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Auditory scene analysis emerges from a distributed yet integrated network

Rhodri Cusack[a] and Daniel Pressnitzer[b]

[a]MRC CBU, 15 Chaucer Road, Cambridge, CB2 7EF Cambridge, UK

[b]CNRS UMR 8158 ; Univ. Paris Descartes ; Ecole Normale Supérieure, 29 rue d'Ulm, 75005 Paris, France

Three architectures that have been explicitly or implicitly proposed for auditory scene analysis were evaluated: (1) that some single module is responsible for scene analysis after feature extraction; (2) that scene structure is elaborated through feed-forward stages of auditory processing; and (3) that scene analysis is integrated yet distributed. It is argued that the available evidence points towards the third model. Against (1), scene analysis is influenced by features that are best represented across a broad range nodes in the auditory network, and transmitting this information to a single module would not be parsimonious. Furthermore, neurophysiology has shown a range of nodes reflect scene analysis, ranging from the cochlear nucleus, through auditory cortex to the parietal cortex. Against both (1) and (2) is the high degree of reciprocal interaction between the behavioural derivation of features and scene analysis, and the integration evident from the exclusivity of scene organisations. In contrast, model (3) naturally predicts these observations and is compatible with auditory anatomy, which is not "feed forward"or hub like. Finally, we highlight outstanding issues important to a fuller understanding of scene analysis, such as the neural code for perceptual groups and the mechanism for extraction of statistical regularities.