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Engineering & Scientific Consulting

Katie Becker, Ph.D.

Scientist | Human Factors

Denver

+1-303-802-3436 | kbecker@exponent.com

Professional Profile

Dr. Becker has expertise and extensive training in human perception, aging, attention, cognition, affective audiovisual processing, and multimodal neuroimaging. She applies this experience to evaluating and explaining the human factors that affect perception and influence decision making in various contexts including motor vehicle and pedestrian accidents, slips and falls, and warning communication. Dr. Becker has extensive experience in experimental design, auditory and visual stimulus creation, behavioral and functional brain imaging data collection and analysis, and scientific communication.

Dr. Becker received her Ph.D. in Psychology with a focus in cognitive neuroscience from Colorado State University. Her graduate research utilized electrophysiological (EEG, MEG) and hemodynamic (fMRI, fNIRS) neuroimaging techniques to quantify the neural substrates underlying the perceptual biases introduced by prosodic voices when viewing emotional faces. Additionally, Dr. Becker examined the effect of spatial cueing on influencing these biases.

After completing her Ph.D., Dr. Becker worked with the National Institute of Health's Research Domain Criteria (RDoC) with creating extensive literature reviews and making experimental recommendations for several cognitive-perceptual tasks included in RDoC's research framework. These reviews aided in the design and development of computerized adaptive tests which target and examine specific psychological constructs. Dr. Becker also completed a postdoctoral fellowship at McGill University, where her work focused on quantifying the neurophysiological and cognitive changes associated with short-term hearing augmentation in older adults with age-related hearing loss (ARHL) using magnetoencephalography. More specifically, she examined the effect of short-term hearing aid use on increasing neural efficiency and improving speech perception in challenging listening conditions in older adults with ARHL.

Academic Credentials & Professional Honors

Ph.D., Psychology, Colorado State University, 2020

B.S., Neuroscience, University of Nebraska, 2012

B.A., German, University of Nebraska, 2012

Regents Scholarship, University of Nebraska at Omaha, 2007

Outstanding German Major, University of Nebraska at Omaha, 2012

Legacy of the Wishing Chair-Stout/Baird Memorial Scholarship, Colorado State University, 2017

Licenses and Certifications

Certified English XL Tribometrist (CXLT)

Academic Appointments

Instructor, Department of Psychology, Colorado State University, 2015-2020

Professional Affiliations

American Psychological Association (APA)

Cognitive Neuroscience Society (CNS)

Human Factors and Ergonomics Society (HFES)

Society for functional Near Infrared Spectroscopy (SfNIRS)

Society for Neuroscience (SfN)

Publications

Becker KM, Rojas DC. Prosodic influence in face emotion perception: evidence from functional near-infrared spectroscopy. *Scientific Reports* 2020; 10 14345.

Badura-Brack A, McDermott TJ, Becker KM, Ryan TJ, Khanna MM, Pine DS, Bar-Haim Y, Heinrichs-Graham E, Wilson TW. Attention training modulates resting-state neurophysiological abnormalities in posttraumatic stress disorder. *Psychiatry Research: Neuroimaging* 2018; 271:135-141.

Badura-Brack A, Heinrichs-Graham E, McDermott TJ, Becker KM, Ryan TJ, Khanna MM, Wilson TW. Resting-state neurophysiological abnormalities in posttraumatic stress disorder: A magnetoencephalography study. *Frontiers in Human Neuroscience* 2017; 11(205):1-8.

Kurz MJ, Proskovec AL, Gehringer JE, Becker KM, Arpin DJ, Heinrich-Graham E, Wilson TW. Developmental trajectory of beta cortical oscillatory activity during a knee motor task. *Brain Topography* 2016; 29(6):824-833.

McDermott TJ, Badura-Brack AS, Becker KM, Ryan TJ, Bar-Haim Y, Pine DS, Khanna MM, Heinrichs-Graham E, Wilson TW. Attention training improves aberrant neural dynamics during working memory processing in veterans with PTSD. *Cognitive Affective and Behavioral Neuroscience* 2016; 16(6):1140-1149.

McDermott TJ, Badura-Brack A, Becker KM, Ryan TJ, Khanna MM, Heinrichs-Graham E, Wilson TW. Male veterans with PTSD exhibit aberrant neural dynamics during working memory processing: an MEG study. *Journal of Psychiatry and Neuroscience* 2015; 41(4):251-60.

Kurz MJ, Becker KM, Heinrichs-Graham E, Wilson TW. Children with Cerebral Palsy have uncharacteristic somatosensory cortical oscillations after stimulation of the hand mechanoreceptors. *Neuroscience* 2015; 305:67-75.

