

Development and evaluation of a test for the assessment of syllabic parsing ability in children

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Background

The Parsing Syllable Envelopes test (ParSE) was developed to investigate whether some children have a deficit in their ability to detect syllable boundaries.

Method

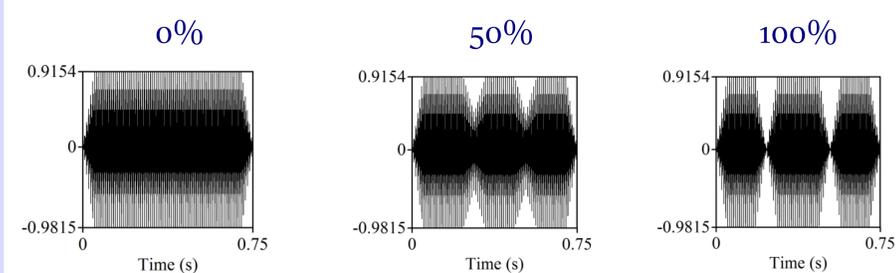
Participants: 138 6-12-year-olds (test and retest); 12 adults

Stimuli: 1, 2, & 3 synthetic [a:] syllables

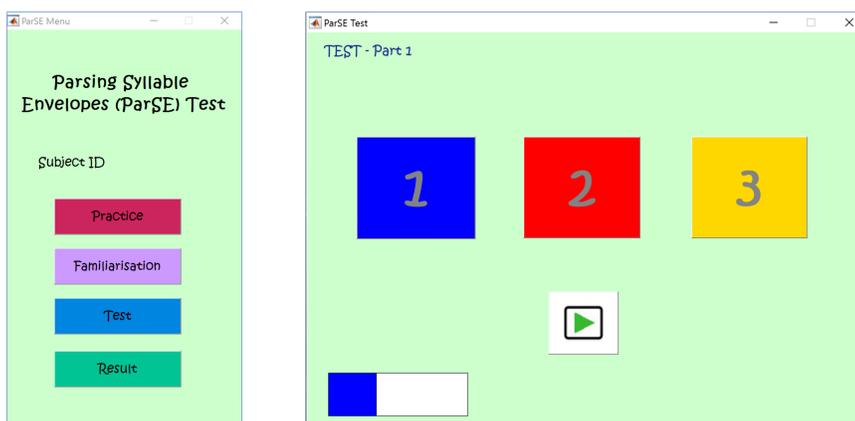
Modulation depths: [0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100]%

Part 1: Non-adaptive

Part 2: Adaptive based on Part 1 responses



ParSE GUI



Measures

Scoring (proportion correct)

1 = modulation identified

0 = modulation not identified

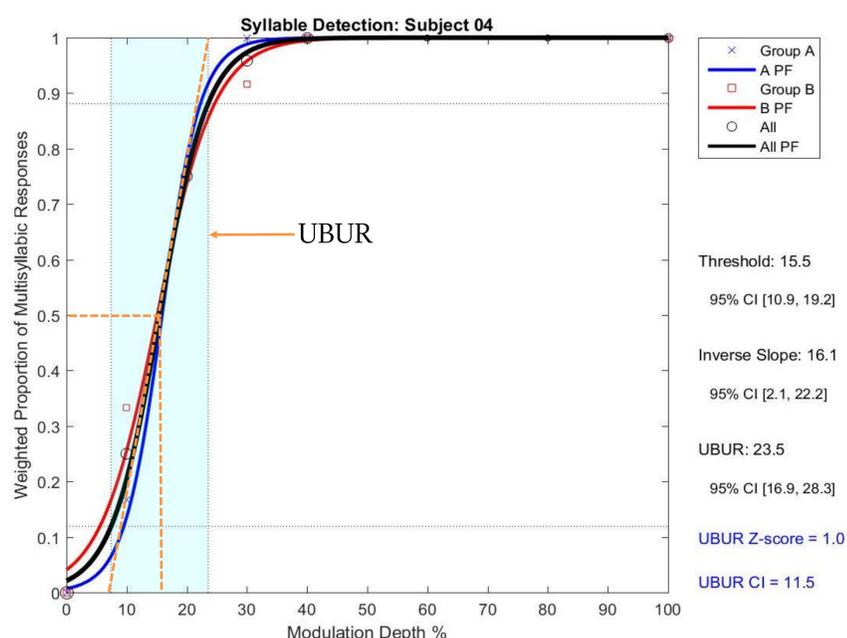
0.5 = incorrect number of syllables identified

Threshold: Point where an individual says that a stimulus is modulated 50% of the time.

