



**MADONNA  
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Rehabilitation Science and Engineering

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## **EDUCATION**

PhD (2008), Human Sciences with a Specialization in Communication Disorders, University of Nebraska-Lincoln

M.S. (1997), Speech-Language Pathology, University of Nebraska-Lincoln

B.S. (1995), Bachelor of Science in Education, Speech-Language Pathology, University of Nebraska-Lincoln

## **SELECTED ARTICLES AND BOOKCHAPTERS**

Beukelman DR, Theissen A, Koch Fager S (2021) Personalization of visual scene displays: Investigations of adults with aphasia, typical females across the age-span, and young adult males and females. *Topics in Language Disorders*. 41(3), e1-e11. doi: 10.1097/TLD.0000000000000256.

Fager SK, Burnfield JM, Pfeifer CM, Sorenson T (2021). Perceived importance of AAC messages to support communication in rehabilitation settings. *Disability and Rehabilitation: Assistive Technology* 16(7):796-801. DOI: 10.1080/17483107.2020.1736652.

Gormley J, Koch Fager S (2021) Personalization of patient-provider communication across the lifespan. Accepted, *Topics in Language Disorders*, 41(3):249-268.

Fager S, Gormley J, Sorenson T (2021). Access to AAC for individuals with acquired conditions: Challenges and solutions in early recovery. In B Ogletree (Ed), *AAC Challenges and Solutions: Improving Everyday Service Delivery (First Edition)*. San Diego, CA: Plural Publishing.

Koch Fager S, Beukelman DR (2020). Individuals with traumatic brain injury. In DR Beukelman & J Light (Eds), *Augmentative and Alternative Communication for Children and Adults (Fifth Edition)*. (627-633). Baltimore, MD: Paul H Brookes Publishing Co.

Cler G, Kokin K, Noordzij JP, Vojtech JM, Fager S (2019). Optimized and predictive phonemic interfaces for augmentative and alternative communication. *Journal of Speech, Language, and Hearing Research*, 62(7). 2065-2081. DOI: 10.1044/2019\_JSLHR-S-MS18-18-0187.

Koch Fager, S, Fried-Oken M, Jakobs T, Beukelman DR (2019). New and emerging access technologies for adults with complex communication needs and severe motor impairments: State of the science. *Augmentative and Alternative Communication*. DOI: 10.1080/07434618.2018.1556730.

Light J, Wilkinson KM, Thiessen A, Beukelman DR, Koch Fager S (2019). Designing effective AAC displays for individuals with developmental or acquired disabilities: State of the science and future research directions. *Augmentative and Alternative Communication*. DOI: 10.1080/07434618.2018.1558283.

McNaughton D, Giambalvo F, Kohler K, Nazareth G, Caron J, Fager S (2018). "AAC will give you a voice": Key practices in AAC assessment and intervention as described by persons with amyotrophic lateral sclerosis. *Seminars in Speech & Language*, 39, 399-415. DOI: 10.1055/s-0038-1669992.

Hanson EK, Fager SK (2017). Communication supports for people with motor speech disorders. *Topics in Language Disorders*, 37(4), 375-388. DOI: 10.1097/TLD.0000000000000137.

Fager S (2017). Speech recognition as a practice tool for dysarthria. *Seminars in Speech and Language*, 38(3), 220-228. DOI: 10.1055/s-0037-1602841.

Fager S, Sorenson T, Butte S, Nelson A, Banerjee N, Robucci R (2017). Integrating end-user feedback in the concept stage of development of a novel sensor access method for environmental control. *Disability & Rehabilitation: Assistive Technology*, May 19: 1-7. DOI: 10.1080/17483107.2017.1328615.

Cler M, Nieto-Castanon A, Guenther F, Fager S, Stepp C (2016). Surface electromyographic control of a novel phonemic interface for speech synthesis. *Augmentative and Alternative Communication*, 32(2), 120-130. DOI: 10.3109/07434618.2016.1170205.

