

P-367 - MOTOR-LANGUAGE COUPLING: DIRECT EVIDENCE FROM EARLY PARKINSON DISEASE AND HUMAN CORTEX DIRECT RECORDINGS

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Language and action systems are functionally coupled in the brain as demonstrated by converging evidence using MRI, EEG, TMS and lesion studies. In addition, this coupling has been demonstrated behaviorally using the action-sentence compatibility effect (ACE) in which motor activity and language interact. Here we investigate direct motor-language coupling in two novel and uniquely informative ways. First, we measured the ACE in patients with motor impairment (early Parkinson disease, EPD) and second in epileptic patients with direct electrocorticography (ECoG) recordings. In experiment 1, EPD participants with preserved motor responses and a relatively preserved cognitive profile nonetheless showed a much diminished ACE relative to matched, non-EPD volunteers. In addition, EPD participants showed a strong association between the size of the ACE and the KDT test of verbal processing. The ECoG (experiment 2) provides a fine-grained spatial and temporal information of about the ACE brain signatures. ECoG in motor and language areas demonstrated simultaneous bidirectional effects: Motor preparation affected language processing (left inferior frontal gyrus and middle/superior temporal gyrus) and language processing affected activity in motor areas (premotor and M1). Our results open new pathways in the fields of motor diseases, theoretical approaches to language understanding, and models of action-perception coupling.