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Special Theme of the Issue. Psychophysiological Explorations: From Body Posture to Social Conformity

EDITORIAL

Studying the human brain is challenging for several reasons. The human brain consists of billions of nerve cells called neurons, which form complex networks. These networks allow us to think, feel and act. But these networks are so complex that they have not yet been fully explored. And any of methods does not always give a complete picture of what is happening inside the brain. This means that research into the brain should take into account various aspects and functions. Thus, studying the human brain is a complex task that requires the use of many different methods and approaches. However, thanks to the development of neuroscience, we continue to learn more about how our brain works. The current thematic issue proposes several articles on psychophysiological mechanisms of different phenomena from body posture to social conformity.

To begin with posture, a study of Ragimova et al. investigated the MNS functioning during head rotation using a mirror task where participants observed finger movements in different head positions while receiving transcranial magnetic stimulation (TMS) at varying intervals. The results demonstrated significant interactions between the movement type and the targeted muscle, revealing increased activation of the First Dorsal Interosseous (FDI) muscle during the index finger and neutral movement observation compared to the little finger movement. Conversely, inhibition of the Abductor Digiti Minimi (ADM) muscle activity was observed during the index finger movement compared to neutral, with the opposite effect seen during little finger movement observation. These findings suggest a complex relationship between MNS activation and muscle activity, indicating increased muscle activation corresponding to the observed finger movement and simultaneous inhibition of muscles not directly involved in the observed motion.

A substantial part of the issue is devoted to working memory, a vital cognitive function for temporarily storing information to aid goal-directed behavior, encompassing components such as the visuospatial sketchpad and central executive. While neuroimaging studies have focused on specific aspects of modality-specific information processing, a comprehensive model evaluating all working memory components is lacking. Otstavnov et al. proposed a modified paradigm based on the retro-cue task to isolate the activity of each working memory component, including

the central executive, through five conditions. Testing on 35 healthy adults revealed varying workloads for simple and complex storage conditions in verbal and visual modalities. This experimental design offers a framework to assess neural activity related to central executive components in different modalities, enhancing understanding of working memory organization.

Reading involves eye movements influenced by various cognitive processes, including working memory capacity, which can vary among individuals. A study by Chuikova et al. aimed to investigate how working memory capacity affects peak saccade velocity during reading tasks with increased cognitive demands. Thirty-one participants read sentences while completing comprehension and reading span tasks. Those with higher n-back task performance showed higher peak saccade velocity during reading tasks, while lower performers did not exhibit significant changes. These findings suggest a connection between working memory, arousal levels, and cognitive processes during reading comprehension.

However, in psychology and neuroscience, researchers should meticulously select experimental stimuli, requiring standardized databases with detailed object information to ensure consistency. While current databases encompass various attributes, they often neglect the aesthetic aspects of human-designed objects. Aesthetic perception is increasingly associated with cognitive processes, motor functions, and decision-making. The absence of standardized visual stimuli with controlled aesthetic features presents a research obstacle. To address this issue, Ledneva et al. have introduced a collection of 126 everyday object images assessed for visual appeal under three conditions: tidy, neutral, and untidy, representing differing attractiveness levels. This new dataset aims to support studies exploring the impact of aesthetics on human-object interactions.

Finally, growing evidence suggests that cultural influences impact brain activity, requiring a comprehensive framework to understand the complex interplay between culture, behavior, and neural function. Cooperation and social conformity mechanisms within cultures show diverse interdependence levels reflected in unique neural patterns. To address the fragmented examination of these mechanisms, Godovanets et al. have introduced the Neuro-Cultural Interdependence Model categorizing four modes with specific neural signatures and behavioral tendencies in cultural contexts. These modes illustrate varying levels of interdependence, shedding light on how individuals engage and depend on others within their cultural setting. The model proposes a direct connection between cultural orientations and neural processes, offering a fresh perspective on how culture internalizes and manifests at the individual level, emphasizing its integration within neural mechanisms that influence cognitive, emotional, and behavioral responses towards others.

The content of the articles in this thematic issue suggests the complex relationships between different mental processes and their brain correlates. This creates special circumstances not only for fundamental research, but also for targeted, applied work aimed at deeper understanding of the human brain and behavior.

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