Disordered speech in children with autism spectrum disorders

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Multimodal perspective

- Multimodal perception of speech in autism spectrum disorders (Saalasti et al., 2011; Saalasti et al., 2012)
- Brain mechanisms (fMRI) underlying lipreading, reading and listening a narrative
  → Naturalistic neuroscience:
  novel analysis methods enable studying near real-life stimuli, requires stimulus models
  (eg. Inter-subject correlation, Hasson et al., 2004; Kauppi et al., 2010; Saalasti et al., submitted)
ASD

Autism Spectrum Disorders:
  • Restricted interests and routines, impaired social interaction (DSM-5, APA, 2013)
  • Early signs and changes difficult to detect quantify

→ AIM: To develop automatic ways to analyze social communication skills in children with autism from real-life data
Disordered speech in ASD:

- Atypical prosody (McCann & Peppé, 2003, Paul et al., 2005, Peppé et al., 2011)
  - Atypical cry acoustics in children at risk (Sheinkopf et al., 2012)
  - Acoustic analysis of prosody in ASD (Bölte, et al., 2010)

- Apraxia of speech
  - Inability to produce speech sounds would explain lack of speech (Shriberg et al., 2011)
Methods:

Participants:
• Piloting in progress
• N = 50 typically developed children (18 – 36 months) to train machine learning algorithms
• N = 30 children with ASD (18 – 36 months) + matched controls

• Psychometric data from the hospital
  • ADI-R (Le Couter, Lord, & Rutter, 2003), ADOS (Lord et al. 2003)
  • MCDI (Finnish version Lyytinen, 1999)
  • Other tests (WISC, RDLSIII), when applicable
Multimodal real-life data:
Data-analysis:

Data driven computational methods extracting:

• Acoustic-prosodic features (wavelet analysis. Suni et al., 2017)
• Motion (facial and gestural)
Data sharing:

Questions:
• Ethical permission for sharing sensitive data?
• Data format (original videos/audiofiles or timeseries?)
• Annotations?
Collaborators:

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• Prof Martti Vainio, Digital Humanities, University of Helsinki
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