The American Otological Society

CLINICIAN SCIENTIST AWARD 2016

"Variability in Speech Recognition for Adults with Cochlear Implants"

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AMOUNT AWARDED BY AOS: $60,000

ONGOING FUNDING: NIDCD, $2,675,927 2021-present; NIDCD, $3,641,618 2022-present

PUBLICATIONS: ***(related to the AOS Award)***

Moberly, A.C., Houston, D.M., Harris, M.S., Adunka, O.F., & Castellanos, I. (2017). Verbal working memory and inhibition-concentration in adults with cochlear implants. Laryngoscope Investigative Otolaryngology;2:254-61.

Moberly, A.C., Pisoni, D.B., & Harris, M.S. (2017). Visual working memory span in adults with cochlear implants: some preliminary findings. World Journal of Otolaryngology-Head and Neck Surgery;3:224-230.

Moberly AC, Houston DM, Harris MS, Adunka OF, Castellanos I. (2017). Verbal working memory and inhibition-concentration in adults with cochlear implants. Laryngoscope Investigative Otolaryngology;2:254-261.

Moberly AC, Harris MS, Boyce L, Nittrouer S. (2017). Speech recognition in adults with cochlear implants: The effects of working memory, phonological sensitivity, and aging. Journal of Speech, Language, & Hearing Research;60:1046-1061.

Moberly, A. C., Castellanos, I., & Mattingly, J. K. (2018). Neurocognitive factors contributing to cochlear implant candidacy. Otology & Neurotology, 2018 Dec;39 (10):e1010.

Mattingly, J.K., Castellanos, I., Moberly, A.C. (2018). Nonverbal reasoning as a contributor to sentence recognition outcomes in adults with cochlear implants. Otology & Neurotology, 2018 Dec;39(10):e956.

Moberly, A.C., Vasil, K.J., Wucinich, T.L., Safdar, N., Boyce, L., Roup, C., Holt, R.F., Adunka, O.F., Castellanos, I., Shafiro, V., Houston, D.M., Pisoni, D.B. (2018). How does aging affect recognition of spectrally degraded speech? The Laryngoscope. 2018 Nov;128.

Kramer, S., Vasil, K. J., Adunka, O. F., Pisoni, D. B., Moberly, A. C. (2018). Cognitive functions in adult cochlear implant users, cochlear implant candidates, and normal-hearing listeners. Laryngoscope Investigative Otolaryngology, 2018 Aug;3(4):304-10.

Moberly, A.C., Patel, T.R., Castellanos, I. (2018). Relations between self-reported executive functioning and speech perception skills in adult cochlear implant users, Otology & Neurotology;39:250-7.

Pisoni, D.B., Broadstock, A., Wucinich, T., Safdar, N., Miller, K., Hernandez, L., Vasil, K., Boyce, L., Davies, A., Harris, M.S., Castellanos, I., Xu, H., Kronenberger, W.G., & Moberly, A.C. (2018). Verbal learning and memory after cochlear implantation in postlingually deaf adults: some new findings with the CVLT-II. Ear and Hearing;39:720-45.

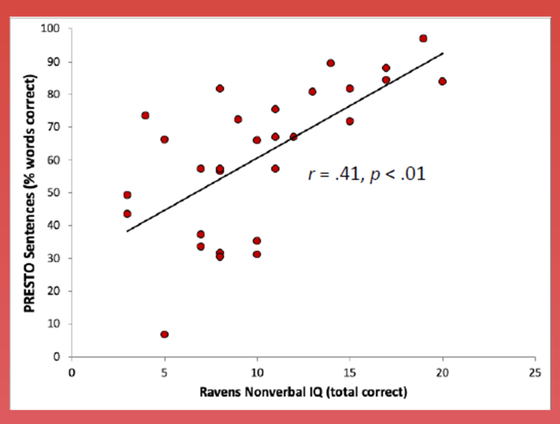
Moberly, A.C., Castellanos, I., Vasil, K.J., Adunka, O.F., & Pisoni, D.B. (2018). "Product" versus "process" measures in assessing speech recognition outcomes in adults with cochlear implants. Otology and Neurotology;39:e195-202.

