

Using a wearable EEG to promote mindfulness in an adolescent with autism spectrum disorder

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Abstract. This study investigated the use of a wearable EEG that provides neurofeedback to promote an adolescent with autism spectrum disorder (ASD) to be mindful. Adolescents with ASD can have an increased risk for developing mental health disorders and mindfulness is one strategy that can help treat these disorders. Results of the case study demonstrate the wearable EEG is a promising tool to promote an individual to be mindful; however additional research is needed to further our understanding of how this device can be used for this particular population.

Keywords: autism spectrum disorder, mindfulness, wearable EEG

1 Introduction

Individuals with ASD can experience deficits in social-emotional reciprocity and non-verbal communicative behaviors across multiple settings [1]. One health concern that individuals with ASD can have is an increased risk for developing mental health disorders [1]. These disorders can include anxiety and depression and can originate in early childhood or adolescence, which is why it is essential to promote the mental health of adolescents with ASD [1].

One current strategy designed to support the mental health needs of adolescents with ASD is mindfulness. Mindfulness is the ability to be in the present moment in a non-judgmental manner and can enhance self-regulatory skills [3]. However, adolescents with ASD are generally not mindful and need additional support or other innovative methods to help cultivate the practice, especially when first learning how to be mindful [2].

A novel approach to promoting mindfulness in adolescents with ASD is the use of wearable electroencephalography (EEG) devices. Wearable EEGs may help promote mindfulness practice among adolescents with ASD and further our understanding of how mindfulness can support this underserved population. Therefore, the purpose of this study was to investigate the use of a wearable device in an adolescent with ASD designed to promote mindfulness through neurofeedback.

2 Methods

One male adolescent diagnosed with ASD, age 16, participated in the study. The MUSE™, a wearable EEG, was utilized that provides continuous neurofeedback that is displayed in a smartphone or tablet via Bluetooth connectivity. The device detects individual brainwaves and promotes an individual to be mindful by translating brain signals into the sounds of wind, and provides how mindful the participant was as time spent being mindful. Baseline consisted of the participant wearing the MUSE™ without listening to the neurofeedback and the intervention consisted of the participant wearing the device and listening to the neurofeedback to be mindful. All sessions were three minutes each and used the ocean soundscape.

3 Results

The results are displayed in Figure 1. The first three sessions were baseline and the rest consisted of the intervention. The results suggest that mindfulness can be promoted with the support of a wearable EEG for an adolescent with ASD.

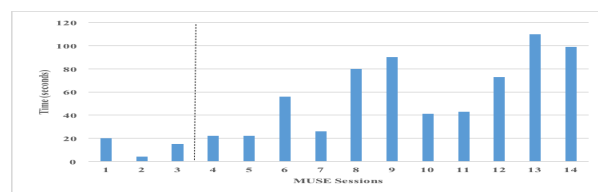


Fig. 1. Time spent being mindful in seconds during the three minute sessions

4 Discussion

The use of wearable EEGs that provide neurofeedback may be a promising tool to promote those with ASD to be mindful, due to their accessibility and inclusivity. However, future research is needed, such as larger sample sizes and replicated studies, to establish this construct as evidence-based. Longitudinal evidence is needed to further explore how wearable EEGs can help those with ASD cultivate the practice and be used for certain mental health disorders.

References

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