

both differences and clusters of similarity across individuals' ANS data over the two-month period.

**128.112 112** Exploring the Interplay Between Autonomic Activity and Behaviors in Children with Autism Spectrum Disorder (ASD) Through a Multisensorial Platform for the Continuous Monitoring of Physiological Signals. L. Billeci\*<sup>1</sup>, G. Tartarisco<sup>1</sup>, A. Narzisi<sup>2</sup>, G. Baldus<sup>1</sup>, D. Corda<sup>1</sup>, F. Muratori<sup>2</sup> and G. Pioggia<sup>1</sup>, (1)*Institute of Clinical Physiology, National Research Council (CNR)*, (2)*University of Pisa – Stella Maris Scientific Institute*

**Background:** There is a widely held assumption that ANS (Autonomic Nervous System) activity and behavioural manifestations in ASD subjects are closely related, but the relationship between the two is not yet well assessed and findings are contradictory. This study is part of the MICHELANGELO European Project, which is aimed to move the assessment and the therapeutic interventions from the clinic to a more "natural" home environment in which children are continuously monitored with unobtrusive technologies in order to establish a link between physiological and behavioural parameters for a personalization of the treatment.

**Objectives:** The main aim of this study is to explore connections between ANS and specific ASD symptoms, developing a collaboration between clinical assessment and engineering methodologies. In particular ANS activity is analysed acquiring unobtrusively, during social interactions, ECG and movement. A further aim is to characterize different phenotypes in ASD to suggest more tailored intervention strategies.

**Methods:** In this study we developed a naturalistic protocol based on imitation and joint attention tasks in which the child is free to move and interact with the therapist thanks to the unobtrusiveness of the acquisition system. Video, ECG and the movement of 8 school children (4 HFASD, rigorously diagnosed by an experienced clinic according to DSM-IV-TR and confirmed by the ADOS-G, and 4 typical controls) were simultaneously acquired during 20 min experimental sessions structured as: i) 5 min baseline (child still on a chair); ii) shared attention task; iii) imitation task (gestures and movements). Physiological data have been recorded with a wearable system implemented by the Institute of Clinical Physiology of the National Research Council of Italy (CNR) realized as a

chest strap placed at the level of the thorax embodying electrodes, electrical connections and a portable electronic board which acquires the signals and transmits data via Bluetooth to a PC for visualization, storage, analysis and transmission to a remote center. The system can visualize ECG and assess heart rate (HR), heart rate variability (HRV), the powers of high frequency (HF) and low frequency (LF), as well as the LF/HF ratio, allowing cardiac vagal and sympathetic activities as markers of autonomic interaction to be estimated.

**Results:** We observed that children, both typical and ASD, well accepted the system and the protocol and were able to perform the tasks without difficulties or constraints. Using the video we were able to link specific tasks and behaviours of each child with his/her physiological response. We observed a decrease of HR and an increase of HF during imitation tasks respect to the baseline in controls, while in ASD children there were not statistically significant differences.

**Conclusions:** The protocol applied in this study allows monitoring and correlating the behaviour and the physiological signals of the children in a naturalistic setting. The subtyping of ASD through an accurate description of these variables can help clinicians to identify which type of strategies work best for which subtype of ASD child and to adapt the environmental stimuli and the caregiver interaction to specific needs of the child.

**128.113 113** Mindgamers in School. R. H. Rice\*<sup>1</sup>, L. I. Sugarman<sup>2</sup> and S. Jacobs<sup>2</sup>, (1)*St. John Fisher College*, (2)*Rochester Institute of Technology*

### **Background:**

Originally presented as a poster at IMFAR 2012, this project represents ongoing development of a therapeutic, physiologically-controlled video game that address autonomic and cognitive control issues in young people with high functioning autism (HFA). The game is intended to help young people with HFA learn skills to better manage anxiety and restrictive/repetitive behaviors (RRB). This project is supported by the Office of the Vice for Research and the Center for Applied Psychophysiology and Self-regulation at Rochester Institute of Technology.