the source of this is a biomechanical origin or a phonological one is a matter of debate. Exploring intrinsic pitch in children especially speech sound disorders could be a window into understanding speech motor control in this population.

Together, each of these individual projects advance my long-term goal of understanding the comprehensive profiles- both strengths and weaknesses-of children with SSD and their subtypes such as CAS, ultimately improving diagnostic accuracy and treatment outcomes.

References

1. Krishnamurthy, Rahul, Bhavana Bhat, Priyanka Suresh Nayak, and Radish Kumar Balasubramaniam. "Videofluoroscopy practice in India: A survey of speech-language pathologists." *Dysphagia* 38, no. 1 (2023): 457-465.
2. Bhat, Bhavana, Radish Kumar Balasubramaniam, Rahul Krishnamurthy, and Rico NMP Rinkel. "Validation and Psychometric Evaluation of the Kannada Version of the Speech Handicap Index in Individuals with Oral and Oropharyngeal Cancer." *Indian Journal of Otolaryngology and Head & Neck Surgery* 74, no. Suppl 3 (2022): 5019-5027.
3. Terband, Hayo, Bhavana Bhat, and Anniek van Doornik. "Speech Sound Production in Australian English–Dutch Bilingual Children." *American journal of speech-language pathology* (2025): 1-12.
4. Terband, Hayo, and Bhavana Bhat. "Intrinsic Fundamental Frequency of Vowels in Children with Childhood Apraxia of Speech." *Folia phoniatica et logopaedica* (2025).