

The two stages of facial expression recognition: An ERP study

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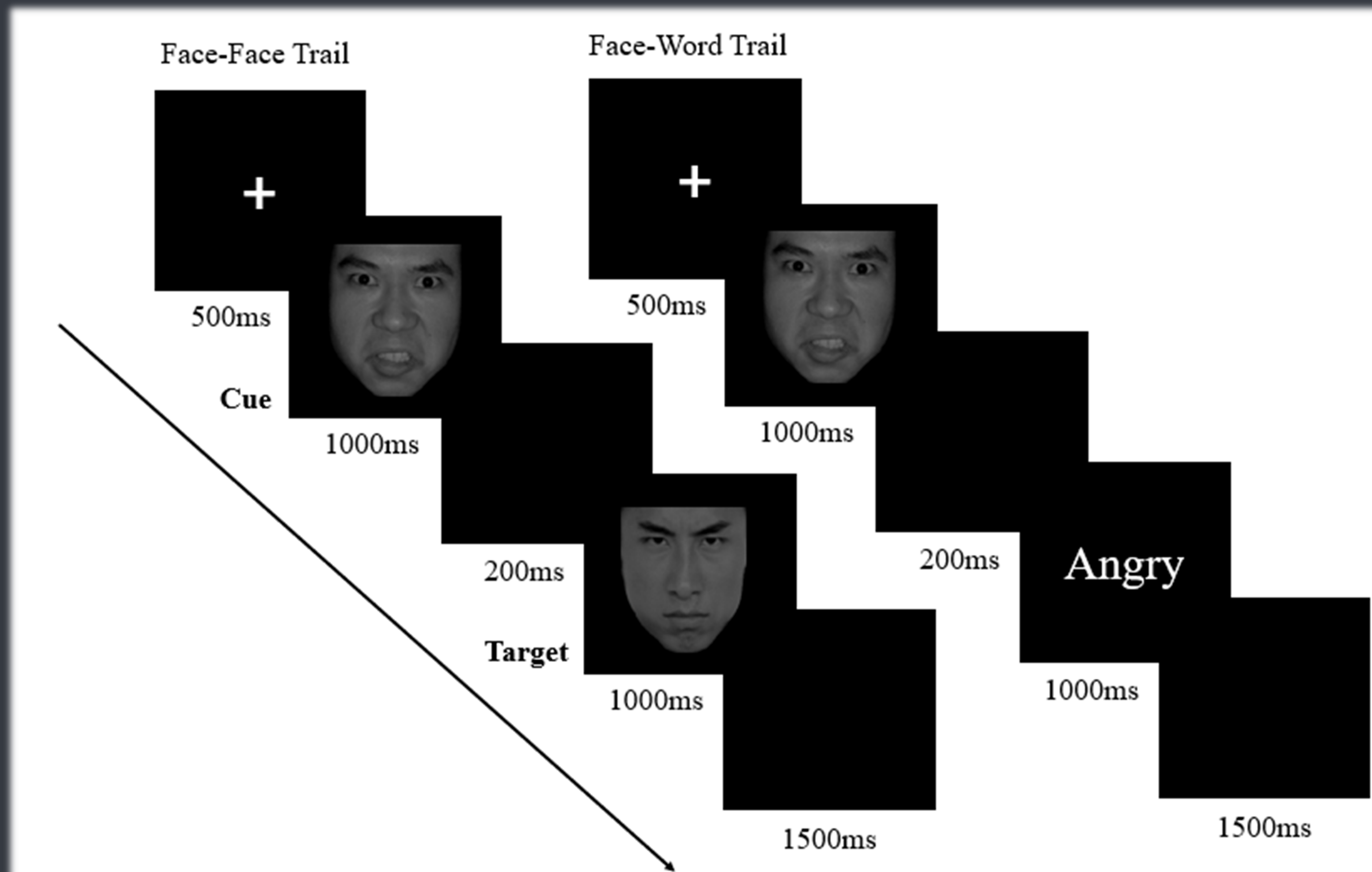
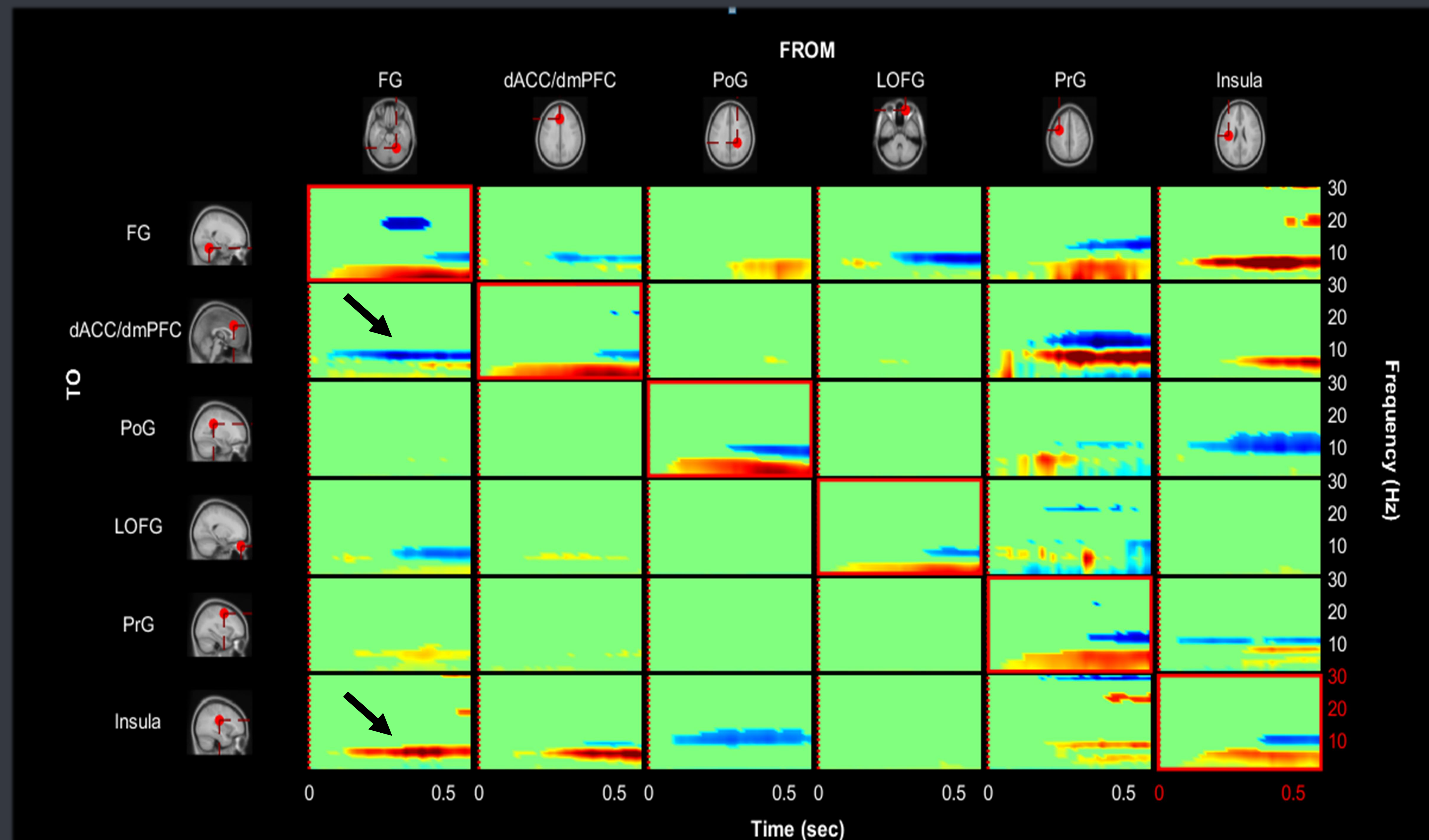


