1. Record Nr. UNINA9910220055403321

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Titolo	Neural Mechanisms of Perceptual Categorization as Precursors to Speech Perception
Pubbl/distr/stampa	Frontiers Media SA, 2017
Descrizione fisica	1 online resource (186 p.)
Collana	Frontiers Research Topics
Soggetti	Neurosciences
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia

Sommario/riassunto

Perceptual categorization is fundamental to the brain's remarkable ability to process large amounts of sensory information and efficiently recognize objects including speech. Perceptual categorization is the neural bridge between lower-level sensory and higher-level language processing. A long line of research on the physical properties of the speech signal as determined by the anatomy and physiology of the speech production apparatus has led to descriptions of the acoustic information that is used in speech recognition (e.g., stop consonants place and manner of articulation, voice onset time, aspiration). Recent research has also considered what visual cues are relevant to visual speech recognition (i.e., the visual counter-parts used in lipreading or audiovisual speech perception). Much of the theoretical work on speech perception was done in the twentieth century without the benefit of neuroimaging technologies and models of neural representation. Recent progress in understanding the functional organization of sensory and association cortices based on advances in neuroimaging presents the possibility of achieving a comprehensive and far reaching account of perception in the service of language. At the level of cell assemblies, research in animals and humans suggests that neurons in the temporal cortex are important for encoding biological categories. On the cellular level, different classes of neurons (interneurons and pyramidal neurons) have been suggested to play differential roles in the neural computations underlying auditory and visual categorization. The

moment is ripe for a research topic focused on neural mechanisms mediating the emergence of speech representations (including auditory, visual and even somatosensory based forms). Important progress can be achieved by juxtaposing within the same research topic the knowledge that currently exists, the identified lacunae, and the theories that can support future investigations. This research topic provides a snapshot and platform for discussion of current understanding of neural mechanisms underlying the formation of perceptual categories and their relationship to language from a multidisciplinary and multisensory perspective. It includes contributions (reviews, original research, methodological developments) pertaining to the neural substrates, dynamics, and mechanisms underlying perceptual categorization and their interaction with neural processes governing speech perception.