University of Nebraska-Lincoln

AAC Translation Lab

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Dear "Masonic Institute for The Developing Brain" (MIDB) committee,

I am pleased to support the current grant proposal, titled "*A Feasibility Study: Application Of Brain-Computer Interface In Augmentative And Alternative Communication For Non-Speaking Autistic Population*" with the University of Minnesota, Institute on Community Integration (ICI), TeleOutreach Center, and Division of Biostatistics, Analytic Cores, Masonic Institute for Developing Brain.

As a speech-language pathologist certified in clinical competency (SLP-CCC), and director of the Augmentative and Alternative Communication Translation (AACT) Laboratory at the University of Nebraska-Lincoln (UNL), I have unique experience in brain-computer interface (BCI) research in relation to supporting access to augmentative and alternative communication devices (BCI-AAC). In more detail, my work has identified multiple areas crucial for the real-world implementation of BCI-AAC technology, including the importance of extending BCI-AAC to children and adolescents who may have minimal or emerging language and literacy skills and be currently left without an efficient or effective form of communication. Further, my research is informing the development of clinically focused and user-centered design frameworks aiming to elucidate how to best design and implement BCI-AAC devices, based upon individuals' unique cognitive-sensory-motor profile.

My research indicates a need to improve AAC access to children/adolescents with severe physical impairments who may also have a diagnosis of autism spectrum disorder (ASD), such as those diagnosed with Rett syndrome. The proposed project plan aims to bolster BCI-AAC development and implementation through a novel approach using a pictorial-based BCI-AAC controlled by noninvasive electroencephalography (EEG) over a one-year period. Individuals with Rett syndrome may present with a complex profile including ASD and physical impairment. Therefore, in addition to establishing BCI-AAC feasibility for those with ASD, this proposed project is especially exciting as it will lay a crucial foundation for future studies aiming to disambiguate the impacts of ASD and motor difficulties on brain-signals utilized for BCI-AAC access, helping understand how to best optimize and tailor BCI-AAC solutions to different individuals.

Considering my expertise in BCI-AAC for communication disorders, which includes 15 peer reviewed publications in BCI-AAC, I am excited to provide study consultation, as needed. In this regard, I am looking forward to providing input on user-centered considerations in BCI-AAC design and implementation, protocol development and setting, BCI-AAC task designs, and interpretation of study findings as they relate to the real-world implementation of BCI-AAC technology. I am confident in the abilities of our interdisciplinary team that is established based on people's interest and expertise. The team has a well-rounded focus in supporting individuals with ASD, as well as experience in providing technology for the population with disabilities. The proposed work will also strengthen connections between University of Minnesota and UNL, particularly to develop a long-term learning collaborative. If funded, I believe that this work will greatly benefit those with neurodevelopmental disabilities in high need of communication supports.

Sincerely,

Kevin Pitt, Ph.D., CCC-SLP
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