Age and sex modulate the variability of neural responses to naturalistic videos

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Does neural variability increase with age?
Neural development generally corresponds with an increase in the efficiency and diversity of neural processing. Does this hold true for the processing of naturalistic video stimuli in developing children and adults?

Intersubject correlation of EEG (ISC): A measure of neural variability

Inter-subject correlation (ISC)
Implicated in:
- Memory (Cohen et al., 2016)
- Attention (Ki et al., 2016)
- Engagement (Dmochowski et al., 2014)

Stimuli:
- Arith
- Fract
- StudT

Demographics:

Intersubject correlation decreases with age

For all stimuli used (except Rest which contained no stimulus), ISC decreased with age. The division between “Young” and “Old” was determined by a median split across the age distribution (see Demographics).

Intersubject correlation is elevated in males

Across all stimuli, males had higher ISC than females. This effect was driven by the “Young” cohort.

Correlated component topographies similar across age and sex groups

The first two correlated components (C1 and C2) appear largely similar across ages and sexes. This indicates that the observed differences in ISC are due to consistent neural generators.

Replication of results

Three stimuli were shown to an additional cohort of 303 subjects. The ISC differences between the ages and sexes replicate with this additional cohort.

References

StudT

Wimpy

DesMe

Flash

Young

Old

Wimpy

DesMe

Arith

StudT

Fla