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VOICE PERCEPTION IN THE VISUALLY DEPRIVED BRAIN: BEHAVIORAL AND ELECTROPHYSIOLOGICAL INSIGHTS

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Background: The ability to infer emotion and identity information from the voice is a relevant social skill. Although blind listeners need to rely more strongly on vocal cues alone to successfully interact with their social environment, the mechanisms of voice perception and its neural underpinnings remain poorly understood.

Aims: This Project investigated: 1) whether blindness modulated the perception of vocal emotion and identity information; 2) whether the age of blindness onset affected vocal emotion and identity perception mechanisms.

Method: Behavioural and event-related potential (ERP) measures of voice emotion and identity perception were collected in blind and sighted participants. The ERP analyses focused on the N1, P2, and late positive potential (LPP). Behavioural and ERP data analyses were conducted using linear mixed-effects models.

Results: Our ERP findings in voice emotion perception revealed that only early-blind listeners were sensitive to crying authenticity at the N1 (all p 's < .001) and middle LPP (all p 's < .001) time windows, and to laughter authenticity at the early LPP (all p 's < .001) time window. Moreover, early-blind and sighted listeners were more sensitive than late-blind ones to crying authenticity at the P2 (all p 's < .001) and late LPP (all p 's < .001) time windows. All groups were sensitive to laughter authenticity at the P2 time window (lowest $p = .016$), and to crying authenticity at the early LPP time window (lowest $p = .015$). Behaviourally, early-blind and sighted participants performed similarly well in emotional authenticity perception ($p > .999$), but the late-blind group performed worse than sighted controls ($p < .001$). Our ERP results in voice identity perception showed that identity effects were stronger in the early blind group (vs. sighted) at the N1 (lowest $p = .008$) and N400 stages (lowest $p < .001$). Furthermore, identity modulations at the P2, early LPP, and late LPP time windows were observed in both early blind and sighted groups, but sighted listeners were more sensitive than early blind to self- (at P2; $p < .001$) and familiar identity (at early LPP; $p < .001$). Behaviourally, there were no group differences in identity recognition ($p = .619$).

Conclusions: Together, these studies suggest that neural mechanisms of voice perception develop differently in cases of early blindness.

Keywords: Vocal emotion, Emotional authenticity, Vocal identity, Blindness, Neuroplasticity

Publications:

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