SÖZLÜ BİLDİRİLER

SS-112 - Modality-dependent variation of the frontal theta response to emotional stimuli

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Objectives: This study examined whether frontal theta response to emotional stimuli varies with stimulus modality (visual, auditory, audiovisual). Frontal theta is associated with emotional and attentional processing, yet direct comparison of the three modalities within the same participants under a baseline-normalized design remains limited. This modality sensitivity was evaluated in an exploratory manner.

Methods: Data were collected after ethics approval and informed consent. Thirty students (15 female, 15 male) participated. Stimuli were drawn from standardized databases (auditory: IADS-E; visual: NAPS; audiovisual: EGEFILM). Valence and arousal followed the database norms; arousal was held approximately constant while contrasting positive and negative valence. Audiovisual stimuli were longer; however, theta power was time-averaged over each recording and baseline-normalized to improve comparability across modalities. EEG was recorded with a 14-channel headset (EMOTIV EPOC X). Eight frontal channels were analyzed; theta power was baseline-normalized, log-transformed and z-normalized to one value per participant. Stimulus type and its interaction with valence were tested with repeated-measures ANOVA (Greenhouse-Geisser corrected), followed by Bonferroni-corrected pairwise comparisons.

Results: The main effect of stimulus type was significant: $F(1.71, 49.72)=4.62$, $p=0.019$ (Greenhouse-Geisser corrected, $\varepsilon=0.86$), $\eta^2p=0.057$. The visual condition produced the lowest response (+0.12), and the auditory (+0.34) and audiovisual (+0.28) conditions were higher. Post-hoc comparisons (Bonferroni-corrected) showed both the auditory ($p=0.048$, $d=0.59$) and audiovisual ($p=0.029$, $d=0.47$) conditions significantly higher than visual, whereas auditory and audiovisual did not differ ($p=1.00$). The valence × modality interaction was not significant ($F(2,58)=1.16$, $p=0.32$), with no evidence that the modality effect differed across valence.

Conclusion: Frontal theta is sensitive to stimulus modality, increasing more strongly with an auditory component, and appears important in EEG-based emotion recognition. As the theta band was selected in an exploratory manner, the results require confirmation.

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Keywords: EEG, emotion, frontal theta, repeated-measures ANOVA, stimulus type

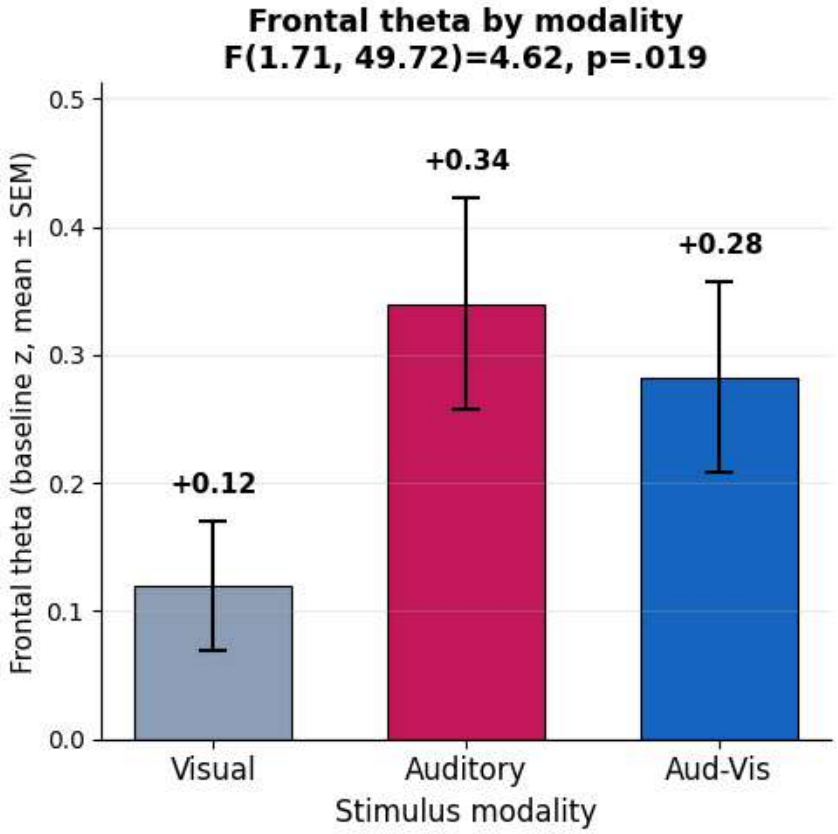


Figure 1. *Frontal theta power by stimulus modality (eight-channel average, baseline-normalized z; mean ± SEM, n=30, valence combined): the auditory (+0.34) and audiovisual (+0.28) conditions show a greater increase than the visual condition (+0.12); F(1.71, 49.72)=4.62, p=.019.*