Fager SK, Burnfield JM (2015). Speech recognition for environmental control: Effect of microphone type, dysarthria, and severity on recognition results. *Assistive Technology*, 27(4), 199-207. DOI: 10.1080/10400435.2015.1024349.

Fager SK, Nordness A, Delgado A, Hakel M, Barlow S, Palmer JB, & Brady S (2015). Adult neurogenic communication and swallowing disorders. In R.L. Braddom (Ed.) *Physical Medicine & Rehabilitation, 5<sup>th</sup> Edition*, (pp. 53-70). Philadelphia, PA: Elsevier Saunders.

Fager SK, Burnfield JM (2014). Patients' experiences with technology during inpatient rehabilitation: opportunities to support independence and therapeutic engagement. *Disability & Rehabilitation: Assistive Technology*, 9(2), 121-127. DOI: 10.3109/17483107.2013.787124.

Beukelman D, Gillespie L, Fager S, Ullman C (2013). Perceived attention allocation of listeners who transcribe the speech of speakers with traumatic brain injury. *Journal of Medical Speech Language Pathology*, 21(3), 261-266.

Ball L, Fager S, Fried-Oken M (2012). Augmentative and alternative communication for people with progressive neuromuscular disease. *Physical Medicine and Rehabilitation Clinics of North America*, 23(3), 689-600. DOI: 10.1016/j.pmr.2012.06.003.

Maeder McCarthy J, Fager S, Collins K, Beukelman D (2012). Representation of potential communication items in medical settings: An intervention note. *Augmentative and Alternative Communication*, 28(3), 190-195. DOI: 10.3109/07434618.2012.704526.

Fager S, Bardach L, Russell S, Higginbotham J (2012). Access to augmentative and alternative communication: New technologies and clinical decision-making. *Journal of Pediatric Rehabilitation Medicine*, 5(1), 53-61. DOI: 10.3233/PRM-2012-0196.

Fager S, Beukelman D, Fried-Oken M, Jakobs T, & Baker J (2012). Access interface strategies. *Assistive Technology*, 24(1), 25-33. DOI: 10.1080/10400435.2011.648712.

Fager S, Spellman C (2011). Augmentative and alternative communication intervention in children with traumatic brain injury and spinal cord injury. *Journal of Pediatric Rehabilitation Medicine*, 3, 269-277. DOI: 10.3233/PRM-2010-0142.

Beukelman D, Fager S, Nordness A (2011). Communication support for people with ALS. *Neurology Research International*, DOI: 10.1155/2011/714693.

Fager S, Karantounis R (2011). AAC assessment and intervention in TBI. In K. Hux (Ed.). *Assisting survivors of traumatic brain injury, 2<sup>nd</sup> Edition*, (pp. 227-254). Austin, TX: Pro-ed.

Fager S, Beukelman D, Jakobs T, Hosom JP (2010). Evaluation of a speech recognition prototype for speakers with moderate and severe dysarthria: A preliminary report. *Augmentative and Alternative Communication*, 26, 267-277. DOI: 10.3109/07434618.2010.532508.

Ball L, Nordness A, Fager S, Kersch K, Pattee G, Beukelman D (2010). Eye gaze access of AAC technology for persons with amyotrophic lateral sclerosis. *Journal of Medical Speech Language Pathology*, 18, 11-23.

Nordness A, Ball L, Fager S, Beukelman D, Pattee G (2010). Late AAC assessment for individuals with amyotrophic lateral sclerosis. *Journal of Medical Speech Language Pathology*, 18(1), 48-54.

Beukelman DR, Ball LJ, Fager S (2008). An AAC personnel framework: Adults with acquired complex communication needs. *Augmentative and Alternative Communication*, 24, 254-266. DOI: 10.1080/07434610802388477.

Yorkston K M, Hakel M, Beukelman DR, Fager S (2007). Evidence for effectiveness of treatment of loudness, rate or prosody in dysarthria: A systematic review. *Journal of Medical Speech-Language Pathology*, 15(2), xi-xxxvi.

Beukelman D, Fager S, Ball L, Dietz A (2007). AAC for adults with acquired neurological conditions. *Augmentative and Alternative Communication*, 23, 230-242. DOI: 10.1080/07434610701553668.

