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Evaluation of auditory processing disorder and auditory efferent system functionality in adult dyslexics: towards a unification theory of auditory-language processing impairments?

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In a recent paper, Veuillet et al., (2007) suggested that some auditory processing mechanism could be impaired in children with dyslexia. They reported a link between children's ability to perceive phonemic boundaries and the physiological functionality of their medial olivocochlear system (MOC), an auditory efferent pathway functioning under central control. In the present experiment, we extended this observation by comparing speech-in-speech comprehension performances in a group of control participants (N=40) and a group of adults who had been diagnosed dyslexic as children (N=49). Confirming the idea that patients with dyslexia present auditory processing disorders (APD), we show that adult dyslexics exhibit greater difficulty in comprehending speech in noise. Data moreover suggest a link between speech-in-noise comprehension difficulty and the MOC functionality in these participants. More precisely, it appears that the absolute functionality of the left and right MOC bundles does not differ in dyslexic patients compared to controls. What appears to be differing is the functional asymmetry in the MOC functionality between both ears, normal readers showing a classical functional asymmetry, while dyslexic adults show an absence of-, or reduced functional asymmetry between MOC bundles. These results will be discussed in the context of current models of APD and Dyslexia.