

Early traumatic experiences alter both spatial and temporal principles of multisensory integration

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Background - We process information from the world through multiple senses, and the brain must decide what information belongs together and what information should be segregated. To do so, our brain follows specific spatial and temporal principles with the intuitive consequence that stimuli detected within a specific spatial distance or temporal window are then integrated. These ranges, far from being rigid and pre-established, are rather particularly permeable to the nature of the sensory experiences that are acquired during development.

Objectives - In this context, the potential effect of early traumatic experiences on shaping multisensory processing has been partially theorized but empirically unexplored (De Klerk et al., 2021; Rabellino et al., 2020). The aim of the present study was to investigate whether exposure to traumatic events during development can lead to alterations in multisensory integration processes.

Methods - We asked a group of Sierra Leonean adolescent exposed to traumatic experiences during development to perform an audio-tactile peripersonal space task (Serino et al., 2015; Ferroni et al., 2020) and a simultaneity judgment task (Wallace & Stevenson, 2014) to measure spatial and temporal principle of multisensory integration processing, respectively.

Results - Compared to controls, adolescents exposed to trauma showed a narrower multisensory integration space and a wider multisensory integration temporal window. Furthermore, estimates of spatial and temporal multisensory integration correlated with the assessment of clinical consequences of trauma exposure.

Discussion - The present study reveals that being exposed to early traumatic experiences specifically alters the principles governing the processes of multisensory integration, raising interesting reviews of at least some of the clinical sequelae frequently associated with such experiences (e.g., dissociative phenomena, interpersonal deficits, temporospatial distortions).

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