Badura-Brack A, Becker KM, McDermott TJ, Ryan TJ, Becker MM, Hearley AR, Heinrichs-Graham E, Wilson TW. Decreased somatosensory activity to non-threatening touch in combat veterans with posttraumatic stress disorder. *Psychiatry Research: Neuroimaging* 2015; 233(2):194-200.

Kurz MJ, Heinrichs-Graham E, Becker KM, Wilson TW. The magnitude of the somatosensory cortical

activity is related to the mobility and strength impairments seen in children with cerebral palsy. *Journal of Neurophysiology* 2015; 113(9):3143-3150.

Wilson, TW, Heinrichs-Graham E, Becker KM, Aloï J, Robertson KR, Sandkovsky US, White ML, O'Neill J, Knott NL, Fox HS, Swindells S. Multimodal neuroimaging evidence of alterations in cortical structure and function in HIV-infected older adults. *Human Brain Mapping* 2015; 36(3):897-910.

Rojas DC, Becker KM, Wilson LB. Magnetic resonance spectroscopy studies of glutamate and GABA in Autism: Implications for excitation-inhibition imbalance theory. *Current Developmental Disorders Reports* 2015; 2(1):46-57.

Harbourne R, Becker KM, Arpin DJ, Wilson TW, Kurz MJ. Improving the motor skill of children with posterior fossa syndrome: a case series. *Pediatric Physical Therapy* 2014; 26(4):462-468.

Wilson TW, Heinrichs-Graham E, Becker KM. Circadian modulation of motor-related beta oscillatory responses. *Neuroimage* 2014; 102(P2):531-539.

Heinrichs-Graham E, Kurz MJ, Becker KM, Santamaria PM, Gendelman HE, Wilson TW. Hypersynchrony despite pathologically reduced beta oscillations in patients with Parkinson's disease: a pharmacomagnetoencephalography study. *Journal of Neurophysiology* 2014; 112(7):1739-47.

Kurz MJ, Becker KM, Heinrichs-Graham E, Wilson TW. Neurophysiological abnormalities in the sensorimotor cortices during the motor planning and movement execution stages of children with cerebral palsy. *Journal of Developmental Medicine and Child Neurology* 2014; 56(11):1072-7.

Kurz MJ, Heinrichs-Graham E, Arpin DJ, Becker KM, Wilson TW. Aberrant Synchrony in the Somatosensory Cortices Predicts Motor Performance Errors in Children with Cerebral Palsy. *Journal of Neurophysiology* 2014; 111(3):573-9.

Becker KM, Heinrichs-Graham E, Fox HS, Robertson KR, Sandkovsky U, O'Neill J, Swindells S, Wilson TW. Decreased MEG beta oscillations in HIV-infected older adults during the resting-state. *Journal of Neurovirology* 2013; 19(6):586-594.

Presentations

Becker KM, Voss P, Martínez Moreno ZE, Lunner T, López Valdés A, Baillet S, de Villers-Sidani E. Neurophysiological effects of longitudinal hearing aid use on auditory entrainment and speech in noise perception in older adults with age related hearing loss. Poster presentation, 50th Annual Meeting of the Society for Neuroscience, 2022.

Becker KM, Rojas DC. EEG Source Localization of Independent Components Associated with Multimodal Emotion Perception. Poster presentation, 49th Annual Meeting of the Society for Neuroscience, Chicago, IL, USA, 2019.

Becker KM, Rojas DC. An Independent Component Analysis Approach to Assessing the Integration of Faces and Voices in Multimodal Emotion Perception: An Electroencephalography Study. Poster presentation, 26th Annual Meeting of the Cognitive Neuroscience Society, San Francisco, CA, USA, 2019.

Becker KM, Rojas DC. Prosodic influence in face emotion perception: evidence from electroencephalography. Poster presentation, 25th Annual Meeting of the Cognitive Neuroscience Society, Boston, MA, USA, 2018.

Becker KM, Rojas DC. Prosodic influence in face emotion perception: evidence from functional near-infrared spectroscopy. Poster presentation, 1st Annual Molecular, Cellular, and Integrative Neuroscience (MCIN) Spring Symposium, Colorado State University, Fort Collins, CO, USA, 2017.

Becker KM, Rojas DC. Prosodic influence in face emotion perception: evidence from functional near-infrared spectroscopy. Poster presentation, 46th Annual Meeting of the Society for Neuroscience, San Diego, CA, USA, 2016.

Wilson TW, Heinrichs-Graham E, Becker KM, Aloï J, Robertson KR, Sandkovsky US, White ML, O'Neill J, Knott NL, Fox HS, Swindells S. Multimodal imaging evidence of alterations in cortical structure and function in the aging HIV brain. Poster presentation, 20th Annual Conference of the Society on NeuroImmune Pharmacology, New Orleans, LA, USA 2014. *Journal of Neuroimmune Pharmacology* (Suppl).

