

Disfluencies and Speech Rates of Standard Korean Speakers in Story-telling and Reading Contexts

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ABSTRACT

The purpose of this study is to compare disfluencies and speech rates (overall speech rate and articulation rate) of normal adult speakers who use the standard Korean according to dissimilar speech tasks (story-telling and text-reading). Participants were 100 Korean adult speakers. The results are summarized as follows: First, the most frequent type of disfluency in the story-telling task was "interjection", whereas that in the text-reading task was "revision". Second, the overall speech rates (syllables per second and syllables per minute) showed significant differences depending on the speech tasks. Third, the articulation rates (syllables per second and syllables per minute) showed significant differences depending on the speech tasks.

Keywords: disfluencies, overall speech rate, articulation rate, fluency disorders

1. Introduction

To make an utterance is a complicated process because speakers should decide many things including what to say, how to say. Researchers have been studying about characteristics of the utterance and the studies of 'fluency' and 'speech rate' are important parts of the researches (Amster, 1984).

The studies of speech rate and fluency can be divided into two parts. One is a study for normal speakers and the other is a compared study between normal speakers and speakers who have language or speech problems. These studies can provide normative data and help distinguish between normal people and speech-language disordered people. Venkatagiri (1999) studied overall speech rate and sentence rate of young normal adults (age range: 19 years-31 years) when they read, described picture and talked about themselves. In results, the sentence rate was faster than the overall speech rate and there were no significant differences between men and women. Chon et al. (2004) compared disfluencies (typical disfluencies and atypical disfluencies) and speech rates (overall speech

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rate and articulation rate) between children who do not stutter (CWNS) and children who stutter (CWS) in a free interaction context and a story-telling context. The atypical disfluencies showed significant differences between CWNS and CWS. The typical disfluencies, the overall speech rate and the articulation rate showed significant differences between the contexts.

The purpose of this study is to investigate whether normal adult speakers who use the standard Korean show meaningful differences in disfluencies and speech rates (overall speech rate and articulation rate) according to dissimilar speech tasks (story-telling and text-reading).

2. Method

2.1 Participants

As shown in Table 1, all participants were 100 Korean adult speakers who consisted of two groups: a story-telling task group (mean age: 21.2 years old, age range: 19-29 years old) and a text-reading task group (mean age: 21.8 years old, age range: 19-26 years old). The story-telling task group was composed of 60 people (30 men and 30 women) and the text-reading group was composed of 40 people (20 men and 20 women), as summarized in Table 1. All their academic backgrounds were beyond undergraduate. The people who performed the story-telling and the text-reading tasks used the standard Korean, and were born and raised in Seoul or Gyeonggi Province in Korea.

Table 1. Background information for speakers.

Speakers	Sex	Number	Mean age (year)	Age range (year)
Speakers who participated in a story-telling task	Male	30	21.3	19-29
	Female	30	21	19-27
Speakers who participated in a text-reading task	Male	20	21.8	20-26
	Female	20	21.8	19-26

2.2 Data Collection

The story-telling data of normal speakers who use the standard language were collected by having them select and discuss one of three topics (① what you did yesterday, ② about your favorite movie, ③ about your best friend) presented to them. As well, the text-reading data of speakers who use the standard language were also gathered by having them read 800 syllables from 'the reading material for middle school students

or higher' in the Paradise-Fluency Assessment (Shim, Shin & Lee, 2004). All data were collected by audio-tape recording (SONY netMD Walkman MZ - N710, Panasonic micro-cassette recorder RN-502 and Sony DAT walkman digital audio tape recorder TCD-D100).

2.3 Data Analysis

All the story-telling data which were four minutes in length or longer were recorded and three minutes (180 seconds) were analyzed by excluding 30 seconds each at the beginning and the ending parts. All the text-reading data were analyzed from the start to the end. The speech data were transcribed and then confirmed three to five times to enhance the accuracy of disfluency analysis. The types of disfluency were classified into hesitation, interjection, revision, unfinished phrase, phrase repetition, word repetition, syllable repetition, sound repetition, prolongation, blocking and other fluency breaks in this study (Shin, 2000; Campbell & Hill, 1993; Chon et al., 2004).

The speech rates were classified as overall speech rate and articulation rate based on the fluency and analysed as syllables per minute (SPM) and syllables per second (SPS). Recorded data were entered into computers as the waveforms of the PCQuirer 5.0 Program (Ko & Jeong, 2001) and the overall speech rate and the articulation rate through such waveforms were measured (Figure 1).

