Adults with dyslexia have problems with non-speech sounds too

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(PhysOrg.com) -- Dyslexia is usually associated with persistent reading, spelling, and sometimes speech difficulties that are hard to overcome. One theory proposed to explain the condition is that people with dyslexia suffer from a more fundamental deficit in auditory processing than just interpretation of the spoken or written word, but this idea has produced much debate. Now scientists in Europe have shown that adults with dyslexia do have a specific auditory processing impairment that is not specific to speech sounds.

Dyslexia is a learning disability that can hinder the development of spoken and/or written language skills. In visual dyslexia there is a tendency to reverse letters or numbers and to struggle with writing symbols in the right order. In auditory dyslexia sounds may not be heard correctly or may seem jumbled. There have been many theories about the possible causes of the condition, and much debate about whether the condition only involves comprehension of language or lies in problems with auditory processing in general.

A team of scientists from Belgium, Switzerland and the UK designed experiments that tested auditory dyslexic adults (and non-dyslexic controls) using carefully controlled sound stimuli. They played recordings of consonant and vowel sounds in both speech and non-speech versions, and determined how well the subjects understood the sounds.

For consonants, they played a recording that rapidly alternated between

the sounds “ba” and “da,” in a speech version and then in a non-speech version that altered the pitch of parts of the sound, and mixed them up. For example, a non-speech version of “ba” could start with a high-pitch “b” and end with a low-pitch “ah,” or vice versa. They then repeated the experiments with speech and non-speech versions of the vowel sounds “u” and “y”.

The results showed that the subjects with dyslexia did find it difficult to distinguish between consonants but fared as well as the non-dyslexic subjects with vowel sounds. The non-dyslexic subjects had little trouble distinguishing the non-speech versions of the consonants but those with dyslexia were confused by them even if the non-speech tones were only slightly unnatural, which suggests their problem may be a difficulty in processing variations in intonation in sounds, whether from speech or other sources.

The results of the experiments may mean people with dyslexia could be able to undergo auditory training to help them learn to distinguish consonant sounds better by focusing on shifts in pitch.

The paper is published in the *Proceedings of the National Academy of Sciences*.

More information: Adults with dyslexia are impaired in categorizing speech and nonspeech sounds on the basis of temporal cues, *PNAS*, Published online before print May 24, 2010, doi:10.1073/pnas.0912858107

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