Introduction

Single-word speech intelligibility testing in children with repaired cleft lip and palate (CL/P) is attractive given 1) the need for conversational speech and potential linguistic bias are avoided, 2) computer technology can facilitate administration and scoring, 3) an objective index of severity is obtained, and 4) investigation of underlying phonetic deficits is possible depending upon the construction of the test.

The purpose of this study was to determine the reliability and validity of a 50-word speech intelligibility test designed for children with repaired CL/P.

Method

Participants

- 38 children (4 to 9 years of age)
  - 22 children with repaired CL/P without syndromes (15 girls, 7 boys)
  - 16 control children without CL/P (11 girls, 5 boys)
  - Controls passed hearing and articulation screenings

Test Construction

- 50-word speech intelligibility test modeled upon tests described by Morris et al. (1995) and Yorkston and Beukelman (1980)
- A corpus of 511 monosyllabic words divided into 50 sets of phonetically similar words
- Each set contained between 6 to 12 words
- The majority of the 511 words (≈85%) were in the vocabulary of young children (Hall et al., 1984)

Test Administration

- Computerized Speech Assessment System (ComSAS) (Haley, 2008)
- 2 unique sets of 50 words (randomly selected) administered to each child
- Productions recorded directly to a laptop computer using a head-mounted condenser microphone

Intelligibility Testing

- 20 adult listeners (undergraduate students)
- Subsets of 5 listeners orthographically transcribed 8 to 10 children
- Each listener transcribed 800 to 1000 words (8 to 10 children x 2 forms x 50 words)
- 3 listeners repeated the transcription following an interval of 3 weeks
Results

Reliability
- Intra- and inter-listener reliability of transcription ranged from .92 to .95
- Reliability of the mean scores (5 listeners per child) for the 2 forms of the intelligibility test was high ($r=.97$, $p<.001$).
- Mean difference between the two forms of the test was less than 1% and was not significant ($t[37]=1.086$, $p>.05$).
- Individual differences between the 2 forms ranged from a low of 0% to a high of 11%*
- Most of the individual differences were under 5% (32 of 38 children)

*Mean difference for one child was 18% but she “over articulated” many words of the 2nd set.

Validity
- ANCOVA with age as a covariate revealed a significant difference between groups with an adjusted mean of 85% for the controls and 67% for the children with CL/P ($F[1, 35]=14.249$, $p<.01$)
- Moderately high correlation among all children between intelligibility scores and percent consonants correct obtained from articulation screening ($r=.79$, $p<.001$)

Discussion
- Computerized single-word speech intelligibility testing appears to be a valid and reliable means of evaluating children with repaired CL/P
- Single-word intelligibility tests hold promise as outcome measures in large-scale clinical trials across multiple centers

References


†Caitrin Plante conducted this research as part of an Undergraduate Honors Thesis.
cplante@med.unc.edu

††Amanda Lloyd is currently a master’s student at the University of Virginia.

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