Badura-Brack AS, Becker KM, Heinrichs-Graham E, McDermott TJ, Ryan T, Wilson TW. Magnetoencephalography reveals combat veterans' resting state is much less restful than matched-controls. Poster presentation, 26th Annual Meeting of the Association for Psychological Science, San Francisco, CA, USA, 2014.

Wilson TW, Heinrichs-Graham E, Becker KM. Motor-related beta oscillatory responses linearly increase with the time of day. Poster presentation, 19th International Conference on Biomagnetism, Halifax, Nova Scotia, Canada, 2014.

Wilson TW, Heinrichs-Graham E, Becker KM, Aloï J, Robertson KR, Sandkovsky U, White ML, O'Neill J, Knott NL, Fox HS, Swindells S. Multimodal neuroimaging evidence of alterations in cortical structure and function in the aging HIV brain. Poster presentation, 19th International Conference on Biomagnetism, Halifax, Nova Scotia, Canada, 2014.

Kurz MJ, Heinrichs-Graham E, Becker KM, Wilson TW. Oscillatory activity in the somatosensory cortices predicts the motor performance of children with cerebral palsy. Poster presentation, 19th International Conference on Biomagnetism, Halifax, Nova Scotia, Canada, 2014.

McDermott TJ, Badura-Brack A, Heinrichs-Graham E, Becker KM, Ryan TJ, Wilson TW. Working memory deficits in veterans with combat-related PTSD: A magnetoencephalography study. Poster presentation, 26th Annual Meeting of the Association for Psychological Science, San Francisco, CA, USA, 2014.

Harbourne R, Kurz MJ, Becker KM, Wilson TW. Neuroplastic Changes Related to Rehabilitation in Children with Posterior Fossa Syndrome. Poster presentation, 68th annual meeting of the American Academy of Cerebral Palsy and Developmental Medicine in San Diego, California, USA, 2014.

Wilson TW, Heinrichs-Graham E, Becker KM, Aloï J, Robertson KR, Sandkovsky U, White ML, O'Neill J, Knott NL, Fox HS, Swindells S. Multimodal neuroimaging evidence of alterations in cortical structure and function in the aging HIV brain. Poster presentation, 20th Scientific Conference of the Society for Neuroimmune Pharmacology, New Orleans, LA, USA, 2014.

Badura-Brack A, Becker KM, Heinrichs-Graham E, McDermott T, Wilson TW. Magnetoencephalography reveals combat veterans' resting state is much less restful than matched-controls. Poster presentation, 26th Annual Meeting of the Association of Psychological Science, San Francisco, CA, USA, 2014.

McDermott TJ, Badura-Brack A, Heinrichs-Graham E, Becker KM, Ryan TJ, Wilson TW. Abnormal MEG Theta Activity in Veterans with PTSD during Working Memory Processing. Poster presentation, 2nd annual Nebraska Neuroscience Symposium, Omaha, NE, USA, 2014.

Becker KM, Helikar T, Rogers JA, Grisham WE. Modeling correspondence between auditory and motor pathways in the zebra finch song system with Boolean logic. Poster presentation, 43rd Annual Meeting of the Society for Neuroscience, San Diego, CA, USA, 2013.

Becker KM, Heinrichs-Graham E, Fox HS, Robertson KR, Sandkovsky US, O'Neill J, Swindells S, Wilson TW. Decreased MEG beta oscillations in HIV-infected older adults during the resting-state. Poster

presentation, 1st annual Nebraska Neuroscience Symposium, Omaha, NE, USA, 2013.

Schroeder CL, Heinrichs-Graham E, Becker KM, Wilson TW, Bonasera SJ. Magnetoencephalography evaluation of a computerized cognitive assessment battery. Poster presentation, 2013 Conference of the American Geriatrics Society, Grapevine, TX, USA, 2013.

Wilson TW, Heinrichs-Graham E, Becker KM, White ML, Wetzel MW. Revisiting medial prefrontal cortex dysfunction in adults with ADHD: Evidence from Pharmac-MEG imaging. Poster presentation, 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, USA, 2013.

Arpin D, Becker KM, Heinrichs-Graham E, Wilson TW, Kurz MJ. Neuromagnetic activity of the sensorimotor cortices during the motor planning and execution stages in children with cerebral palsy. Poster presentation, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE, USA, 2013.

Kurz MJ, Arpin D, Heinrichs-Graham E, Becker KM, Wilson TW. The neuromagnetic activity of the sensorimotor cortices and the ankle force control is altered in children with cerebral palsy. Poster presentation, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE, USA, 2013.

Peer Reviews

Aging

Cerebral Cortex

Human Factors and Ergonomics Society

Journal of American Medical Association (JAMA) Network Open

Journal of Psychiatry and Neuroscience