The O-to-P consistency and homophone density effects in writing Chinese characters

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Previous studies have demonstrated that knowledge of orthography influences the spoken word recognition and proposed two kinds of explanations. One is the orthographic co-activation view, which assumes that orthography is activated online during spoken word recognition (Perre & Ziegler, 2008). The orthography effect would arise within main spoken language areas and distant cerebral regions known to process orthographic information (i.e. temporo-occipital visual cortex). The other one is the phonological restructuring view, which claims that the orthographic properties of words may restructure preexisting phonological representations during literacy acquisition. The orthography effect would arise within the speech network that processes phonological information, such as left inferior frontal gyrus (IFG), insula, superiortemporal gyrus (STG, BA22) and supramarginal gyrus (SMG, BA40). This study aims to use MEG, which provides great temporal and spatial resolution, to investigate the neural substrates of orthographic consistency effect (i.e. homophone density) in writing Chinese characters with dictation and to resolve the debate between the orthographic co-activation and phonological restructuring views. Participations would hear 108 monosyllabic Chinese spoken words and then were asked to write down the corresponding characters. These candidates for orthographic outputs were divided into four conditions based on their O-to-P consistency (High/Low) and homophone density (High/Low). For the averaged dynamic statistical parametric maps (dSPM) of homophone density effect, the signiﬁcant activitiese were ﬁrst seen in the left insula (433-548ms) and STG (494-546 ms), and then spread to the left temporo-occipital visual cortex such as left inferiorparietal (545- 614 ms) and left lingual (743- 842 ms), which support the co-activation of orthographic codes in spoken word processing. Besides, the O-to-P consistency effect revealed a later activation in the left IFG (555-597 ms), SMG (788-850 ms) and STG (666-752 ms), and modulated the homophone density effect. To be more specific,. the homophone density effects were found in low O-P consistent characters in left IFG, SMG , ITG, inferior parietal gyrus and fusiform (580-850 ms). The second-order feedback consistency effect in the auditory modality supports the reverberation between orthography and phonology in spoken word recognition.

Emotional Mismatch Negativity in Patients with Chronic Schizophrenia

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Although the general consensus holds that emotional perception is impaired in patients with schizophrenia, the extent to which neural processing of emotional voices are altered in schizophrenia remains to be determined.

We measured auditory event-related potentials (ERP) in 30 patients with chronic schizophrenia and 30 controls who were screened for criteria based on the Diagnostic and Statistical Manual of Mental Disorder IV and evaluated using the Positive and Negative Syndrome Scale (PANSS). In a passive oddball design, happily or angrily spoken deviant syllables were randomly presented within a train of emotionally neutral standard syllables.

In patients with chronic schizophrenia, ERP component mismatch negativity (MMN) − which reflects preattentive auditory change detection− significantly decreased for angry syllables and angry-derived deviants. Angry P3a, which is a selective attention control index, had comparable amplitudes but longer latencies in the schizophrenia group. Weaker MMN amplitudes were associated with more positive symptoms of PANSS among patients with chronic schizophrenia. Receiver operator characteristic analysis revealed that angry MMN, angry-derived MMN, and angry P3a yielded a value of 0.65 (*p* = .049), 0.70 (*p* = .007), and 0.66 (*p* = .037).

Our results suggested that patients with chronic schizophrenia might process emotional voices in an atypical fashion at the preattentive level, which might be partially driven by impaired processing of low-level acoustic parameters. This abnormality was associated with positive schizophrenia symptoms.