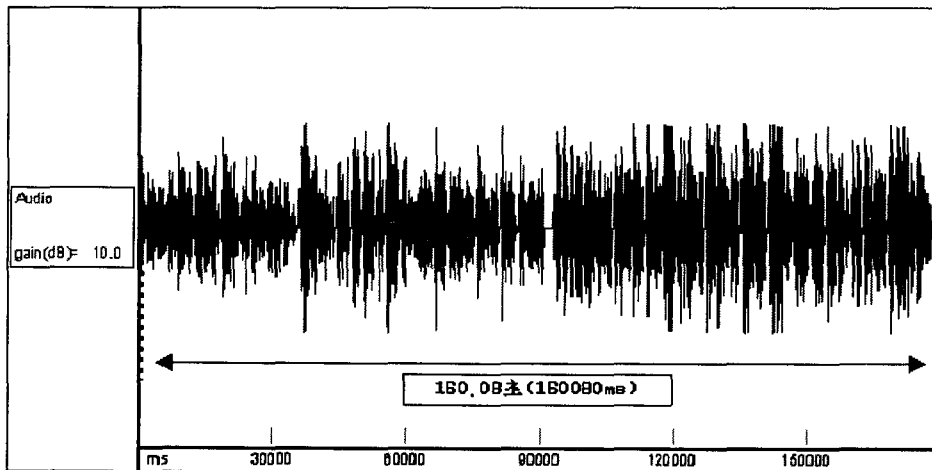


Figure 1. An example of waveforms which was measured by the PCQuirer.

3. Results

3.1 Disfluencies

In the disfluency analysis, the most frequent types of disfluency in the story-telling task were in the order of “interjection (mean=5.15)”, “revision (mean=2.22)” and “unfinished phrase (mean=1.63)”, whereas those in the text-reading task were in the order of “revision (mean=0.65)”, “interjection (mean=0.35)” and “unfinished phrase (mean =0.35)” (Figure 2). Sound repetition, prolongation and blocking which are classified as atypical disfluencies were not observed from all the groups, and syllable repetition was rarely observed.

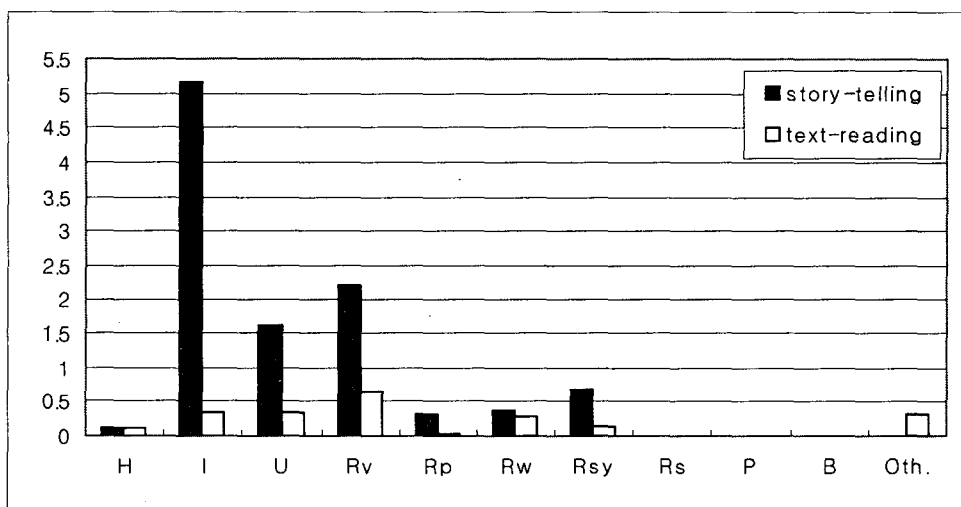


Figure 2. Frequencies of disfluency types in the story-telling task and the text-reading task (H: hesitation, I: interjection, U: unfinished phrase, Rv: revision, Rp: phrase repetition, Rw: word repetition, Rsy: syllable repetition, Rs: sound repetition, P: prolongation, B: blocking, etc: other fluency breaks).

3.2 The overall speech rate and the articulation rate

The results for speech rates of the story-telling task and the text-reading task are as shown in Table 2. In the analysis of the overall speech rate, the average rate per second in the story-telling task was 4.20 SPS (syllables per second) (SD=0.77) and the average rate per minute was 251.79 SPM (syllables per minute) (SD=45.98). The average rate per second in the text-reading task was 5.11 SPS (SD=0.44) and the average rate per minute was 306.52 SPM (SD=26.37).

In the case of the articulation rate, the average rate per second in the story-telling

task was 4.41 SPS (SD=0.70) and the average rate per minute was 264.71 SPM (SD=42.05), whereas the average rate per second in the text-reading task was 5.13 SPS (SD=0.43) and the average rate per minute was 308.05 SPM (SD=25.49).