Fager SK, Doyle M, Karantounis R (2007). Traumatic brain injury. In Beukelman, D.R., Garrett, K.L., & Yorkston, K.M. (Eds.), *Augmentative communication strategies for adults with acute or chronic medical conditions* (pp. 131-162). Baltimore: Brookes Publishing.

Culp D, Beukelman DR, Fager SK (2007). Brainstem Impairment. In Beukelman, D.R., Garrett, K.L., & Yorkston, K.M. (Eds.), *Augmentative communication strategies for adults with acute or chronic medical conditions* (pp. 59-90). Baltimore: Brookes Publishing.

Fager S, Beukelman D, Karantounis R, and Jakobs T (2006). Use of safe-laser access technology to train head movement in persons with severe motor impairment: A series of case reports. *Augmentative and Alternative Communication*, 22, 222-229. DOI:10.1080/07434610600650318.

Fager S, Hux K, Karantounis R, Beukelman D (2006). Augmentative and alternative communication use and acceptance by adults with traumatic brain injury. *Augmentative and Alternative Communication*, 22, 37-47. DOI: 10.1080/07434610500243990.

Fager SK, Green JR, Nip I, Hakel M (2006). Facial kinematics of a speaker with a palatal lift following brainstem impairment. *Journal of Medical Speech-Language Pathology*, 14(4), 235-240.

Beukelman D, Hanson E, Hiatt E, Fager S, Bilyeu D (2005). AAC technology learning part 3: Regular AAC team members. *Augmentative and Alternative Communication*, 21(3), 187-194. DOI: 10.1080/07434610400006638.

Fager S, Beukelma, DR (2005). Individuals with traumatic brain injury. In D.R. Beukelman & P. Mirenda (Eds.), *Augmentative and Alternative Communication: Supporting Children & Adults with Complex Communication Needs* (pp. 517-531). Baltimore, MA: Paul Brookes Publishing Co., Inc.

Hanson E, Beukelman DR, Fager S, Ullman C (2004). Listener attitudes toward speech supplementation strategies used by speakers with dysarthria. *Journal of Medical Speech-Language Pathology*, 12(4), 161-166.

Hakel M, Fager S, Beukelman DR, Green J, Marshall J (2004). Nasal obturator for velopharyngeal dysfunction in dysarthria: Technical report on a one-way valve. *Journal of Medical Speech-Language Pathology*, 12(4), 155-159.

## SELECTED PRESENTATIONS

Fager S, (2021). Minimal movement: Challenges & solutions for access to AAC. *Invited Presentation, Brewer Smith Lecture in Communication Sciences and Disorders, Western Carolina University*. Cullowhee, North Carolina. Virtual Presentation. October 29, 2021.

Koester H, Fager SK, Jakobs E, Sorenson T. Designing an app for computer access assessments: Using interviews to uncover and define user needs. Presented, *Rehabilitation Engineering Society of North America*. Virtual Conference, July 8, 2021.

Light J, McNaughton D, Fager S, Koester H, Jakobs E. (2021). Emerging AAC technologies and interventions to increase access and participation. Accepted invited presentation, *International Society on Augmentative and Alternative Communication (ISAAC): Connect*. August 9, 2021.

McNaughton D, Light J, Koester H, Fager S, Jakobs E. (2021). RERC on AAC: Progress on research, development and training activities. Presented, *Rehabilitation Engineering Society of North America*. July 8, 2021.

Koch Fager S. Translational PM&R research (Part 2- Qualitative research and single subject design). *UNMC PM&R Residency Program*. Madonna Rehabilitation Hospitals, Omaha, NE. September 18, 2020.

McNaughton D, Jakobs T, Light J, Fried-Oken M, Fager S, Beukelman DR. RERC on AAC: Progress on research, development, and training activities. *Assistive Technology Industry Association*, Orlando, FL, January 31, 2020.

