Abstract

This study examines the neural correlates of response selection conflict in a strategic recognition task. Previous studies have shown that familiarity and recollection processes contribute collectively or in isolation to correct responses. Here, we propose that familiarity and recollection processes contribute to incorrect responses and that these processes may lead to response conflict on certain trials. To test this model, we measured brain activation patterns during a strategic recognition task. In Experiment 1, we measured brain activation patterns using functional magnetic resonance imaging (fMRI) while participants engaged in a strategic recognition task. Our results suggest that the anterior cingulate cortex (ACC) and dorsal rostral prefrontal cortex (DOR) are activated during response conflict. In Experiment 2, we measured EMG activity to determine whether motor conflict was also observed. Our results suggest that motor conflict was also observed in the DOR region. These results are consistent with previous studies using fMRI and EMG to study strategic recognition tasks.

Introduction

In the model-exclusion exclusion task, participants study two lists and later respond “old” to items from one list (old-exclude) and “new” to items from the other list (new-exclude). Typically, participants are slower and less accurate when rejecting false items compared to true hits. Many dual-process accounts of recognition performance suggest that familiarity and recollection processes contribute collectively or in isolation to correct responses. However, the relative contributions of these processes are not fully understood. The present study examines the neural correlates of response conflict in a strategic recognition task.

Method

Participants

Ten volunteers (ages 19-25, women).

Experimental Procedure

Phase 1: Filler Task. This task included two conditions: a 20-item study phase followed by a 20-item recognition phase. In the study phase, participants were presented with a series of phrases and were instructed to remember them. In the recognition phase, they were presented with a series of phrases and were instructed to judge whether each phrase was old or new.

Phase 2: Include Study Task. This task included three conditions: a 10-item study phase followed by a 20-item recognition phase. In the study phase, participants were presented with a series of phrases and were instructed to remember them. In the recognition phase, they were presented with a series of phrases and were instructed to judge whether each phrase was old or new.

Phase 3: Exclusion Study Task. This task included three conditions: a 10-item study phase followed by a 20-item recognition phase. In the study phase, participants were presented with a series of phrases and were instructed to remember them. In the recognition phase, they were presented with a series of phrases and were instructed to judge whether each phrase was old or new.

Brain Region of Interests

ACC (left), ACC (right), DOR (left), DOR (right), FPC (left), FPC (right), VPFC (left), VPFC (right).

Results

Phase 1: Filler Task. No significant differences were found between the old-exclude and new-exclude conditions. Phase 2: Include Study Task. Significant differences were found between the old-exclude and new-exclude conditions. Phase 3: Exclusion Study Task. Significant differences were found between the old-exclude and new-exclude conditions.

Summary & Conclusions

The present study investigated the neural correlates of response conflict in a strategic recognition task. Our results suggest that the anterior cingulate cortex and dorsal rostral prefrontal cortex are activated during response conflict. These results are consistent with previous studies using fMRI and EMG to study strategic recognition tasks.

References