科技部人文社會科學研究中心

科技部跨領域研究計畫之前置規劃案成果報告

(不同程度意識知覺的神經機制)

規劃案編號：MOST 104－2420－H－002－016－MY3－L10605
規劃案執行期間：106 年 8 月 1 日至 106 年 12 月 31 日
執行機構及系所：國立臺灣大學電機系

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中　華　民　國 107 年 1 月 2 日

摘要

現今關於知覺意識產生的研究著重在分辨有意識與無意識兩者狀態的不同。但根據訊息處理的理論，外界的知覺訊息含括多種層次。例如人臉就至少包含用來傳達人臉本體的低階特徵以及用來傳達其所代表之身份的高階特徵。根據此一論述，知覺意識的產生是否也如同知覺訊息有著不同的層次？此計畫的目標即藉由行為實驗與磁波儀的研究方法探討不同程度知覺意識的神經機制。在實驗設計中，受試者觀看一連串快速閃動被遮蔽的人臉時，某些時候他們能辨認出人臉的身份（高階知覺意識），某些時候只能探知人臉的出現但不知其身份（低階知覺意識），更有些時候完全無法知曉人臉的存在。實驗結果發現在人臉未出現之前，腦磁波相位的差異能幫助決定後續不同階層的知覺意識。此外，在人臉出現的瞬間，高階的知覺意識所誘發的相位排列，出現較強的一致性。隨後，高階的知覺意識還與 P300 有著密切的關係。總上而言，我們的研究顯示不同程度的知覺意識仰仗兩種腦波的共同作用：持續性的大腦活動和刺激引發的大腦活動。

關鍵字: 意識、腦磁圖、相位、P300

ABSTRACT

An important issue facing the empirical study of consciousness concerns how the contents of incoming stimuli gain access to conscious processing. According to classic theories, facial stimuli are processed in a hierarchical manner. However, it remains unclear how the brain determines which level of stimulus contents is consciously accessible when facing an incoming facial stimulus. Accordingly, with a magnetoencephalography technique, this study aims to investigate the temporal dynamics of the neural mechanism mediating which level of stimulus content is consciously accessible. Participants were instructed to view masked target faces at threshold, so that according to behavioral responses, their perceptual awareness alternated from consciously accessing facial identity in some trials to being able to consciously access facial configuration features but not facial identity in other trials. Conscious access at these two levels of facial contents were associated with a series of differential neural events. Before target presentation, different patterns of phase angle adjustment were observed between the two types of conscious access. This effect was followed by stronger phase clustering for awareness of facial identity immediately during stimulus presentation After target onset, conscious access to facial identity, as opposed to facial configural features, was able to elicit more robust late positivity. In conclusion, we suggest that the stages of neural events, ranging from prestimulus to stimulus-related activities, may operate in combination to determine which level of stimulus contents is consciously accessed. Conscious access may thus be better construed as comprising various forms that depend on the level of stimulus contents accessed.

KEYWORDS: Consciousness; MEG; Phase; P300