BIOGRAPHICAL SKETCH

NAME: Antje S. Mefferd

eRA COMMONS USER NAME : meffera

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
Schule für Logopädie; Kreischa, Germany	Certified SLP	07/2000	Speech Language Pathology
University of Nebraska-Omaha; Omaha, NE	M.A.	05/2004	Speech Language Pathology
University of Nebraska-Lincoln; Lincoln, NE	Ph.D.	12/2008	Speech Science

A. Personal Statement

My long-term research goal is to delineate the articulatory mechanisms of speech intelligibility loss and recovery in talkers with dysarthria. My current research grant (R03 funded by the National Institutes on Deafness and other Communication Disorders, NIDCD) compares the tongue- and jaw-specific mechanisms of three commonly used speech treatment approaches in talkers with Parkinson's disease (PD) and Amyotrophic Lateral Sclerosis (ALS). Outcomes are expected to provide an explanatory model for the tongue- and jaw-specific mechanisms in two clinical groups (PD, ALS) with distinctly different impairment profiles.

1. Mefferd, A.S. & Green, J.R., & Pattee, G. (2012). A novel fixed-target task to determine articulatory speed constraints in persons with amyotrophic lateral sclerosis. *Journal of Communication Disorders*, *45,* 34-45. PMCID: PMC3251716

2. Mefferd, A.S. (2015). Articulatory-to-acoustic relations in talkers with dysarthria - a first analysis. *Journal of Speech Language and Hearing Research, 58(3), 576-589. PMID: 25763998*

3. Mefferd, A.S. (2017). Tongue- and jaw-specific contributions to acoustic vowel contrast changes in the diphthong /ai/ in response to slow, loud, and clear speech. *Journal of Speech, Language, and Hearing Research.* Advanced online publication DOI:10/1-44/2016_JSLHR-S-17_0114

B. Positions and Honors

Positions and Employment

2000-2001 Speech-Language Pathologist, University Medical Center Dresden, Germany
2002-2004 Speech-Language Pathologist Assistant, Laboratory of Speech and Language Disorders, Omaha, NE
2004-2007 Speech-Language Pathologist, Laboratory of Speech and Language Disorders, Omaha, NE
2004-2008 Graduate Research Assistant, Speech Physiology Laboratory (Dr. Jordan Green, Director), University of Nebraska-Lincoln, Lincoln, NE

2009-2014 Assistant Professor, Department of Communication Sciences and Disorders, Wichita State University, Wichita, Kansas
2014-present Assistant Professor, Department of Hearing and Speech Sciences, Vanderbilt University Medical Center, Nashville, Tennessee

Other Experience and Professional Memberships

2004-present Member, American Speech-Language-Hearing Association (ASHA)
2009-present Reviewer, *Journal of Speech, Language, and Hearing Research*
2010-present Reviewer, *Journal of Communication Disorders*
2010-present Reviewer, *Journal of the Acoustical Society of America*
2011-present Reviewer, *International Journal of Language and Communication Disorders*

Honors

2004 Elton S. Carter Award "Excellence in a Master's Thesis Competition" University of Nebraska-Omaha
2006 1st Prize - Herman Peter Poster Award at the International Conference on Speech Motor Control in Nijmegen, Netherlands
2007 American Speech Language and Hearing Association: Special Division 2 Registration Waiver (highest rated proposal in specialty area)
2011 Distinguished Alumni Award: Promising Professional, University of Nebraska-Omaha
2013 Stipend, "Lessons for Success" – NIH Grantwriting workshop hosted by American Speech Language and Hearing Foundation
2016 Stipend, Grant Review and Reviewer Training funded by the American Speech Language and Hearing Foundation

C. Contribution to Science

Theme 1: Advancing the effectiveness of speech treatments aiming to improve speech intelligibility in talkers with dysarthria.

The current lack of understanding about the specific mechanistic changes in response to commonly used speech treatment approaches significantly hinders the strategic selection of therapeutic interventions that can most effectively target articulatory deficits that are most disruptive to speech intelligibility in talkers with dysarthria. The overarching goal of this line of research is to delineate the articulatory mechanisms that underlie improved speech acoustics and intelligibility in response to three most frequently used behavioral treatment strategies (i.e., instructions to speak either slow, loud, and as clear as possible). So far, this work has focused on delineating these mechanisms in healthy talkers, talkers with Parkinson's disease (PD) and talkers with Amyotrophic Lateral Sclerosis (ALS) because a fair amount of kinematic and acoustic literature has been established that allows the formulation of theoretically-grounded hypotheses. One working hypothesis is that articulatory mechanisms underlying speech acoustic changes vary with the pathophysiology. So far, we provided empirical evidence that in healthy young adults, healthy older adults, and in talkers with PD speech behavioral modifications elicit tongue articulatory changes, which are tightly linked to speech acoustic changes; however, in talkers with ALS such mappings appear to be more complex. Because the jaw moves with the tongue during speech and also impacts speech acoustics and because jaw and tongue are often differentially affected in talkers with dysarthria, a logical next step is to investigate tongue- and jaw-specific contributions to speech acoustic changes in these talkers. Findings from studying tongue- and jaw-specific contributions to speech acoustics in talkers with ALS and PD are of great clinical and theoretical significance. Clinically, these findings can be used to establish a tongue-dominant (ALS) and jaw-dominant (PD) articulatory impairment type of dysarthria. These articulator-specific impairment profiles may yield distinct response patterns to commonly used behavioral treatment approaches. In future studies, these established profiles may be used to serve as templates to classify the articulator-specific impairment types of dysarthrias with much more hetereogeneous impairment patterns, such as traumatic brain injury (TBI) or multiple sclerosis (MS), which may help then guide treatment selection for these talkers based on findings from the study of speech modification-related mechanistic changes and their acoustic consequences in talkers with ALS and PD. Theoretically, such work

will help improve our conceptual understanding of dysarthria as *motor* speech disorder as well as our conceptual understanding of the mechanism underlying speech behavioral treatment approaches.

