Neuroscience in Psychiatry

EPP206

Camera movement impacts on mu-wave activity during action observation in adults with Autism Spectrum Disorders without intellectual disabilities

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Introduction: Despite extensive investigation, the neurophysiological underpinnings of ASD remain poorly understood; a predominant hypothesis relates to the activity of the brain's mu-rhythm (defined as the frequency band ranging between 8–14 Hz topographically centered over the sensorimotor cortex) and the so-called "Mirror Neuron System" (MNS), considered as an execution-imagination-observation matching system. In particular, mirror neurons (MN) are bimodal neurons located in the ventral premotor cortex, discharging both when a goal-directed action is performed and when it is observed. Previous studies investigating mu-wave suppression in individuals with ASD were limited by having consistently employed video clips filmed with a fixed camera position, hence not including the potential movement of the observer towards the other person (a condition perceived as more ecological and close to reality).
Objectives: Aim of this study was to investigate differences in mu-wave modulation in individuals with Autism Spectrum Disorder (ASD) without intellectual disabilities with respect to a group of neurotypical controls (NT).
Methods: Thirty individuals with ASD and thirty NT underwent an EEG recording while watching short videos depicting goal-oriented action filmed from a fixed position, zooming in on the scene, and approaching the scene by means of a steadycam. Afterwards, participants underwent a rating task to evaluate their subjective viewing experience.
Results: Steadycam videos elicited enhanced event-related desynchronization (ERD), suggestive of an enhanced neural activity, in the NT group, and a reduced ERD in the ASD group, with respect to the other filming conditions. ASD participants also showed difficulties in returning to baseline mu-power levels after watching videos filmed from a fixed position. NT reported to feel more comfortable watching videos with movement, whereas participants with ASD did not exhibit differences between conditions.
Conclusions: The ecological nature of video recording (i.e., visual stimuli filmed with a steadycam) seems to have an opposite effect on the ASD an NT population, as it enhances mu-wave suppression in NT, and reduces it in individuals with ASD, bringing them to a level of desynchronization closer to the one of NT. Understanding these differences might help developing tailored interventions to support perceptual, cognitive, and social processes of people with ASD.

Disclosure of Interest: None Declared

EPP208

Varying Impacts of MRI-Detected Lesions on Cognitive Function in CADASIL Patients

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Introduction: Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy (CADASIL) is a hereditary cerebrovascular disorder caused by point mutations in the NOTCH3 gene located on chromosome 19. The condition is primarily characterized by three core MRI lesions: white matter hyperintensities (WMH), lacunar infarcts, and cerebral microbleeds. Unlike age-related MRI lesions, which can be attributed to multiple factors such as aging, hypertension, and diabetes, the lesions in CADASIL are linked to a single genetic cause, offering a more uniform model for studying the impact of lesion location.
Objectives: This study focuses on CADASIL patients and aims to identify factors associated with dementia while examining the relationships between total WMH volume, WMH location, lacunar infarct count, cerebral microbleeds, and cognitive performance.
Methods: A total of 81 participants were included in the study. Each participant underwent both brain MRI and the CERAD neuropsychological battery. White matter hyperintensity (WMH) volume was assessed via MRI, and the WMHs were categorized by their proximity to the ventricular surface into three types: juxtaventricular (JVWMH), periventricular (PVWMH), and deep white matter hyperintensities (DWMH). DWMH included lesions located beyond 13 mm from the ventricular surface. Additionally, MRI was used to evaluate the number of lacunar infarcts and cerebral microbleeds (CMB) present.
Results: The prevalence of dementia among CADASIL patients was 18.5%. Logistic regression analysis revealed an odds ratio of 1.078 (95% CI = 1.011–1.150) for WMH volume. Similarly, However, the number of lacunar infarcts and CMB did not demonstrate a significant relationship with dementia risk. Linear regression analysis indicated that total WMH volume was significantly linked to performance on several cognitive tests. When WMH volume was categorized by distance from the ventricular surface, JVWMH volume and PVWMH volume werr significantly associated with performance on various cognitve tests. Conversely, DWMH volume did not demonstrate a significant association with cognitive performance in CADASIL patients. The number of lacunar infarcts was correlated with performance on the trail-making test A, the Stroop word test, and the Stroop color test, while cerebral microbleeds did not show significant associations with cognitive performance.
Conclusions: Core MRI-detected lesions exhibit diverse impacts on cognitive function in CADASIL patients. Total WMH volume and JVWMH volume showed a significant correlation with dementia diagnosis. However, DWMH volume did not demonstrate a significant relationship with either dementia diagnosis or specific cognitive functions. The number of lacunar infarcts was notably associated with visual search speed, while CMB were not significantly connected to dementia diagnosis or any particular cognitive functions

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