Moberly, A.C., Harris, M.S., Boyce, L., Vasil, K., Wucinich, T., Pisoni, D.B., Baxter, J., Ray, C., & Shafiro, V. (2018) Relating quality of life to outcomes and predictors in adult cochlear implant users: are we measuring the right things? Laryngoscope;128:959-66.

Moberly, A. C., Mattingly, J. K., & Castellanos, I. How does nonverbal reasoning affect sentence recognition in adults with cochlear implants and normal-hearing peers? Audiology and Neurotology. 2019;24(3):127-38.

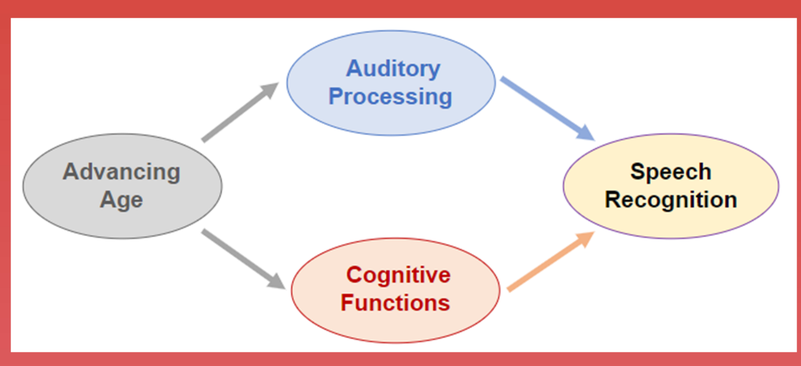
RESEARCH SUMMARY: The research supported by the AOS Clinician-Scientist Award provided a foundation for my subsequent NIH/NIDCD K23 Career Development Award funding, followed by R01 funding. Through the AOS award, I began collecting cross-sectional data in a group of experienced adult cochlear implant users and normal-hearing peers to examine how cognitive-linguistic functions contribute to speech recognition outcomes. These data served as preliminary data for my K23 proposal, which eventually led to development of a longitudinal study of adult cochlear implant outcomes funded by my current R01 research grant.

OUTCOMES: The body of work begun with AOS Clinician-Scientist Award funding has provided data and publications supporting the roles of a number of top-down cognitive-linguistic functions to explain adult cochlear implant speech recognition outcomes. These functions have been assessed using visual measures of working memory capacity, inhibition-concentration, nonverbal reasoning, and speed of lexical and phonological processing. Ultimately the findings supported the potential for top-down functions to predict cochlear implant outcomes prior to surgery, as well as to possibly serve as rehabilitative targets after cochlear implantation.



LEFT: Scatterplot of high-variability PRESTO sentence recognition scores vs. Ravens measure of nonverbal IQ in 39 experienced cochlear implant listeners.

Data presented from Mattingly JK, Castellanos I, Moberly AC. Nonverbal reasoning as a contributor to sentence recognition outcomes in adults with cochlear implants. Otology & Neurotology. 2018 Dec;39(10):e956.



LEFT: Model of mediating effects of auditory processing abilities and cognitive functions on the relation between age and speech recognition abilities in adult cochlear implant listeners. Modified from Moberly AC, Vasil KJ, Wucinich TL, Safdar N, Boyce L, Roup C, Holt RF, Adunka OF, Castellanos I, Shafiro V, Houston DM. How does aging affect recognition of spectrally degraded speech?. The Laryngoscope. 2018 Nov;128.

FURTHER FUNDING HAS ENABLED US TO EXPAND OUR RESEARCH TO: Use a battery of cognitive-linguistic measures, along with measures of auditory processing, to predict adult cochlear implant outcomes, and to identify targets of rehabilitation after cochlear implant surgery.

LAY SUMMARY OF FINDINGS AND IMPLICATIONS OF THIS RESEARCH: Adult cochlear implant speech recognition outcomes are highly variable. Our work has demonstrated that a number of cognitive and language functions contribute to the ability to recognize speech when listening through a cochlear implant. These abilities may help us to predict how well someone will do with a cochlear implant, prior to surgery, or to identify functions that we might be able to target to improve performance after cochlear implantation.