

Encoding emotional states in Autism Spectrum Disorders: Can music help autistic children identify emotions in faces?

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Introduction

The Autistic Spectrum Disorder (ASD) is characterized by a delay in expressing and interpreting others' emotions, in particular interpreting emotions encoded in facial expressions. Music therapy has been shown to improve autistic individuals' emotional and social skills.

Objective

To explore the usefulness of music as a tool for improving autistic children's emotion recognition in facial expressions.

Methods

Sample

- 6 children with ASD aged 6-10 years

Materials. Figure 1



KDEF – The Karolinska Directed Emotional Faces
70 subjects, 7 emotions
5 angles



MTG (UPF) music Database + Film Sound tracks DB
30s, 7 moods

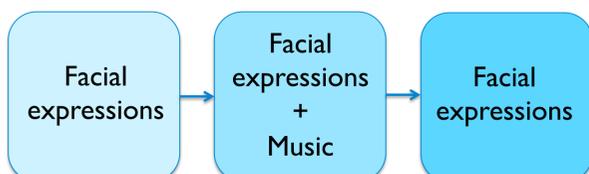


Emotiv EPOC EEG Device. Low-cost
14 channels

Procedures

- Longitudinal, within-subject pilot study
- Exposition to facial expressions for 4 basic emotions: happy, sad, angry and fear with and without music (4 sessions: 1 session/week)
 - Identification of the expressed emotion
 - EEG recording of brain activity

Figure 2. Session conditions



Variables and analysis

- Inter and intra-session improvement
 - Verbal response accuracy
 - EEG signal in four locations in the prefrontal cortex: AF3, AF4, F3 and F4

Results

- A significant improvement has been noticed in participants' responses when sessions one and four have been compared both in terms of verbal responses ($t= 5.00$, $p=.011$) and EEG responses ($p=0.032$).

Figure 3. Correct verbal identifications of facial expressions

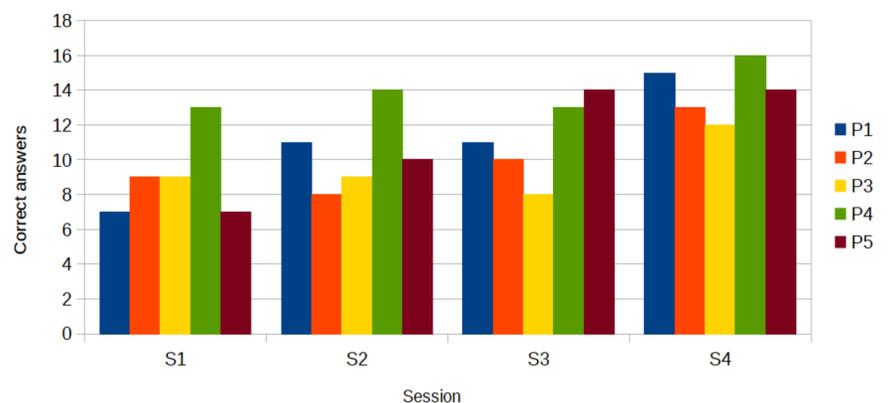


Figure 5. EEG signal to arousal/valence plane

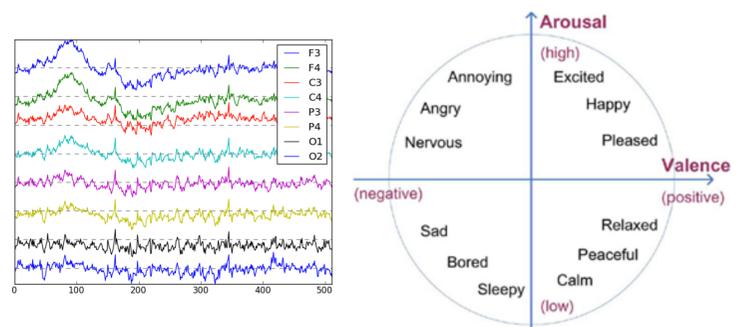
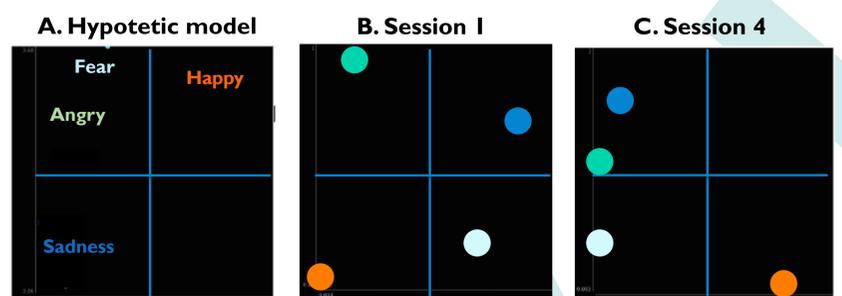


Figure 4. EEG signal in 1st and 4th sessions (1 subject)



Conclusions

- Music did have a positive impact on participants' results; both in the integration of the target emotion (EEG signal) and in their verbal responses.
- This suggests that music has a positive impact on autistic children's social and emotional skills.

References

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