



EVALUATION OF JOINT ATTENTION AND PERCEPTION OF 3D MOTION AND DEPTH THROUGH VIRTUAL AND AUGMENTED REALITY METHODS

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Introduction

- Individuals diagnosed with Autism Spectrum Disorder (ASD) may experience varying degrees of challenges in their perceptual, social, motor, and cognitive skills [1].
- The development of social and communication skills depends on the development of joint attention (JA) skills [2].
- Autism spectrum disorder (ASD) impacts individuals' perceptual, social, motor, and cognitive skills. Joint attention skills are pivotal for social and communication development.
- Moreover, ASD individuals often face motion and depth perception challenges, affecting their daily life.
- While traditional interventions existed, computing technology, particularly Virtual Reality (VR) and Augmented Reality (AR), offers novel therapeutic solutions.



Figure 1: Joint Attention Training Platform's virtual avatar for task cue delivery in AR (left) and VR environments (right)

- This study has dual aims: assessing the efficacy of an AR and VR joint attention (JA) training platform for ASD individuals and analyzing eye-tracking data concerning 3D motion and depth perception among them.
- Focusing on participants aged 6-13, the research uses avatar-based AR and VR platforms to establish joint attention and compares ASD participants' responses to typically developing (TD) peers.
- 19 ASD and 13 TD participants aged 6-13 participated. Their health was robust, with autism severity measured using SRS and SCQ.
- They engaged in 20-minute sessions using AR and VR headsets with eye-tracking. The JA platform featured a virtual avatar directing attention to virtual objects, tracking participants' eye movements to determine gaze focus.







- responded to cues and maintained eye contact with avatars.
- TD participants showcased better motion and depth perception, effectively tracking stimuli.

Conclusions

- promptly followed cues and established eye contact with the virtual avatar.
- effectively tracking stimulus movement.

References

[1] Poster IDO. Ousley and T. Cermak, "Autism spectrum disorder: defining dimensions and subgroups," Current developmental disorders reports [2] A. De Giacomo and E. Fombonne, "Parental recognition of developmental abnormalities in autism," European child & adolescent psychiatry [3] "Hololens 2 – overview, features and specs — microsoft hololens." [Online].https://www.microsoft.com/en-in/hololens/hardware [4] Fove 0 — fove official website." [Online] https://fove-inc.com/product/fove0/



Figure 2: Participant interacting with the AR (left) and VRbased (right) training platform



Figure 3: Microsoft Hololens 2 AR HMD [3] (left) and FOVE 0 VR HMD devices (right) [4]

Results

ASD participants in the JA experiment had slower responses than TD participants, who quickly

• This research evaluates a VR and AR-based JA platform for ASD children and observes perceptual differences between ASD and TD groups, with notable performance discrepancies between them.

ASD participants exhibited slower response times compared to their TD counterparts, who

Additionally, TD participants demonstrated superior motion and depth perception skills, more

Contact

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