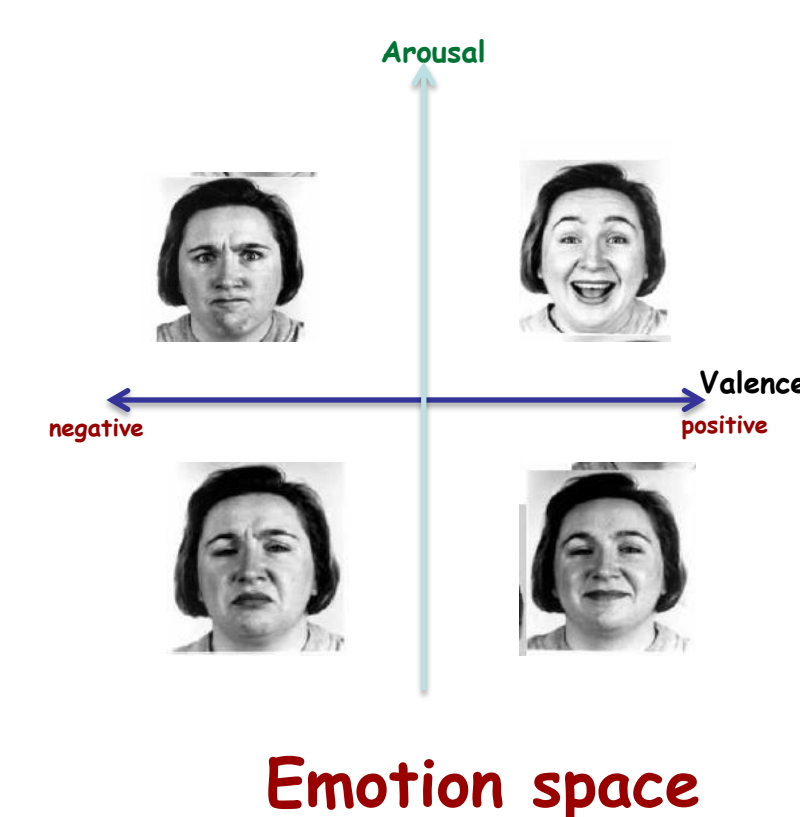


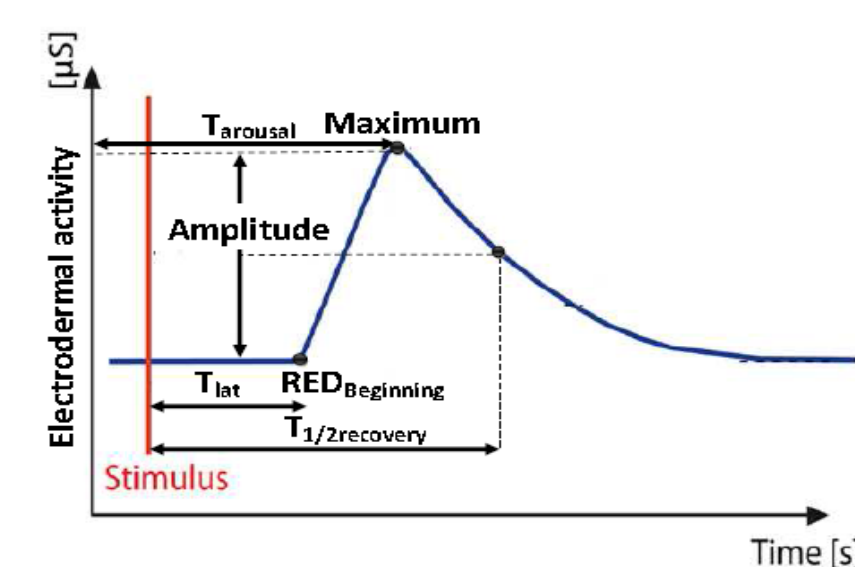
Affective assessment through Electro-Dermal Activity (EDA)

Over the past half century, the Electro-Dermal Activity (EDA) has proved to reflect the arousal level in humans and as a result was used in lie detection and emotional stress tracking in different situations [1].

Inadequacy of classical facial, gate and speech analysis for emotional assessment in autistic children



Recently, advances in embedded system design and mobile technology have made manufacturing of light portable EDA sensors a reality [1].



