

The Effects of Speech Rate on Response-Time Latency and Stuttering

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Introduction

- Some studies indicate a reduction in caregiver speech rate may result in increased fluency for some children (Guitar & Marchinkoski, 2001; Stephenson-Opsal & Bernstein Ratner, 1988; Zebrowski, Weiss, Savelkoul, & Hammer, 1996). Findings have led to clinical recommendations to caregivers to slow speech rate (Guitar, 1998).
- The particular characteristics of slow speech that might facilitate fluency have not been identified. A slower parental rate might give the child a sense that he or she has more time to talk, or may serve as a model to the child as an easier way to talk. Slower rate may also bring changes in the interaction between parents and child, such as an increase in response time latency (RTL), defined as “the time between speaker turn exchanges” (Newman & Smit, 1989, p. 636).
- Studies of normally fluent children have noted an increase in RTL in both caregivers and children when caregivers were instructed to slow their speech (Bernstein Ratner, 1992; Newman & Smit, 1989; Welkowitz, Bond, Feldman, & Tota, 1990). Furthermore, dyads of normally fluent children and their mothers had significantly similar RTL, and mothers have been observed to entrain to their children’s RTL (Welkowitz et al., 1990).

Purpose of the Study

Investigate the effects of a reduced parental speech rate treatment program on (a) the child’s disfluency, (b) the child’s speech rate, and (c) the parent and child’s response-time latency. Specifically, these questions were addressed:

- Does slower parental speech rate result in fewer disfluencies for the child who stutters?
Does a decrease in speech rate result in a decrease in speech rate for the child?
- Does a decrease in speech rate result in an increase in response-time latency for the parent and the child?

Method

Participants

6 preschool-aged boys who stutter between the ages of 44 to 66 (M=55), and their female caregivers. They were recruited from the Eckelmann-Taylor speech-language hearing clinic at Illinois State University.

The participants were regarded by their parents and one speech-language pathologist as exhibiting stuttering. Each child had a minimum of 3 stuttering-like disfluencies per 100 syllables in their speech and no history of neurologic disorders or abnormalities.

Stuttering severity was assessed using a weighted measure reflecting the extent or length of disfluencies (Ambrose & Yairi, 1999). 1 child exhibited mild stuttering, 4 exhibited moderate stuttering, and 1 exhibited moderate to severe stuttering.

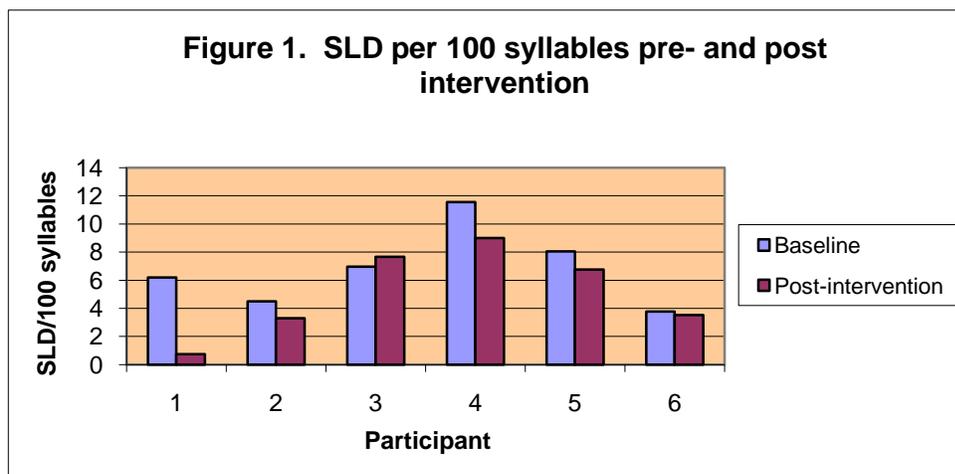
Procedure

- ♦ 15-minute baseline conversation condition.
- ♦ 3-week slow easy speech intervention, rate of 90-100 syllables per minute.
- ♦ 15-minute post-intervention recording with caregivers using slow easy speech.
- ♦ Speech samples transcribed orthographically.
- ♦ RTL and speech rates calculated using acoustic waveform analysis on the Kay- Pentax Multispeech software and spectrogram analysis on CSpeech.
- ♦ Caregivers' fluent speech analyzed and for the children, all instances of stuttering-like disfluencies and other disfluencies were removed.
- ♦ Articulatory rate = $\frac{\text{number of fluent syllables in each utterance}}{\text{duration in seconds of the utterance}}$
- ♦ RTL = time between speaker exchanges. Cursor placed at the offset of the children's and caregivers' waveforms and the onset of the caregivers' and children's following utterances. Simultalk and non-speech communicative vocalizations (e.g., laughing and gasping) were excluded.