McNaughton D, Fager SK, Fried-Oken M, Jakobs E, Jakobs T. RERC on AAC: Progress on Research, Development, and Training Activities. *Assistive Technology Industry Association*. Orlando, FL. February 1, 2019.

Cler G, Fager SK, Stepp C (2018). A predictive phonemic interface for AAC users: A case series of performance & user impressions. *American Speech Language and Hearing Association's Annual Convention*. Boston, MA. November 2018.

Fager SK, Brumberg J, Pitt K, Heidrick L (2018). AAC technology for individuals with severe physical impairment: Current practice & future trends. *American Speech Language and Hearing Association's Annual Convention*. Boston, MA. November 2018.

Fager S, Fried-Oken M, Jakobs T, Beukelman D (2018). Improving access to AAC & other technologies for individuals with severe motor impairments. *State of the Science Conference: RERC on AAC*. Arlington, VA. July 13, 2018.

Fager S, Jakobs T, Beukelman D, Sorenson T (2018). Access and AAC: Preliminary results of a multi-access strategy. *Rehabilitation Engineering Society of North America (RESNA) annual convention*. Arlington, VA, July 14, 2018.

Fager S, Jakobs T, Sorenson T (2018). Multimodal input to enhance access to technology. *Assistive Technology Industry Association*. Orlando, FL. February 3, 2018.

McNaughton D, Fried-Oken M, Fager S, Jakobs T (2018). RERC on AAC: Progress on research, development, and training activities. *Assistive Technology Industry Association*. Orlando, FL. February 1, 2018.

Fager S, Sorenson T (2017). User-centered design in development of novel sensor access technology. *Assistive Technology Industry Association*. Orlando, FL, January 20, 2017.

McNaughton D, Fager S (2017). RERC on AAC: Progress on research, development and training activities. *Assistive Technology Industry Association*. Orlando, FL, January 20, 2017.

Dietz A, Fager S, Bourgeois M, Simmons-Mackie N, Garrett K (2016). AAC for adults with neurogenic communication disorders: An overview of recent discoveries. Invited panel presentation at the *American Speech Language Hearing Association's annual convention*. November, 17, 2016, Philadelphia, PA.

Fager S, Gormley J, Beukelman D (2016). Visual/cognitive processing demands of keyboard layouts for individuals with and without TBI. *American Speech Language Hearing Association's annual convention*. November, 19, 2016, Philadelphia, PA.

Beukelman D, Fager S, Jakobs T (2016). Supplemented communication for speakers with severe dysarthria. *International Society on Augmentative and Alternative Communication*. August 6-13, 2016, Toronto, Canada.

Beukelman D, Fager S (2016). Selection of visual images: Personal relevance. *International Society on Augmentative and Alternative Communication*. August 6-13, 2016, Toronto, Canada.

Fried Oken, M, Fager S, Jakobs T (2016). New directions in access to augmentative and alternative communication technologies for persons with minimal movements. *Rehabilitation Engineering Society of North America's annual convention*. Arlington, VA, July 14, 2016.

Fager S, Gormley J, Beukelman D (2016). Visual cognitive processing demands of ABC and QWERTY onscreen keyboards: A preliminary investigation of individuals with SCI/TBI and typical individuals. *Rehabilitation Engineering Society of North America's annual convention*. July 14, 2016, Arlington, VA.

Fager S, Carrell T, Beukelman DR (2016). Computer speech practice for dysarthria in early and late post-onset TBI. *9th World Congress on NeuroRehabilitation*. Philadelphia, PA. Presented May 12, 2016.

Light J, Fried-Oken M, McNaughton D, Jakobs T, Fager S, Beukelman DR (2016). RERC on AAC: Overview of research, development, and training objectives. *Assistive Technology Industry Association*. Presented February 4, 2016.

Fager SK, Beukelman DR, Jakobs T (2015). Integrating speech recognition into AAC technology. *American Speech Language Hearing Association's annual convention*. Denver, CO. Presented November 12, 2015.

Fager SK, Beukelman DR, Jakobs T (2015). Integrating speech recognition into AAC technology. *Assistive Technology Industry Association*. Orlando, FL. Presented January 29, 2015.

