

Neurophysiological evidence for instantaneous processing of speech prosody conveying different communicative actions

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Abstract (250 words, now 250)

In everyday conversations, the speaker's communicative intentions can sometimes be understood through the power of the voice, namely intonation. Rising vocal tone at the sentence-final word typically acts as a cue for the recognition of an utterance as a question types, as opposed to falling pitch denoting statements. Little is known about the brain correlates underlying such prosodic markers affecting the meaning of the speaker's linguistic action. Here, we show that already at ~100 ms after the critical word differing in intonation brain responses diverged between question and statement functions expressed with the same spoken sentence. To control for the effect of acoustic features, we also presented low-pass filtered and non-linguistic sounds obtained by mimicking the f0 contours of critical sentences. These control conditions did not show any neurophysiological dissociations comparable to the speech acts differing in prosody, thus arguing against an effect of the physical intonation differences. The cortical origin generating the larger responses of questions compared to statement, showed activation in the articulatory motor, inferior frontal and right temporo-parietal regions. These activations may reflect the processing of richer action- and social interaction knowledge immanent to questions, particularly the expectations of the partner action of answering the question. As other types of directive speech acts are characterized by such motor activation indicative of expectations of partner actions, these results appear consistent with a grouping of questions into the broader category of directives. The present findings underscore the crucial role of prosody for the rapid understanding of linguistic actions.