Results

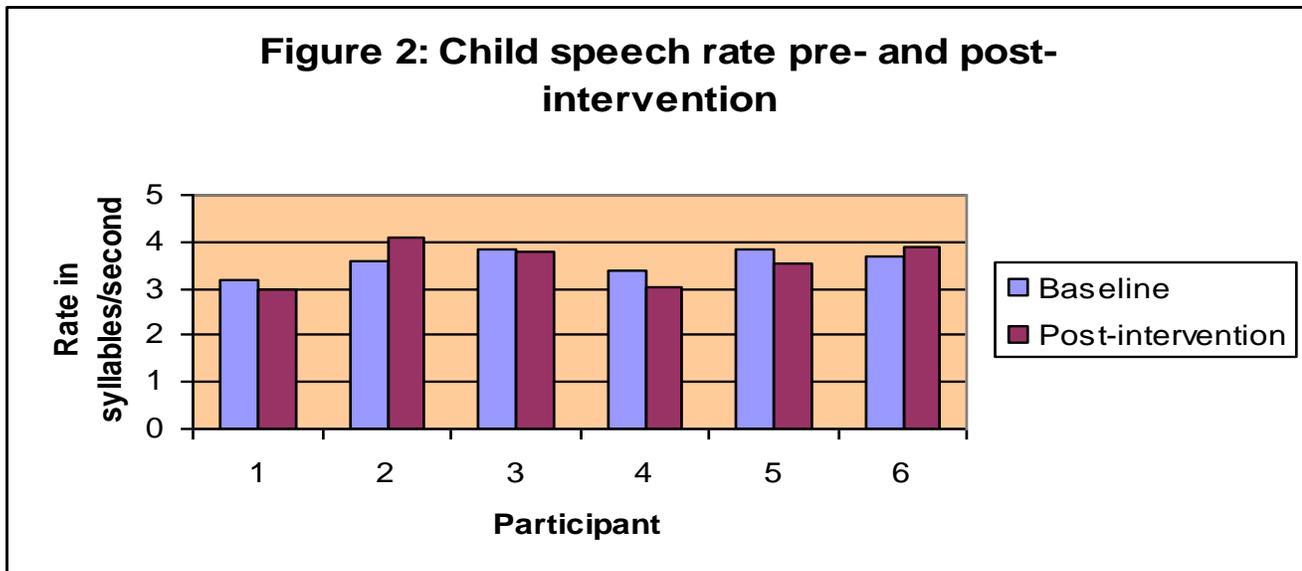
1. Does slower caregiver speech rate result in fewer disfluencies for the child who stutters?

Figure 1 shows that the SLD decreased from pre-intervention (M = 6.84, SD = 2.80 to post-intervention (M = 2.06, SD = 3.04. Individually, 5 out of 6 children showed a decrease in SLD per 100 syllables.



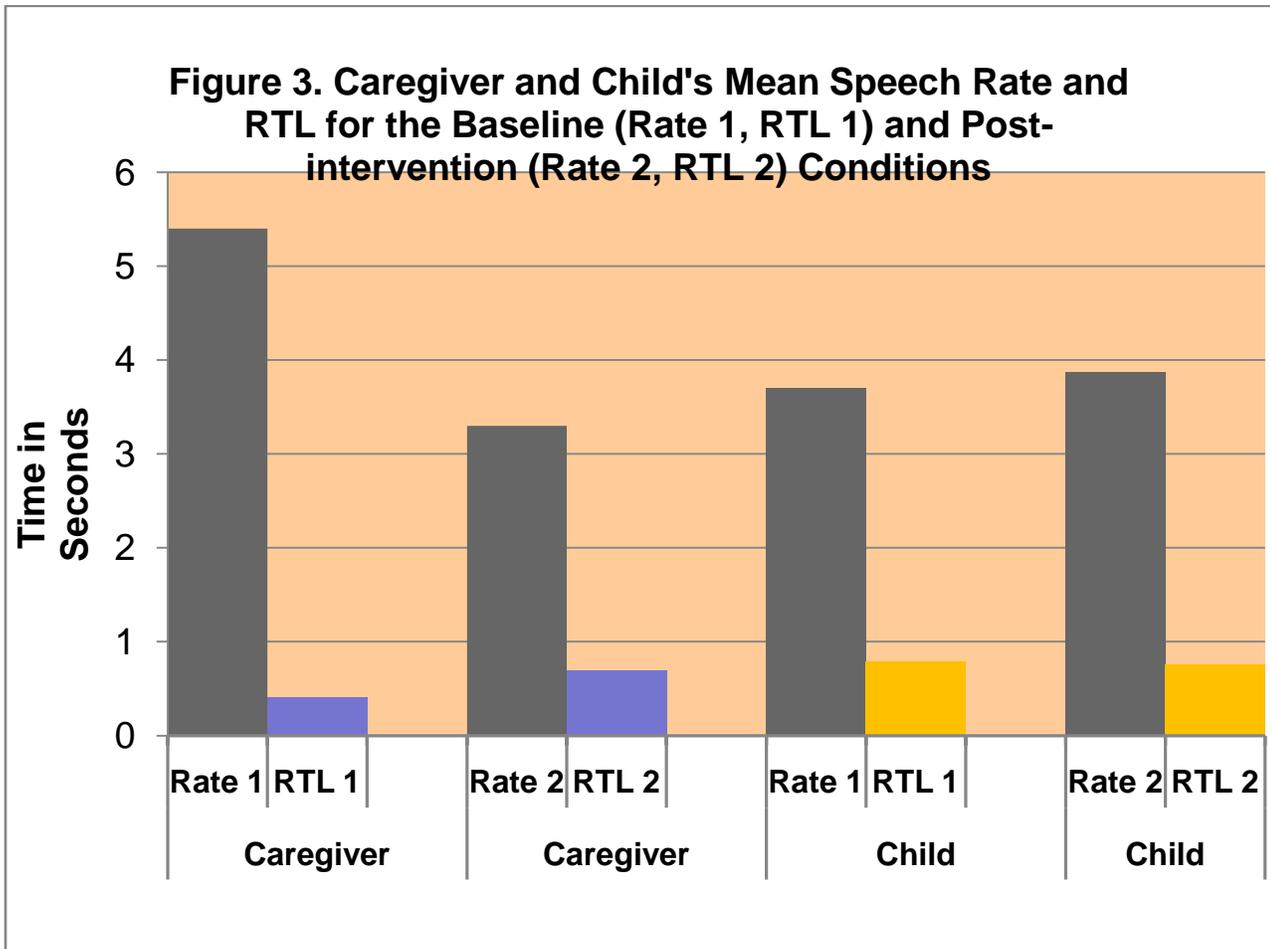
2. Does a decrease in caregiver speech rate lead to a decrease in speech rate for the child?

