

THE LANGUAGE CIRCLE

MPI FOR HUMAN COGNITIVE AND BRAIN SCIENCES, STEPHANSTRASSE 1A, LEIPZIG

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Neural dynamics and computations constraining speech processing

To investigate speech comprehension, we developed a framework based on channel capacity, defined as the maximum rate at which information can be transmitted over a communication channel without errors. We behaviorally examined the influence of seven acoustic and linguistic features on the comprehension of compressed speech. Our results show that comprehension is independently affected by all these features, with a clear dominance of the syllabic rate. Using human intracranial recordings, we then studied how neural dynamics in the auditory cortex adapt to different acoustic features, enabling parallel sampling of speech at syllabic and phonemic timescales. These findings highlight the dynamic adaptation of neural processes to temporal characteristics in speech, enhancing our understanding of speech perception.