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## Introduction to auditory processing disorder - the language 'barrier'

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from International Society on Brain and Behaviour: 3rd International Congress on Brain and Behaviour  
Thessaloniki, Greece. 28 November – 2 December 2007

Published: 17 April 2008

*Annals of General Psychiatry* 2008, **7**(Suppl 1):S9 doi:10.1186/1744-859X-7-S1-S9

This abstract is available from: <http://www.annals-general-psychiatry.com/content/7/S1/S9>

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Medical Psychoacoustics is the field of science dealing with the way human beings perceive auditory phenomena and the inter-relation with the physical characteristics of sounds; extending from the simplest (a tone) and going all the way to the most complex everyday life sounds such as speech and music. When perceiving sounds, a human being uses first of all his hearing. Additional functions involve attention, language abilities, memory, learning, as well as vision. All of them need to be intact in order for the auditory perception to work properly, especially in highly demanding auditory situations and/or conditions.

Real time processing of auditory stimuli involves the transformation of auditory into mechanical energy and subsequently into electrical pulses. During the peripheral processing higher ordered functions from the central auditory nervous system (CANS) are simultaneously involved in the rapid and detailed processing leading into accurate perception.

Assessment of the central auditory nervous system in people with normal audiograms was gradually made feasible with the development of two tests: a speech test in which the low frequency acoustic features of the speech signal had been removed (Bocca, Calero & Cassinari, 1954) and the Broadbent (1954) invented the dichotic listening technique, which was employed by Kimura (1961) in the study of both normal subjects and patients with brain lesions and which was additionally employed in the evaluation of brain laterality.

In our attempt to construct a diagnostic test battery, the major obstacle was the many speech based tests that are currently being used for Auditory Processing Disorders. The tests included in our test battery finally were: 1. a dichotic digits one, used as early as the 80ies, 2. a newly developed speech in babble test, 3. a Frequency Pattern

Sequence Test, 4. a Duration Pattern Sequence Test, 5. a Masking Level Difference Test and 6. a GAP detection test. Verbal tests are mostly used as speech is a highly complex auditory signal but auditory and language processing are not clearly separated while testing.

Our initial results indicate that if failing two of the central auditory processing tests was the criterion to put the APD diagnosis then 54 in 177 children are diagnosed with some degree of auditory processing deficit. Additional testing is being done with IMAP software providing some information on auditory and visual attention. Further research is needed to optimize diagnosis and assist in the most appropriate management of the condition.