

# **Movement-dependent modulation of audiotactile integration early in life: distinct patterns of multisensory integration following self- and externally-directed movements in adults and newborns**

*Monday, September 23, 2024 6:30 PM (10 minutes)*

Compelling evidence shows that audio-tactile multisensory integration (AT-MSI) is modulated by body proximity already at birth. In our view, early movement may represent the developmental context allowing to encode multisensory stimuli in a body-centered reference frame, by anchoring auditory and tactile inputs to the body through proprioception. Based on these premises, we addressed whether AT-MSI is modulated by movement's directionality, i.e., whether distinct patterns of AT-MSI can be measured following hand-movements directed either to the self-body or to the external environment. First, we devised an EEG audio-tactile paradigm to capture this effect in adults and, then, we tested it in newborns. In our paradigm, tactile stimuli are delivered on the hand, either alone or concomitant with a sound and, by leveraging a postural manipulation, the hand is dragged either towards or away from the body. In a series of experiments, we demonstrate that, in adults, greater AT-MSI responses are observed following self- as compared to externally-directed movements. Crucially, preliminary results in newborns suggest the presence of this adult-like pattern already at birth. In sum, we provide original evidence on movement-dependent modulations of AT-MSI, in line with pioneering prenatal studies, highlighting differential kinematics during self- and externally-directed movements. In our interpretation, when movements aim toward the self, proprioceptive input anchors audio-tactile stimuli to the body, resulting in boosted AT-MSI responses. Our data indicate the presence of such a mechanism already at birth, which may ensure the evolutionary advantage of allowing better processing of environmental events approaching the body.

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The ontogenetic necessity to extract information from the auditory environment

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Yes

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