Table 2. Mean overall speech rate and articulation rate of the two groups

		Speakers	N	Mean	SD
Overall speech rate	Syllables Per Second (SPS)	Speaking	60	4.20	0.77
		Reading	40	5.11	0.44
	Syllables Per Minute (SPM)	Speaking	60	251.79	45.98
		Reading	40	306.52	26.37
Articulation rate	Syllables Per Second (SPS)	Speaking	60	4.41	0.70
		Reading	40	5.13	0.43
	Syllables Per Minute (SPM)	Speaking	60	264.71	42.05
		Reading	40	308.05	25.49

The results for *t*-test performed to see whether there are significant differences of the overall speech rate between the story-telling task and the text-reading task are presented in Table 3. The overall speech rates (syllables per second and syllables per minute) indicated significant differences depending on the speech tasks (speech rate per second $t = -6.771$, $p < .001$, speech rate per minute $t = -6.765$, $p < .001$).

Table 3. Results for *t*-test of the overall speech rate.

		<i>t</i>	df	<i>p</i>
Overall speech rate	Syllables Per Second (SPS)	-6.771	98	.000*
	Syllables Per Minute (SPM)	-6.765	98	.000*

* $p < .001$

The results for *t*-test performed to see whether there are significant differences of the articulation rate between the story-telling task and the text-reading task are presented in Table 4. The articulation rates (syllables per second and syllables per minute) indicated significant differences depending on the speech tasks (speech rate per second $t = -5.801$, $p < .001$, speech rate per minute $t = -5.796$, $p < .001$).

Table 4. Results for *t*-test of the articulation rate.

		<i>t</i>	df	<i>p</i>
Articulation rate	Syllables Per Second (SPS)	-5.801	98	.000*
	Syllables Per Minute (SPM)	-5.796	98	.000*

* $p < .001$

4. Discussion

This study was to provide the norms of speech characteristics (disfluencies, speech rates) of normal standard Korean speakers. The results show that, in the story-telling task, 'interjection' was observed as the most frequent disfluency which is generally consistent with the previous study (Chon et al., 2004). However, in the text-reading task, 'revision' was showed to be the most frequent disfluency. This may be interpreted that interjection was relatively less occurred due to the clue of the eyesight in the text-reading task. When the frequency of the disfluencies is compared, interjection, unfinished phrase, revision, phrase repetition, word repetition and syllable repetition in the story-telling task were observed more than in the text-reading task. This result may suggest that speakers have more difficulty when they express their own thoughts than when they read texts which have the clue of eyesight. Sound repetition, prolongation and blocking in disfluency were not observed and syllable repetition was rarely observed, which are generally observed frequently by people who stutter. These results are consistent with the previous study and support the disfluency types and domains which are classified in speech-language pathology (Shin, 2000; Campbell & Hill, 1993; Chon et al., 2004).

In the speech rate, the text-reading task is significantly faster than the story-telling task both in the overall speech rate and the articulation rate. This suggests that the speakers can feel easier to read with the sense of sight than to talk about their thoughts such as the different frequency of disfluencies.

The results can be used as some meaningful guidelines and as basic data to differentiate normal and language disorders in various areas of speech pathology, particularly in fluency disorders, hearing impairments, voice disorders, aphasia and dysarthria, by presenting circumstantial data on the patterns and frequencies of disfluency and speech rate of normal adult speakers. In the case of stuttering, in particular, the data gained from normal adult speakers will serve as crucial information that can help determine the characteristics and curability of stuttering through its comparison with the data gathered from adults who stutter.

References

- Amster, B. 1984. "*The rate of speech of normal preschool children.*" Dissertation of Doctor of Philosophy, Temple University.
- Campbell, J. & Hill, D. G. 1993. "*Systematic disfluency analysis.* In Northwestern and The Stuttering Foundation of America (eds.), *Stuttering therapy: Workshop for specialists.*" Evanston, IL: Northwestern University.

- Chon, H., Ko, D. & Shin, M. 2004. "Disfluency Characteristics and speech rate of stuttering and nonstuttering children." *Korean Journal of Communication Disorders*, 9(2), 102-115.
- Ko, D. & Jeong, O. (eds.), 2001. "Manuals of Speech and Language Analyzing Tools." Seoul: Hangeuk Publishing Co.
- Shim, H., Shin, M. & Lee, E. 2004. "Paradise - Fluency Assesment: P-FA." Seoul: Paradise Welfare Foundation.
- Shin, M. 2000. "Measurements of Speaking rate & fluency in stuttering." *Korean Journal of Speech Sciences*, 7, 273-284.
- Venkatagiri, H. 1999. "Clinical measurement of rate of reading and discourse in young adults." *Journal of Fluency Disorders*, 24, 209-226.

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