Figure 2 shows that the children's speech rate before intervention (M= 3.59 syllables/second, SD= .26) did not appreciably change during the caregiver's slower speech rate post-intervention (M = 3.55, SD = .45)



3. Does a decrease in speech rate result in an increase in response-time latency for the caregiver or child?

Figure 3 shows an increase in mean RTL for the caregiver as speech rate decreased from the baseline (M speech rate = 5.4 seconds; M RTL = .41 seconds) to the post-intervention condition (M speech rate = 3.3 seconds, M RTL = .69 seconds). The children's rate and RTL was similar over both conditions.



Discussion

SLOWER SPEECH RATE AND DISFLUENCIES

A slower rate of caregiver speech appeared to coincide with a decrease in children's disfluencies for 5 of the 6 children. A slower caregiver rate did not lead to a slower rate of speech in the children.

SLOWER SPEECH RATE AND RESPONSE- TIME LATENCY

An increased response-time latency appears to be an artifact of slow easy speech. Five of the six caregivers increased response time latency in the slow easy speech condition. The children did not entrain to their caregivers' longer RTL in the slow speech condition.

CLINICAL IMPLICATIONS

Changes in parent speech output, specifically rate and response-time latency, may be fluency-facilitating for some preschool children who stutter. Further research in this area is needed, but parent-based intervention of slow easy speech may help increase the fluency of children who stutter.

References

- ♦ Bernstein Ratner, N. (1992). Measurable outcomes of instructions to modify normal parent child interactions: Implications for indirect stuttering therapy. *J. of Speech and Hearing Research*, 35, 14-20.
- ♦ Guitar, B. (1998). *Stuttering: An integrated approach to its nature and treatment* (2nd ed.). Baltimore: Williams and Wilkins.
- Guitar, B., & Marchinkoski, L. (2001). Influence of mothers' slower speech on their children's speech rate. *J. of Speech, Language, and Hearing Research*, 44, 853-861.
- ♦ Newman, L. and Smit, A. (1989). Some effects of variations in response time latency on speech rate, interruptions and fluency in children's speech. *J. of Speech and Hearing Research*, 32, 635-644.
- ♦ Stephenson-Opsal, D., & Bernstein Ratner, N. (1998). Maternal speech rate modification and childhood stuttering. *J. of Fluency Disorders*, 13, 49-56.
- ♦ Welkowitz, J., Bond, R., Feldman, L., & Tota, M. (1990). Conversational time patterns and mutual influence in parent-child interactions: A time series approach. *J. of Psycholinguistic Research*, 19, 221-243.
- ♦ Zebrowski, P., Weiss, A., Savelkoul., E., & Hammer, C. (1996). The effect of maternal rate reduction on the stuttering, speech rate, and linguistic productions of children who stutter: Evidence from individual dyads. *Clinical Linguistics and Phonetics*, 10, 189-206.

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