BIOGRAPHICAL SKETCH

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NAME: Kate Bunton, PhD, CCC-SLP

eRA COMMONS USER NAME (credential, e.g., agency login): bunton

POSITION TITLE: Associate Professor, Department of Speech, Language, and Hearing Sciences

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
University of Iowa	BS	12/1990	Speech and Hearing Science
University of Wisconsin-Madison	MS	8/1993	Communication Disorders
University of Wisconsin-Madison	PhD	5/1999	Communication Disorders
University of Arizona	postdoc	8/2002	Speech and Hearing Science

A. Personal Statement

I have the expertise, training, and motivation necessary to successfully support Dr. Long in conducting the proposed project examining the relationship between perceptual and acoustic measures in vocal production in infants. My expertise relates to vocal and speech production, specifically, the acoustic, aerodynamic, and articulatory (kinematic) study of production in infants as young as 4 months of age. As a co-PI or co-Investigator on several NIH and NSF funded grants, I have focused on understanding how the articulatory (movements of the tongue, lips, etc.), aerodynamic (air pressures and flows), and acoustic (sound) elements of the vocal tract affect speech sound production, and thus, intelligibility across the lifespan. I have successfully administered research protocols, collaborated, and produced over 34 peer-reviewed publications from each of these funded projects. The goal of my research is to develop a model that explains mechanisms underlying speech intelligibility deficits in children at risk for neuromotor impairment, which falls directly in line with the aims of Dr. Long's proposal. Also, the proposed research builds on my work documenting the development of early vocal and speech production in healthy infants and young children. Specifically, a primary arm of my research has sought to identify perceptual and acoustic correlates of velopharyngeal closure in real words versus infant babble. My experience and expertise in this area can directly support the proposed work characterizing of acoustic features in infant vocalizations. I am also a certified speech pathologist (25+years) with experience working clinically as part of an early intervention and cleft palate team. Thus, I am enthusiastic to support Dr. Long and provide expert consultation for her to learn acoustic measurements to support her clinical research with clearly defined implications for diagnosis and early intervention in developmental disabilities like cerebral palsy.

Citations:

a. Story BH, **Bunton K.** (2015). Formant measurement in children's speech based on spectral filtering. Speech Communication, 76, 93-111. doi: 10.1016/j.specom.2015.11.001. PubMed PMID: 26855461; PubMed Central PMCID: PMC4743040.
b. **Bunton K,** Story BH. (2016). Arizona Child Acoustic Database Repository. Folia Phoniatr Logo, 68(3), 107-111. doi: 10.1159/000452128. Epub 2016 Oct 27. PubMed PMID: 27784009

c. Story BH, **Bunton K.** (2017). An acoustically-driven vocal tract model for stop consonant production. Speech Communication, 87, 1-17. doi: 10.1016/j.specom.2016.12.001. Epub 2016 Dec 9. PubMed PMID: 28093574; PubMed Central PMCID: PMC5234468.
d. Story BH, **Bunton K.** (2017). Vowel space density as an indicator of speech performance. J Acoust Soc Am, 141(5), EL458. doi: 10.1121/1.4983342. PubMed PMID: 28599542; PubMed Central PMCID: PMC5724721.

B. Positions, Scientific Appointments, and Honors

Positions and Scientific Appointments

2022-Present	Director, Program for Excellence in Teaching and Learning, University of Arizona
2021 - Present	Associate Department Head, Dept of Speech, Language, and Hearing Sciences, Univ. of Arizona
2021 - Present	Member, Cleft Palate Speech Outcomes Clinical Study Oversight Panel, NIDCR
2019 - 2022	Editor, Journal of Speech, Language, and Hearing Science
2018 - 2020	Guest Editor, American Journal of Speech-Language Pathology
2016 - Present	Director of Graduate Studies, Dept of Speech, Language, and Hearing Sciences, Univ. of Arizona
2010 - Present	Associate Professor, Dept of Speech, Language, and Hearing Sciences, Univ. of Arizona
2006 - 2010	Assistant Research Scientist, Dept of Speech, Language, and Hearing Sciences, Univ. of Arizona
2002 - 2006	Assistant Research Scientist, Institute for Neurogenic Communication Disorders, Univ. of Arizona
2000 - Present	Licensed Speech Language Pathologist, State of Arizona
2000 - 2002	Post-Doctoral Fellow, Institute for Neurogenic Communication Disorders, Univ. of Arizona
1999 - 2000	Research Associate, Waisman Center, University of Wisconsin-Madison
1996 – Present	Member, American Cleft Palate-Craniofacial Association
1993 - Present	Clinically Certified Speech Language Pathologist, American Speech, Language, and Hearing Association
1993 - Present	Member, Speech Communication Technical Committee, Acoustical Society of America