Fager SK (2015). AT outcomes: Industry perspectives on data collection (Invited panelist). *Assistive Technology Industry Association*. Orlando, FL. Presented January 29, 2015.

Fager S, Beukelman DR, Carrell T, Bates S, Dinslage T (2014). Speech recognition as a practice tool for a speaker with TBI and dysarthria. *International Conference on Motor Speech Disorders*. Sarasota, FL.

Fager S, Garrett K (2013). Stimulation, structured and compensatory AAC interventions for severe brain injury. Invited presentation. *Pennsylvania Speech Language and Hearing Association's Annual Convention*. Harrisburg, PA. Presented April 5, 2013.

Beukelman D, Fager S, King J, Hu K (2013). AAC for adults with acquired neurological conditions: Today & tomorrow. Invited presentation. *American Speech Language and Hearing Association's Annual Convention*. Atlanta, GA. Presented November 16, 2012.

Fager S, Beukelman D, Jakobs T (2012). Simplifying AAC for patients with critical medical conditions: Safe-laser keyboard and speech buttons. *International Society of Augmentative and Alternative Communication*. Pittsburgh, PA.

Fager S, Beukelman D, Jakobs T, Hosom JP (2012). Supplemented speech recognition for dysarthria: Evaluation of phase 2 prototype. *International Society of Augmentative and Alternative Communication*. Pittsburgh, PA.

Fager S, Ledoux, J, Beukelman D (2012). Evaluating preferred AAC strategies for patients in longer-term health care hospitals. *International Society of Augmentative and Alternative Communication*. Pittsburgh, PA.

Fager S, Beukelman D, Jakobs T, Hosom P (2012). Supplemented Speech Recognition for Dysarthria. *Conference on Motor Speech Disorders*. Santa Rosa, CA.

Fager S, Beukelman D, Jakobs T, Hosom JP. (2011). Supplemented speech recognition for individuals with dysarthria. American Speech Language and Hearing Association's annual convention. San Diego, CA.

Fager S (2011). New access technology for individuals with severe physical limitations using AAC. *American College of Rehab Medicine*. Atlanta, GA.

Fager S, Rodgers K (2011). Continuum of Communication Options in ALS. *Nebraska Speech Language Hearing Association's Annual Convention*. Kearney, NE.

Fager, S (2011). Transitioning to eye gaze access. *Rehabilitation Engineering Society of North America*. Toronto.

Garrett K, Karantounis R, Fager S (2010). Communication interventions for individuals with severe-profound brain injuries. *American Speech Language Hearing Association's annual convention*. Philadelphia, PA.

Fager S, Beukelman D, Jakobs T, Ewing B (2010). Simplifying AAC for people with critical medical conditions. *American Speech Language Hearing Association's annual convention*. Philadelphia, PA.

Fager S, Beukelman D, Jakobs T, Ternus T, Schley H (2010). New AAC access strategy: Gesture-enhanced word prediction. *American Speech Language Hearing Association's annual convention*. Philadelphia, PA.

Fager S (2010). Management of motor speech disorders in adults. *South Dakota Speech, Language, and Hearing association annual convention*.

Hosom JP, Jakobs T, Baker A, Fager S (2010). Automatic speech recognition for assistive writing in speech supplemented word prediction. *Interspeech*, Makuhari, Japan.

Fager S, Beukelman D, Jakobs T, Hosom P (2010). Supplemented speech recognition for individuals with dysarthria: Preliminary results. *Rehabilitation Engineering Society of North America*. Las Vegas, NV.

Fager S, Beukelman, D, Jakobs T (2010). Duration and variability in speakers with dysarthria and traumatic brain injury. *Conference on Motor Speech*. Savannah, GA.

Fager S, Jakobs T, Beukelman D (2010). Supporting communication of individuals with minimal movement. *Assistive Technology Industry Association*. Orlando, FL.

Fager S, Jakobs T (2009). State of the art technology for people with minimal movement ability. *World Congress on Disabilities annual convention*. Jacksonville, FL.