A sensor with bluetooth technology that measures:

- EDA levels via skin conductance
- Motion, via x,y,z accelerations
- Temperature

Basic EDA Response (EDR)
due to simple impulsive stimulus [2, 3]

EDA: physiological objective insight into the emotional state, in addition to classical physiological measures (EEG, ECG), and psychological evaluations

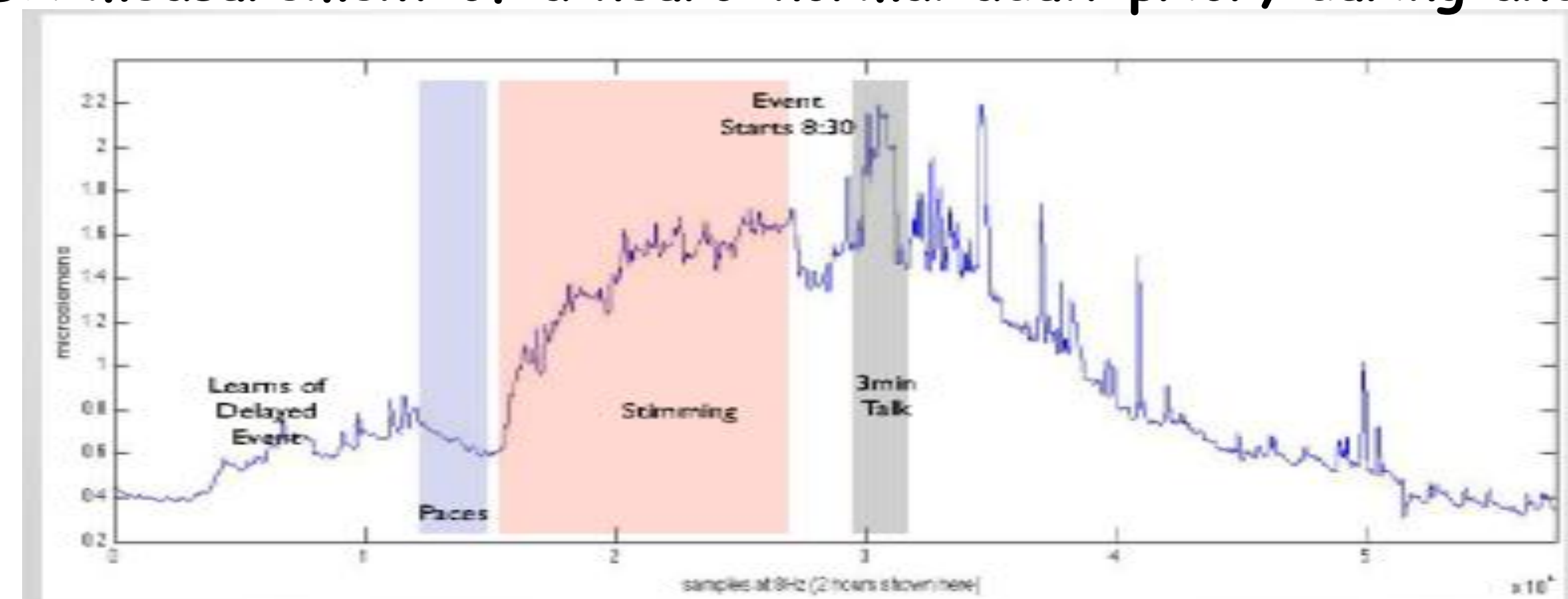
Potential interest to: therapists, parents, and caregivers

References:

- [1] R. Picard, Future affective technology for autism and emotion communication, Philosophy Transactions of the Royal Society, Biological Sciences, vol. 364, no. 1535, 3575-3584, 12 December 2009
- [2] C. Kappeler-Setz, and al., Towards Long Term Monitoring of Electrodermal Activity in Daily Life, 5th International Workshop on Ubiquitous Health and Wellness, UbiHealth 2010, 26 Sept; 2010.
- [3] N.Khalifa, R. Ghazi, M. Jaidane and S.Drissi, Temporal signatures of electrodermal activity for the evaluation of runners' performance: start and finish phases, 8th Int. Workshop on Sys., Signal Proc. and Applications, Alger., 2013
- [4] <http://emotion-research.net/signs/speech-sig/EmoSPACE-RozPicard-keynote.pdf>
- [5] N. Khalifa, P. R. Bertrand, G. Boudet, A. Chamoux, and V. Billat, "Heart Rate Regulation processed through wavelet analysis and change detection. Some case studies," Acta Biotheoretica, 60 (1-2): 109-29, 2012
- [6] P. Chambres, C. Auxiette, C. Vansingle and S. Gil, Adult attitudes toward behaviors of a six-year-old boy with autism. Journal of Autism and Developmental Disorders, 38, 1320-1327, 2008

Monitoring Electro-Dermal Activity: examples and illustrations

EDA measurement of a neuro-normal adult prior, during and after a presentation [4]