Honors

2022 Teaching and Mentoring Award for Graduate Education, Graduate College, University of Arizona

C. Contributions to Science

1. **Computational modeling of acoustic and kinematic movements for speech in children.** I use computational modeling to study how children produce speech during a period of rapid growth, ages 2-6 years. Although much is known about the acoustic characteristics of children's speech, there is comparatively little known about the mechanisms available to a child for producing sounds and how those mechanisms may differ from those of an adult system. This is a collaborative project with Dr. Brad Story (Dept of Speech, Language, and Hearing Sciences, University of Arizona). We have designed a protocol and are beginning longitudinal and cross-sectional data collection from children ages 2-6 years using a recently acquired a noninvasive 3D motion capture system (NDI Wave). This system allows for collection of movement data from the tongue, lip, and jaw during speech production. This new technology is an exciting advance over the more cumbersome and invasive systems used previously, and allows for studying children's speech production, which has historically been difficult. These data will be used to inform and verify modeling efforts. This project is significant, as it will provide new information about the acoustic, aerodynamic (airflow), and kinematic (movement) factors that guide speech production development in children.

    a. Story BH, **Bunton K.** (2015). Formant measurement in children's speech based on spectral filtering. Speech Communication, 76, 93-111. doi: 10.1016/j.specom.2015.11.001. PubMed PMID: 26855461; PubMed Central PMCID: PMC4743040.
    b. **Bunton K,** Story BH. (2016). Arizona Child Acoustic Database Repository. Folia Phoniatr Logo, 68(3), 107-111. doi: 10.1159/000452128. Epub 2016 Oct 27. PubMed PMID: 27784009

c. Story BH, Vorperian HK, **Bunton K,** Durtschi RB. (2018). An age-dependent vocal tract model for males and females based on anatomic measurements. J Acoust Soc Am, 143(5), 3079. doi: 10.1121/1.5038264. PubMed PMID: 29857736; PubMed Central PMCID: PMC5966313.
d. Story BH, **Bunton K**. (2022). Intelligibility of synthetic words generated by transformation of a sequence of discrete acoustic events into modulation of the vocal tract shape. Paper presented at the Annual Meeting of J Acoust Soc Am, 152(4), A173. doi: 10.1121/10.0015931.

2. **Acoustic correlates of speech intelligibility**. A second research project is aimed at building a comprehensive account of the acoustic correlates of speech intelligibility. In short, the research goal is to identify those characteristics of the acoustic signal that pose the most difficulties for listeners in determining a speaker's intended message. Toward this goal, I am working with a computational model of speech production to simulate connected speech samples where specific acoustic features are varied systematically to determine how the changes in acoustics relate to listener identification. This project is also in collaboration with Dr. Brad Story who developed the model and will provide information about which changes explain or underlie the identification and intelligibility of speech.

   a. Story BH, **Bunton K.** (2017). An acoustically driven vocal tract model for stop consonant production. Speech Communication, 87, 1-17. doi: 10.1016/j.specom.2016.12.001. Epub 2016 Dec 9. PubMed PMID: 28093574; PubMed Central PMCID: PMC5234468
   b. Story BH, **Bunton K.** (2017). Vowel space density as an indicator of speech performance. J Acoust Soc Am, 141(5), EL458. doi: 10.1121/1.4983342. PubMed PMID: 28599542; PubMed Central PMCID: PMC5724721.
   c. Story BH, **Bunton K.** (2019). A model of speech production based on the acoustic relativity of the vocal tract. J Acoust Soc Am, 146(4), 2522. doi: 10.1121/1.5127756. PubMed PMID: 31671993; PubMed Central PMCID: PMC7064311.
   d. Story, BH, **Bunton, K.** (2021). Identification of voiced stop consonants produced by acoustically driven vocal tract modulations. JASA Express Lett. doi:10.1121/10.0005917

3. **Velopharyngeal development in infants and young children.** A third project underway in my laboratory examines the time course for development of velopharyngeal function in infants and young children. This work is in collaboration with Dr. Jeannette Hoit (Department of Speech, Language, and Hearing Sciences, University of Arizona). We have collected longitudinal data on 92 infants beginning at four months of age and continuing until approximately two years of age using a noninvasive aerodynamic (airflow) approach. Preliminary data analysis shows significant individual variability in closure that may be related to acquisition of specific speech sounds and different syllable shapes. This dataset is being used to identify reliable to identify reliable acoustic and perceptual correlates of velopharyngeal status and has implications for development of clinical tools that could be used to identify the presence of velopharyngeal difficulties in infants and young children.

   a. **Bunton K,** Hoit JD, Gallagher K. (2011). A simple technique for determining velopharyngeal status during speech production. Seminars in Speech and Language, 32(1), 69-80. doi: 10.1055/s-0031-1271976. PubMed PMID: 21491360; PubMed Central PMCID: PMC3957481.
   b. **Bunton K.** (2015). Effects of nasal port area on perception of nasality and measures of nasalance based on computational modeling. Cleft Palate Craniofacial Journal, 52(1),110-4. doi: 10.1597/13-126. PubMed PMID: 24437587; PubMed Central PMCID: PMC4440335.
   c. **Bunton K,** Hoit JD. (2018). Development of Velopharyngeal Closure for Vocalization During the First 2 Years of Life. J Speech Lang Hear Res, 61(3), 549-560. doi: 10.1044/2017_JSLHR-S-17-0208. PubMed PMID: 29490338; PubMed Central PMCID: PMC6195065.
   d. **Bunton, K.** (2018). Update on Velopharyngeal Closure in Young Children. Perspect ASHA Spec Interest Groups, 3(5), 4-12. doi: 10.1044/persp3.sig5.4

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/myncbi/1d1lzsuHgFX5G/bibliography/public/