Fager S, Beukelman DR, Jakobs T (2009). Supporting communication of individuals with minimal movement. *Rehabilitation Engineering Society of North America*. New Orleans, LA.

Fager SK, Beukelman DR, Jakobs TE, Ullman C (2008). Duration and variability of dysarthric speech in TBI. *American Speech-Language Hearing Association's national convention*. Chicago, IL.

Nordness A, Ball L, Fager S, Beukelman D (2008). Identifying factors affecting delayed AAC referrals for individuals with ALS. *American Speech-Language Hearing Association's national convention*. Chicago, IL.

McCarthy J, Fager S, Beukelman DR (2008). Dynamic capture & representation of visual content in medical settings. *American Speech-Language Hearing Association's national convention*. Chicago, IL.

Fager S, Beukelman DR, Jakobs T (2007). Head tracking for persons with minimal movement: A case study. *American Speech -Language Hearing Association's national convention*. Boston, MA.

Fager S, Beukelma, DR, Jakobs, T (2007). Augmented speech recognition for severe dysarthria- Initial pilot study results. *American Speech-Language Hearing Association's national convention*. Boston, MA.

Fager S, Beukelman DR, Culp D (2007). Brainstem impairment: Supporting communication at all stages of recovery. *American Speech-Language Hearing Association's national convention*. Boston, MA.

Fager S (2006). AAC for persons with brainstem impairment. *American Speech-Language*



*Hearing Association's national convention.* Miami, FL.

Fager S, Green J, Beukelman DR, Hakel M (2006). Facial kinematics of speaker with palatal lift following brainstem impairment. *Conference on Motor Speech Disorders.* Austin, TX.

Fager S, Beukelman DR, Karantounis R, Jakobs T (2005). Use of safe-laser technology to train head movement in LIS. *American Speech-Language Hearing Association's national convention.* San Diego, CA.

Fager S, Green, J, Beukelman DR, Hakel M (2005). Facial kinematics of speaker with palatal lift following brainstem impairment. *American Speech-Language Hearing Association's national convention.* San Diego, CA.

Fager S, Green J, Beukelman D (2004). Orofacial kinematics in a complex clinical presentation. *American Speech-Language Hearing Association's national convention.* Philadelphia, PA.

Fager S, Hux K, Beukelman D (2004). AAC acceptance and use with 25 adults with TBI. *American Speech-Language Hearing Association's national convention.* Philadelphia, PA.

Fager S, Hux K, Karantouni, R, Beukelman D (2004). AAC acceptance and use for persons with TBI. *Nebraska Speech, Language, Hearing Association annual convention,* Kearney, NE.

Fager S, Beukelman D, Jakobs T (2004). Safe laser access system: An innovative AAC treatment option for LIS. *Nebraska Speech, Language, Hearing Association annual convention,* Kearney, NE.

Hanson L, Beukelman D, Fager S, Ullman C (2004). Listener attitudes toward speech supplementation strategies used by survivors of TBI. *Conference on Motor Speech Disorders.* Albuquerque, NM.

Hakel M, Beukelman D, Fager S, Green J, Marshall J (2004). Nasal Obturation for velopharyngeal dysfunction in dysarthria: Technical report on a one-way valve. *Conference on Motor Speech Disorders.* Albuquerque, NM.

Fager S, Beukelman D, Ball L (2003). New AAC interfaces. *American Speech-Language Hearing Association's national convention.* Chicago, IL.

Fager S (2003). Transitional issues in TBI and AAC. *American Speech-Language Hearing Association's national convention.* Chicago, IL.

Fager S (2003). AAC Intervention in severe TBI. *Nebraska AAC Conference.* Mahoney State Park, Nebraska.

Fager S, Beukelman D, Hakel M (2002). Communication intervention for persons with brainstem involvement. *American Speech-Language Hearing Association's national convention.* Atlanta, GA.

Beukelman D, Fager S, Jakobs T (2002). Voice access system- using residual speech sounds to control assistive technology. *American Speech-Language Hearing Association's national convention.* Atlanta, GA.