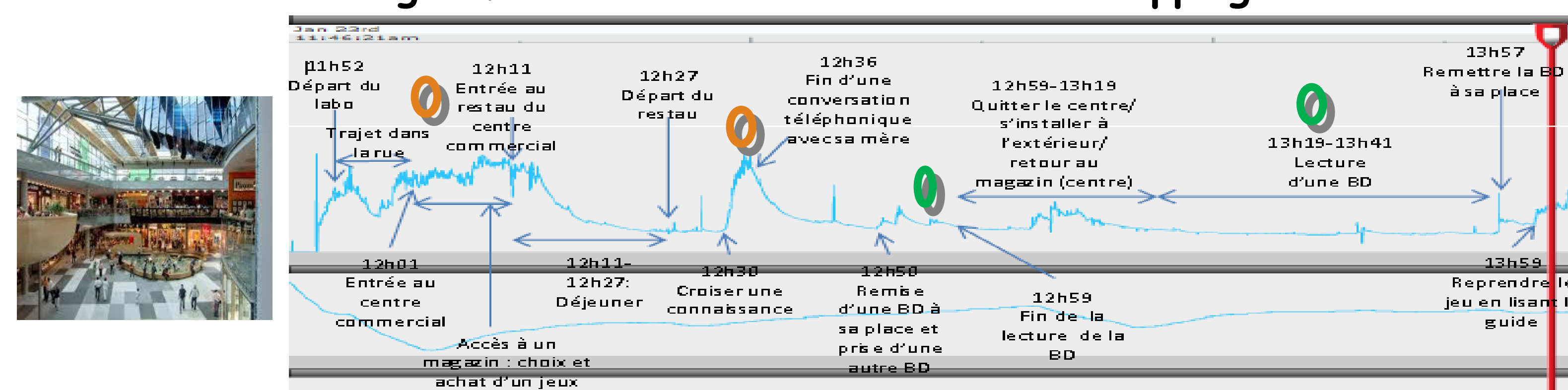
Pacing /stimming
are stress- reducer



Balancing: Therapeutic treatment for autistic children
(www.pasapas-tunisie.org)



3 hours EDA recordings of an autistic adolescent in a shopping center



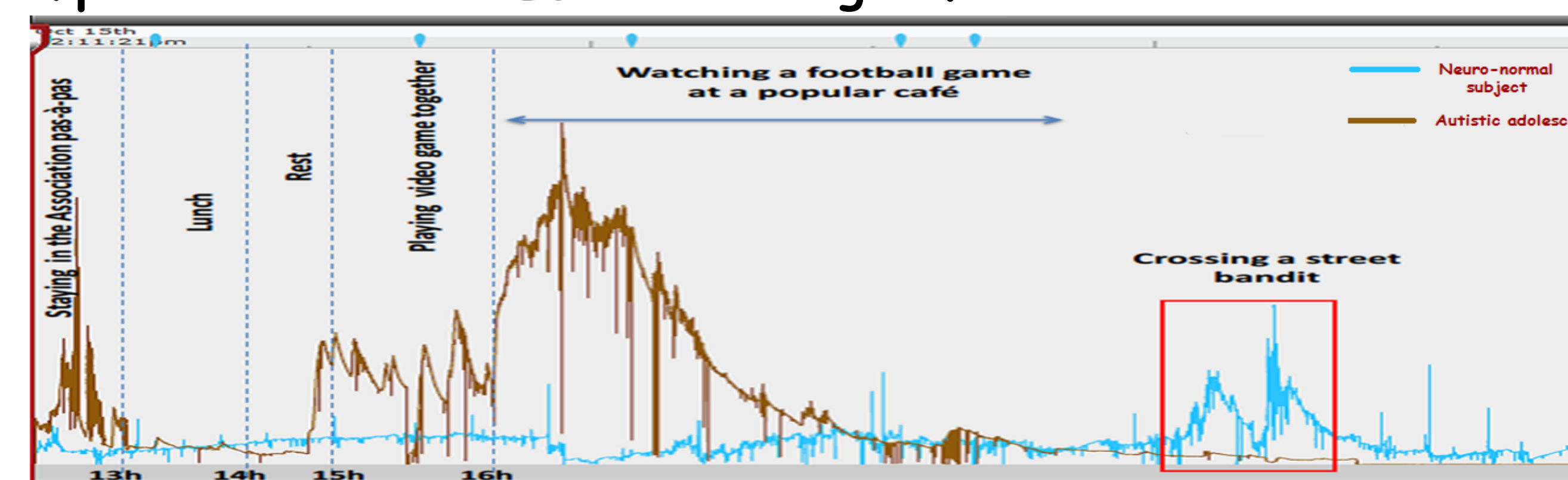
Stressful moments :

- Social interactions with strangers
- Phone negotiation with mother

Calm moments :

- Reading cartoon magazine, favorite pastime

Comparative 24 hour EDA recordings of an autistic adolescent and his friend



- Higher arousal all the time for the autistic adolescent even when watching a match of football

exception: When crossing a street bandit not recognized by the autistic teenager

On-going EDA signal analysis:

- Automatic affective state change detection through EDA change detection [5]
- EDA trend and storm analysis via a fractal approach

Where do we go from here?

- Augment the EDA with subject mobility and the audio-visual environment dimensions
- Towards individualized tracking and care of Tunisian autistic children in real life situations [6]:
 - * school environment
 - * during therapy