Word and NonWord Repetition and Speech Motor Control in Children
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BACKGROUND
- NWrep is linked to language and literacy skills (e.g. Gathercole & Baddeley, 1990; Montgomery, 1995; Sahlén, et al. 1999; Gathercole. 2006).
- No links found between NWrep and oral motor skills (Sahlén, et al. 1999), but the effects of cognitive factors on articulatory control is not well understood.
- Dyslexic subjects make more phonemic errors and are slower than normal subjects, while uttering phonologically complex multisyllabic words and phrases (Catts, 1986; 1989).
- Individuals with anarthria discriminate words well, but not NWs. Retention of unfamiliar word forms may be supported by articulation, resulting in poorer memory of NWs (Bishop et al. 1990).
- Linguistic factors affecting articulators are: changes in stress patters (Goffman et al. 1999); utterance length and complexity (Maner et al., 2000) linguistic and prosodic contrasts (Grigos et al., 2005; 2007).
- Children, but not adults, show an increase in articulatory control and rate when repeating NWs (Walsh et al. 2006).
- Studies on perceptual, cognitive/linguistic and motor processes involved in NWrep are needed (Smith, 2006; Service, 2006; Bowey, 2006; Bishop, 2006).

QUESTIONS
Do children utilize different speech motor patterns when producing real vs. novel word forms?
Are there age-related differences in speech motor control during the production of real vs. novel word forms?

METHOD
Subjects:
- 4-5 year olds n=6 (Non-readers)
- 7-8 year olds n=6
- 11-12 year olds n=6

Procedure: Repetition task (10 tokens each)
Word 4 syllable: baby puppet
NW 4 syllable: bebu mepid
Word 6 syllable: baby mama puppet
NW 6 syllable: menu bebu mepid

Kinematic Analysis
- Lip and jaw movement was recorded using a facial capture system (Vicon 460).
- Displacement, peak velocity, and duration of lip and jaw movements.
- Movement stability spatiotemporal index (STI) (Smith et al. 1995).

REFERENCES

SUMMARY
Movement duration: Articulatory timing was maintained between NWs and RWs in all age groups. Tendency of longer duration for NWs than RWs in 6-syllable structures.

Displacement & Velocity: Differences between RWs and NWs in 4-year-olds but not in 7- and 11-year-olds.

Movement stability: STIs higher for NWs than RWs in the 7- and 11-year-olds but not the 4-year-olds.

DISCUSSION
Articulator movement differences occur with tasks that entail increased cognitive demands.

Lack of differences in STIs in younger children’s productions of RW vs. NW structures may reflect poorer phonological short term memory and/or fewer previously stored representations.

Differences between age groups may also reflect use of sub-vocal rehearsal.

7- and 11-year-old children may be aided by other factors, such as orthographic representation, while repeating RWs.

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