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Poster presentation

Preparation of speech materials for testing auditory processing in learning disabilities

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Background

Auditory processing is the ability to discriminate the auditory stimuli in real life situations with background speech or noise. Relation of auditory processing and learning disabilities has been studied worldwide. Literature has provided proof of auditory processing disorders in children with learning disabilities, the exact correlation and incidence of which is under evaluation. The most important auditory stimulus for communication, social life, and academic achievement is speech.

Materials and methods

Testing auditory processing requires the existence of testing materials based on speech. Non-speech materials are also used but only in a battery including speech tests. Our goal was to create speech testing materials using contemporary Greek language, highly frequent words and phonetically balanced lists of words containing a carrier-phrase to attract and maintain attention. The 3 lists of 50 words each that we created are 1. The shortest possible so as to minimize redundancy, 2. They are highly frequent (top 1000 bi-syllabic words in a lexicon based on a corpus of 9,000,000 words of written materials), 3. They reflect the frequency of occurrence of phonemes in Modern Greek, 4. They reflect first and second syllable stress and 5. They reflect the distribution of vowels in the stressed syllable. Recordings of the lists were made by one female and one male adult with no speech or hearing problem. 37 adults (18–45 years old) were tested to standardize the testing material.

Results

1. Nature of the error responses: The use of highly frequent words resulted in no subject reporting that they did not know any of the words and the suprathreshold presentation ensured that no subject reported that words were not loud and clear. Examination of the error responses showed that they were most often morphological variants of the stimulus words.

2. Mean identification scores for each voice and list: Mean correct word identification scores across subjects ranged from 96.3% (male voice – List 1) to 98.2% (female voice – List 1). The mean correct word identification score across lists for the male recording was 96.5% and, for the female recording, 97.7%. The analysis showed a statistically significant difference between voices, female higher than male, $(F(1,36) = 24.374, p < 0.01)$, but no effect of list $(F(2,72) = 1.219, p > 0.05)$ and no significant interaction $(F(2,72) = 0.799, p > 0.05)$.

3. Mean identification scores for each word: This analysis showed a significant effect of voice $(F(1,288) = 8.821, p < 0.01)$, with the female voice stimuli having been identified slightly more correctly than the male stimuli, a result similar to that reported above. In addition, a word was identified significantly better $(F(1,288) = 8.023, p < 0.01)$ if stress was on the second syllable (97.9% correct) than on the first (96.8%). There was no effect of list and no interactions.

4. Analysis of the female voice advantage: the female voice advantage was concentrated on words with stress on the first syllable.

Discussion

The first step in creating a test battery for evaluation of speech recognition ability and of central auditory processing disorders for any language involves the development of simple, easy-to-use, word-recognition tests like those that are available for English. The small but statistically significant advantage n intelligibility of the female voice over the male voice in the present investigation using Modern Greek reflects similar results from several investigations on English (Bradlow *et al*. 1996; Markham and Hazan, 2004; Ferguson, 2004).

References

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