Impact of Alphabet Supplementation on Speech and Pause Durations of Dysarthric Speakers with Traumatic Brain Injury

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Background
- Alphabet supplementation (AS) is a strategy in which the participant points to the first letter of each word on an alphabet board prior to speaking the word
- AS increased intelligibility of words 10% and sentences 26% (Hanson, Yorkston, & Beukelman, 2004)
- The greater the severity, the greater the benefits (Hanson et al., 2004; Hustad, 2005)
- AS has been shown to increase intelligibility and decrease speaking rate in individuals with cerebral palsy and those who have suffered a traumatic brain injury (TBI) (Beukelman, Fager, Ullman, Hanson & Logemann, 2005; Hustad, Jones, & Dailey, 2003)
- It has also been shown to increase word duration, inter-word pauses and pause durations in speakers with cerebral palsy (Hustad & Garcia, 2005; Hustad et al., 2003)
- To extend the current knowledge on the impact of AS to a new population, survivors of traumatic brain injury

Method
- Participants: 10 speakers (8 males, 2 females) with dysarthria secondary to TBI
  - 19 to 44 years
  - Time post injury: 6 mo to 12 years
  - Intelligibility and speaking rate measured with Speech Intelligibility Test (Beukelman, Yorkston, Hakel, & Dorsey, 2007)
- Procedures:
  - Each participant spoke one set of Hearing in Noise Test (HINT) sentences in each of two conditions: habitual and AS speech
  - Repeated sentences after the examiner
  - Habitual speech samples recorded first
  - Received instruction and practice on AS before recording
  - Speech samples for both conditions were digitized audio and video recorded
  - Pause and speech regions were identified using Speech Pause Analysis (SPA) for MatLab by a single researcher (Green, Beukelman, & Ball, 2004)
  - The noisy segment and entire segment were identified before analysis

Reliability
- A 2nd researcher measured 15% of the samples
- Absolute differences between measures were consistent with the literature:
  - Pause duration = 27 msec; Speech duration = 22 msec; Total duration = 7 msec

Results
- Speaking rate
  - Mean speaking rate during AS speech (mean = 34.95 wpm, S = 7.90) was significantly slower than during habitual speech (mean = 77.00 wpm, S = 34.64), F(1,8) = 14.910, p = .004
- Percent pause & Percent speech
  - Mean percent pause time during AS speech was significantly greater than during habitual speech, F(1,9) = 25.397, p = .001
  - Mean percent speech time during AS speech was significantly less than during habitual speech, F(1,9) = 25.371, p = .001

Impact of AS on intelligibility in the current study was similar to past research
- These results are consistent with the results reported by Hustad and Lee (2008) for speakers with cerebral palsy

Discussion
- Impact of AS on intelligibility in the current study was similar to past research
- The increase in total pause time provided rationale for the decrease in speaking rate when using AS
- These results are consistent with the results reported by Hustad and Lee (2008) for speakers with cerebral palsy

Pause time
- Mean pause time during AS speech was significantly greater than during habitual speech, F(1,9) = 29.452, p < .001

Speech time
- There were no significant differences between the mean speech time during AS speech and habitual speech, F(1,9) = 4.325, p = .067

Total time
- Mean total time during AS speech was significantly greater than during habitual speech, F(1,9) = 24.582, p = .001