



Analysis and Visualization of Longitudinal Physiological Data of Children with ASD

Javier Hernandez¹, Akane Sano¹, Miriam Zisook², Jean Deprey¹, Matthew Goodwin³, Rosalind W. Picard¹
{javierhr, akanes, jdeprey, picard}@media.mit.edu¹, mzisook@ccs.neu.edu², m.goodwin@neu.edu³

Motivation

Individuals with ASD almost always suffer stress and anxiety, but cannot always communicate it.

Can we monitor their inner responses during daily life activity and for long periods of time?

Goal: Test feasibility of longitudinal study in classroom settings using state-of-the-art biosensors to monitor physiological responses of children with ASD.

Data Collection

5 minimally verbal children (9-20 years old)
Non-profit school for people with ASD
Two-month study

Physiology

Context



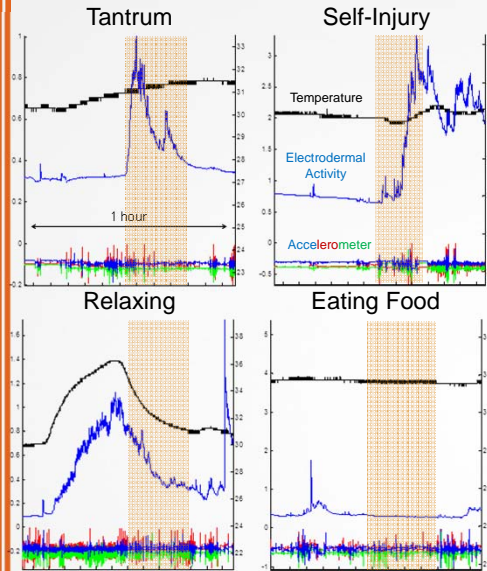
Affectiva Q™ sensor Teachers' Annotations

Electrodermal Activity *Activities:* food, gym, play, reading, walking...
3-axis accelerometer *Behaviors:* aggression, self-injury, tantrums,...

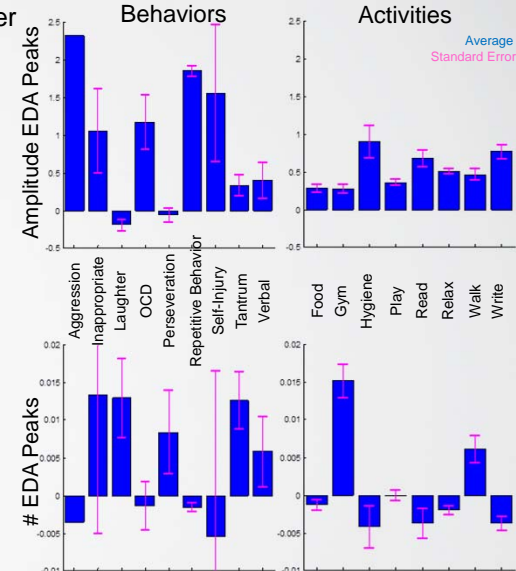
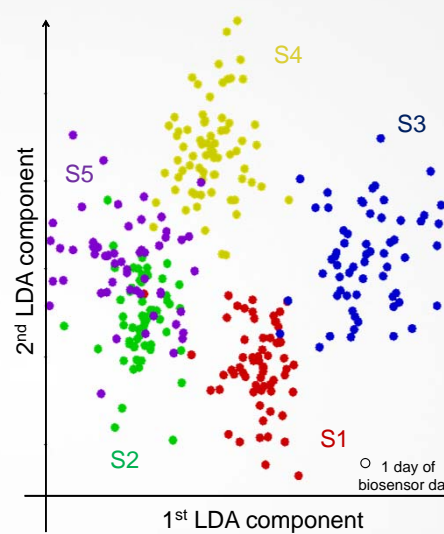
> 1400 hours data > 6000 annotations
91% artifact free

Good Data	S1	S2	S3	S4	S5
# days	64	62	61	70	55
Avg. time/day (hours)	4.55	4.26	4.49	4.23	3.64
Total time (hours)	291	264.1	274	296	200.5

Exploratory Analysis



Each child represents a different cluster

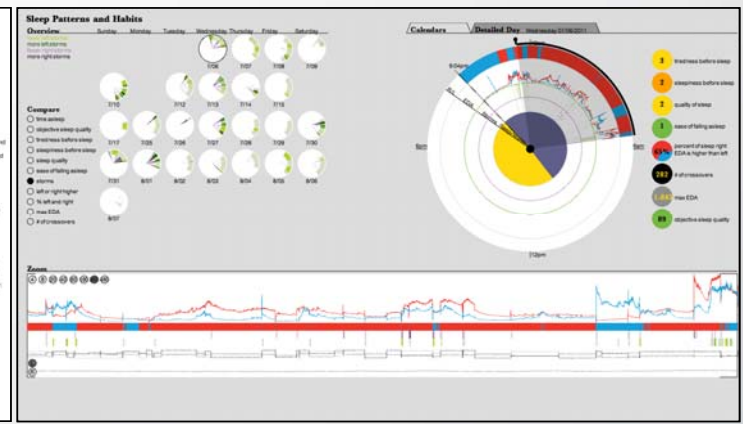
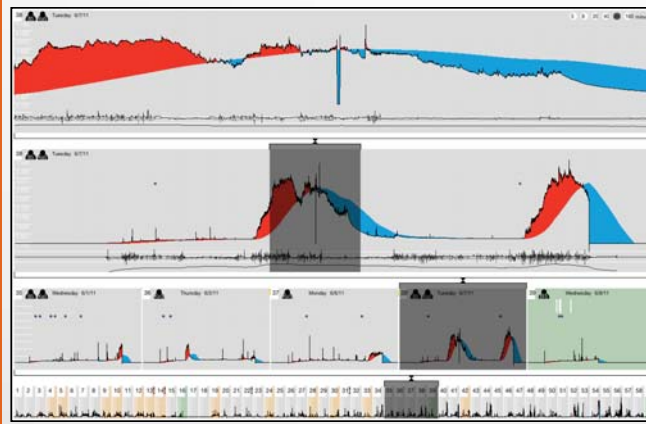


Data Visualization Tools

Physiological data + context

Multiple time granularities (day, week, month)

Feature computation & visualization



Work supported by the National Science Foundation under Grant No. NSF CCF-1029585