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

Amy S. Nordness, Ph.C., CCC-SLP [1], David R. Beukelman Ph.D.[2], Cara Ullman, MA [2]
Munroe-Meyer Institute for Genetics and Rehabilitation[1]
University of Nebraska- Lincoln[2]

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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, 2002; Hustad & Garcia, 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; Hustad & Lee, 2008)

Rationale/Purpose

- To extend the current knowledge on the impact of AS to a new population, survivors of traumatic brain injury
- The purpose of the current study was to document the speech and pause temporal characteristics of 10 speakers with traumatic brain injury for habitual and AS speech.

Method

Participants

- 10 speakers (8 males, 2 females) with dysarthia 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)

	% Intelligibility		Speaking Rate (wpm)	
Participant	HS	AS	HS	AS
1	1.5%	51.7%	117.7	26.26
2	2.3%	31.9%	77.26	34.29
3	6.5%	75.6%	41.16	30.12
4	42.5%	65.7%	30.81	25.38
5	49.6%	76.7%	39.28	35.51
6	61.5%	86.7%	55.08	51.79
7	63.0%	92.0%	72.82	29.38
8	NA	NA	120.23	41.45
9	87.1%	100.0%	111.85	37.70
10	62.0%	83.7%	103.80	37.44

HS = Habitual Speech
AS = Alphabet Supplementation

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 digitally 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

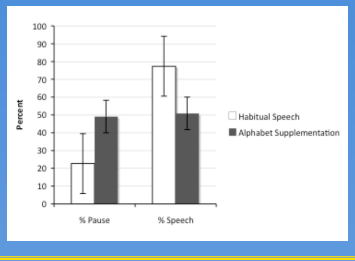
Results

Speaking rate

- Mean speaking rate during AS speech (mean = 34.93 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, $F(1,9) = 25.371$, $p = .001$



Results

Pause time

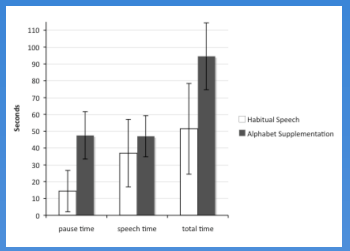
- Mean pause time during AS speech was significantly greater than during habitual speech, $F(1,9) = 29.452$, $p < .001$

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, $F(1,9) = 24.582$, $p = .001$



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

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