Purpose

- To examine the processing time course of facial structure and concepts in the facial expression recognition.
- To examine the neurocognitive processing stages of facial expression recognition.

Method

- Subjects: Participants contained 12 males and 14 females.
- The 3 (Emotion: Happy, Neutral, Angry) × 2 (Task: Face-word, Face-Face) within-subject design to analysis the behavior data.
- 2 (Emotion: Happy-neutral, Angry-neutral) × 2 (Task: Face-word, Face-Face) × electrodes within-subject design to analysis the mean amplitude of N170 and P2.



Procedure

The picture above displaying two possible conditions. “Cue” and “target” stimuli would be presented sequentially. Participants were asked to judge whether or not the emotion of the target matched the emotion of the cue when the target appeared. The cue was always emotional face. While the target could either be emotional face or emotional face word. Besides, the cue and target stimuli pair could either be identical or different.

Results

- Behavior results showed that emotional words were recognized faster than emotional faces, both of which were primed by emotional faces in happy, neutral and angry emotion recognition condition.
- ERP results showed that the contrast of happy and neutral evoked larger N170 in the word condition. There was no difference between the contrast of happy and neutral and the contrast of angry and neutral in face condition. Both emotional words and faces showed larger P2 when processing angry emotion.
- The information flow analysis showed a significant decrease (6-10 Hz) of flow of information from fusiform gyrus to dACC/dmPFC and the increase (5-8 Hz) of flow of information from fusiform gyrus to insula.

Conclusion

- The facial structure was processed in N170 stage. Next, participants extract emotion concepts to distinguish specific emotion categories in P2 stage. Facial expression recognition involves two stages of processing from structure to concepts.