a) Mefferd, A.S. (2017). Tongue- and jaw-specific contributions to acoustic vowel contrast changes in the diphthong /ai/ in response to slow, loud, and clear speech. *Journal of Speech, Language, and Hearing Research.* Advanced online publication DOI:10/1-44/2016_JSLHR-S-17_0114

b) Kuruvilla, M.S. & Mefferd, A.S. (2017). Rate effects on speech motor control in persons with ALS. *Journal of Communication Disorders, 67,* 22-34. DOI: 10.1016/j.comdis.2017.05.002.

c) Mefferd, A.S. (2016). Associations between tongue movement pattern consistency and formant movement pattern consistency in response to speech behavioral modifications. *Journal of the Acoustical Society of America, 140* (5), 3728, DOI: 10.1121/1.4967446

d) Mefferd, A.S. & Green, J.R. (2010). The articulatory-to-acoustic relationship in response to speaking rate and loudness manipulations. *Journal of Speech Language and Hearing Research, 53*(5), 1206-1219. PMCID: PMC3548454.

e) Yunusova, Y., Green, J.R., & Mefferd, A.S. (2009). Accuracy assessment for the AG500, electromagnetic articulograph. *Journal of Speech Language and Hearing Research, 52*(2), 547-555. PMCID: PMC2866108

Theme 2: Advancing the understanding about aging- and disease-related changes in speech motor performance

Aging as well as disease can affect speech performance. When only subtle, these speech changes may not be detectable in speech acoustic or perceptual measures. Understanding aging-related changes is important because dysarthria can affect speakers of all ages. Even within a specific disease, such as Parkinson's disease, speakers can have a wide age range. Yet, current models of speech production do not account for aging-related changes. This lack of knowledge challenges the differentiation between disease-related and aging-related speech characteristics for an early and accurate diagnosis of bulbar involvement.
To address questions about aging- and disease-related changes in orofacial motor control I use models of limb motor control and adapt experimental approaches from limb studies. One of the most recent discoveries revealed that jaw and lip speed do not decline with advanced age. In fact, older adults performed better than younger adults, an observation that is in contrast to previous findings of aging-related decline in limb movement speed. Further, we showed that in talkers with ALS, decline in jaw and lip speed precedes speaking rate and intelligibility declines. Thus, kinematic measures can detect incremental disease-related changes in performance and are more sensitive than acoustic or perceptual measures. Combined these two findings yield important implications for the differentiation of disease- and aging-related progresses in the speech motor system.

a) Mefferd, A.S., Pattee, G., Green, J.R. (2014). Speaking rate effects on articulatory pattern consistency in talkers with mild ALS. *Clinical Linguistics and Phonetics, 28*(11), 799-811 PMID: 24724615

b) Mefferd, A.S., & Corder, E.E. (2014). Assessing articulatory speed performance as a potential factor of slowed speech in older adults. *Journal of Speech Language and Hearing Research, 57*(2), 347-360. PMID: 24686555

c) VanRavenhorst-Bell, H., Mefferd, A.S., Coufal, K., Scudder, R. & Patterson, J. (2017). Tongue strength and endurance: Comparison in active and non-active young and older adults. *International Journal of Speech Language Pathology, 19,* 77-86. DOI: 10.3109/17549507.2016.

A complete list of published work in MyBibliography:

http://www.ncbi.nlm.nih.gov/myncbi/collections/bibliography/47568723/?reload=publicURL

D. Research Support

Current Research Support

NIH National Institutes on Deafness and other Communication Disorders 07/01/2016- 06/30/2019
R03 Small Grant Awards
Tongue- and Jaw-Specific Contributions to Vowel Acoustic Changes: Towards a Mechanistic Model of Speech Intelligibility Loss and Recovery in Dysarthria.
The goal of this grant is to compare tongue- and jaw-specific mechanisms of three commonly used speech treatment approaches in talkers with Parkinson's disease (PD) and Amyotrophic Lateral Sclerosis (ALS) to better understand how these behavioral treatment approaches work.
Role: PI

Completed Research Support

American Speech-Language-Hearing Foundation 12/1/2012 - 11/30/2013
New Investigators Research Grant
The Effects of Speech Modification on Tongue Kinematics and Speech Acoustics in Talkers with ALS and Parkinson's disease
The goal of this project was to determine how tongue motor control is affected in talkers with ALS and PD and how changes in tongue motor control are reflected in the speech acoustic signal.
Role: PI

Internal Grant, Wichita State University 06/01/2011 – 08/31/2011
Award for Research/Creative Projects in Summer (ARCS)
Aging-Related Changes in Orofacial Motor Performance.
This project examined lip and jaw speed capacities in young, middle-aged, young-old, and very old adults.
Role: PI

American Speech-Language-Hearing Association 08/01/2009 - 12/31/2010
Advancing Academic Research Careers (AARC) Award
The goal of this award was to establish short- and long-term research objectives for a successful research career with the support of an interdisciplinary mentoring team of senior researchers.
Role: PI; Primary Mentor: Dr. Gary Weismer, University of Wisconsin-Madison