Exponent®
Engineering & Scientific Consulting

Katie Becker, Ph.D.

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Professional Profile

Dr. Becker applies her expertise and extensive training in cognitive, perceptual, and physical human factors issues to the analysis of accidents examining the effect of attention on human performance, human information processing, and decision-making in various contexts. This includes motor vehicle and pedestrian accidents, accidents involving micromobility devices, slips/trips and falls, product useability, and risk and warning communication.

Additionally, Dr. Becker applies this knowledge to explain how vision, attention, conspicuity and human behavior contribute to accidents involving pedestrians, scooters, bicycles, motorcycles, passenger vehicles, golf carts, semi-trucks, and commercial products. Dr. Becker has also supported multiple user studies examining the usability of wearable devices. In this role she managed and conducted multi-site focus groups to quantitatively and qualitatively measure how consumers interpret, assess, and feel about a product.

Prior to joining Exponent, Dr. Becker completed her Ph.D. in psychology at Colorado State University and two post-doctoral fellowships at McGill University and Colorado State University. During her time at McGill University, she focused her research on the cognitive neuroscience underlying human information processing, the brain mechanisms underlying speech comprehension, working memory, and decision making, and their behavioral manifestations after short-term hearing aid use in older adults with age-related hearing loss. In her research, she used a variety of experimental methods (behavioral, neuroimaging) and statistical analyses to explore the interactions between age, hearing augmentation, memory, and attention underlying comprehending speech under challenging listening conditions.

During her post-doctoral work at Colorado State University, Dr. Becker worked with the National Institute of Health's Research Domain Criteria (RDoC) 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.

Academic Credentials & Professional Honors

Ph.D., Pyschology, 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

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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

Human Factors and Ergonomics Society (HFES)

Publications

Becker KM, Voss P, Martinez-Moreno ZE, Prévost F, Zeitouni A, Valdes AL, & de Villers-Sidani E (2026). Short-term hearing aid use reduces auditory cortical responses to speech-in-noise listening among older adults with age-related hearing loss. Frontiers in Aging Neuroscience. 18:1690956. doi: 10.3389/fnagi.2026.1690956

Becker KM, Krauss D, Gold A, Byrne K, Dewar R, & Olson P (2025). Driver impairment. In D. Krauss (Ed.), Forensic aspects of driver perception and response (5th ed., pp. 261–71). Tucson, AZ: Lawyers & Judges Publishing Company, Inc.

Duffy JR, Sturm ET, Sares AG, Sarabia L, Delao EM, Becker KM, Colmenares AM, Manavi RM, Rojas DC, Tregellas JR, Young JW, Thomas ML (2025). Psychometric evaluation of cognitive and positive valence tasks chosen for the NIMH research domain criteria project. Assessment. 32(6):819-838.

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, Aloi 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 pharmaco-magnetoencephalography 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, Aloi 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, Aloi 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, Aloi 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 Pharmaco-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.

Guest Lectures

"Micromobility safety through a human factors lens" Safe Mobility Conference, Seattle WA, 2026

"Influence of prosody and emotional congruence in emotion perception"Department of Neurology and Neurosurgery, McGill University, Montreal, Canada, 2021

"Hemodynamic correlates of prosody in emotion perception" Department of Psychology, South China Normal University, Guangzhou, China, 2017

"Measuring the Structure and Function of the Brain" Course: Psychology 454: Biological PsychologyDepartment of Psychology, Colorado State University, 2017

"Vision" Course: Psychology 458: Cognitive NeuroscienceDepartment of Psychology, Colorado State University, 2017

"Contributions of Mechanization and Quantification to the Development of Psychology" Course: Psychology 401: History and Systems of PsychologyDepartment of Psychology, Colorado State University, 2017

"Sports-related head trauma: understanding behavioral, cognitive and psychological effects of a blow to the head" Colorado State University Residence Life, Colorado State University, 2016

"Optical and electrophysiological measures of brain activity during emotion perception" Department of Biomedical Engineering and Computer Science, Aalto University, Helsinki, Finland, 2015

Project Experience

Assessed a variety of product-related safety information in "failure to warn" claims.

Performed quantitative and qualitative product usability studies to examine the physical and cognitive abilities of users as they interact with specific products in different environments.

Analyzed the cognitive, perceptual, and environmental factors affecting individuals in numerous accidents involving pedestrians, motor vehicles, and product end users.

Peer Reviews

Aging

Cerebral Cortex

Human Factors and Ergonomics Society

Journal of American Medical Association (JAMA) Network Open

Journal of Psychiatry and Neuroscience