Uncertainty Region: Width equal to inverse slope.

Upper Boundary of the Uncertainty Region:

(UBUR) = Threshold + (IS/2)



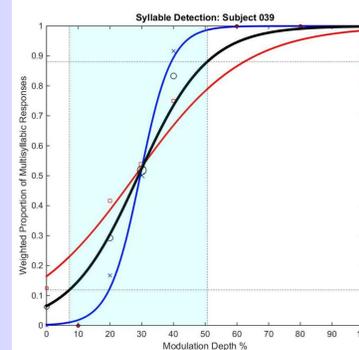
Results

- Average modulation depth at which the syllables can be parsed with 88% accuracy (UBUR) was 47% overall.
- No significant difference between test and retest (mean modulation depths of 48.4 and 40.4% respectively, $p = 0.14$). Test and retest correlation was strong ($r = 0.7$).

Child (8 years 2 months)

UBUR = 50.7

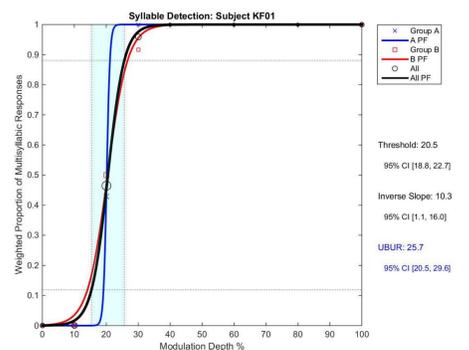
UBUR Z-Score = 0.00



Adult

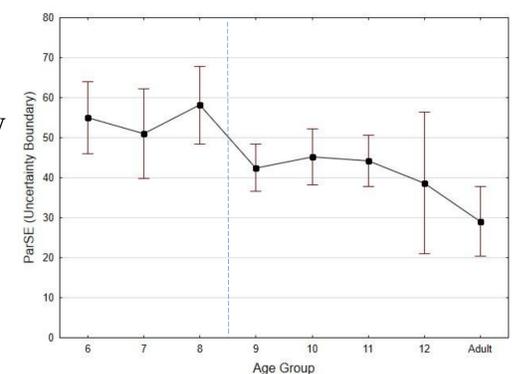
UBUR = 25.7

UBUR Z-Score = -0.16



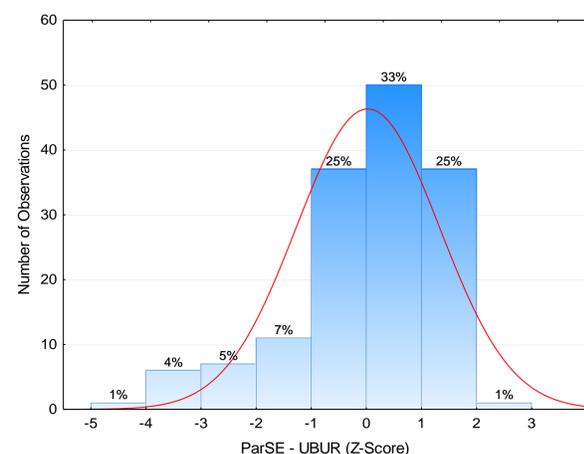
Age Effects

Effect of age was significant ($p = 0.0001$), with performance not significantly different to adults by age 9.



Distribution of Z-Scores

Z-scores were calculated to account for age effects. A skewed distribution towards negative performance occurred, with 5% of participants having scores poorer than 3 standard deviations below the age-adjusted mean.



Conclusions

The ParSE normative data shows that the ability to identify syllable boundaries based on changes in amplitude modulation improves with age, and that some children in the general population have performance much worse than their peers. The test is suitable for use in planned studies in a clinical population.

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