

## Implicit Responses for Assessment of Autism Based on Natural Behaviors Obtained Inside Immersive Virtual Environment

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**Abstract :** The late detection and subjectivity of the assessment of Autism Spectrum Disorder (ASD) imposed a difficulty for the children's clinical and familiar environment. The results showed in this paper, are part of a research project about the assessment and training of social skills in children with ASD, whose overall goal is the use of virtual environments together with physiological measures in order to find a new model of objective ASD assessment based on implicit brain processes measures. In particular, this work tries to contribute by studying the differences and changes in the Skin Conductance Response (SCR) and Eye Tracking (ET) between a typical development group (TD group) and an ASD group (ASD group) after several combined stimuli using a low cost Immersive Virtual Environment (IVE). Subjects were exposed to a virtual environment that showed natural scenes that stimulated visual, auditory and olfactory perceptual system. By exposing them to the IVE, subjects showed natural behaviors while measuring SCR and ET. This study compared measures of subjects diagnosed with ASD (N = 18) with a control group of subjects with typical development (N=10) when exposed to three different conditions: only visual (V), visual and auditory (VA) and visual, auditory and olfactory (VAO) stimulation. Correlations between SCR and ET measures were also correlated with the Autism Diagnostic Observation Schedule (ADOS) test. SCR measures showed significant differences among the experimental condition between groups. The ASD group presented higher level of SCR while we did not find significant differences between groups regarding DF. We found high significant correlations among all the experimental conditions in SCR measures and the subscale of ADOS test of imagination and symbolic thinking. Regarding the correlation between ET measures and ADOS test, the results showed significant relationship between VA condition and communication scores.

**Keywords :** autism, electrodermal activity, eye tracking, immersive virtual environment, virtual reality

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