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DURATIONAL ASPECTS IN VISUAL WORD RECOGNITION OF SENSE AND NONSENSE WORDS

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Abstract

BACKGROUND

Speech Perception refers to the sensory activity mapping from the extremely variable acoustic speech signal to a linguistic illustration whether or not it's phonemes, diaphones, syllables or words. It is that the method by that the way sounds of language are detected, taken and understood. (Holt and Lotto, 2010)

Listeners have a tendency to use their information of the speaking scenario and their knowledge of the speaker, also as visual cues obtained by observance of the face and gestures of the speaker. They are aware solely for the means of speech and stay quite unconscious of the elements of the message. Linguistic information looks to be kept by that means or by the imagination and would take the audible information and proceed to create phonetic, synchronic linguistics, then linguistic unit and at last syntactical choices that make the meaning of the message.

Reaction times in reading-aloud experiment are longer for irregular words than regular words, and therefore the dual-route model attributed this indisputable fact that the two routes generate conflicting information at the phoneme level once a word is irregular, but not when a word is regular: resolution of that conflict takes time, which is answerable for the regularity impact in speeded reading aloud.

Frequency effects on reading aloud were explained by proposing that access to entries for high-frequency words within the mental lexicon was quicker than access for low-frequency words. The low-frequency words show a bigger regularity impact, since lexical process are going to be comparatively slow for such words and there'll be longer for the conflicting info from the non-lexical route to have an effect on reading. Acoustically similar things like consonants are auditorily similar; they show very little recency impact (Darwin and Baddeley, 1974).

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Studies have been attempted on durational aspects of sense and nonsense words in stutterers and very few informational data are present for the above in normals. Hence the present need of the study has taken up to monitor the durational aspects of sense and nonsense words during visual presentation before and after rehearsals in normals.

NEED OF THE STUDY:

From the above literature it could be said that durational aspects play an important role in speech perception. Studies have been attempted on durational aspects of sense and nonsense words in stutterers and very few information data are present for the above in normal. Hence the present need of the study has been taken up to monitor the durational aspects of sense and nonsense words during visual presentation before and after rehearsals in normal.

AIM OF THE STUDY:

The aim of the study was taken to monitor the durational aspects of sense and nonsense words with the following objectives:

1. To examine the changes in the word duration between sense and nonsense words before rehearsal.

2. To examine the changes in word duration between sense and nonsense words after rehearsal.

METHOD

Twelve young adults in the age range of 18-25 years (mean age) fluent in both Malayalam and English with Malayalam being the native language for majority of them with no evident speech, hearing, neurological and psychological problems participated in the study.

Exclusion criteria:

- Individuals with speech, hearing, neurological and psychological problems
- Individuals not fluent in English

Stimulus development:

Twenty-four (24) pairs of sense and nonsense words with a total of 48 words based on the frequent usage which was equally divided into sense and nonsense words with an ascending order of syllable combinations (CV, CVC, and CVCV) were used.

The word list developed was validated by 5 SLP's who were in the field for more than 10 years with Malayalam as their native language. (APPENDIX 1)

Procedure:

Each individual was tested individually in a relatively noise free room with minimal distractions in front of a computer monitor. The words were presented using a PowerPoint presentation with the duration between each slide being adjusted according to the syllable combination. Time taken for each word both sense and nonsense were recorded using the PRAAT software. The position of the screen was 20 inches away from the face making sure the eyes were in level with very top of the monitor. The text was three times the size of the smallest size that can be read according to the rule of thumb. The text was in black on a white background with the brightness being appropriate for the light source in the room.

Each of the individual had to perform two experiments.

Experiment 1

Each individual was presented the set of 24 pairs of words including both sense and nonsense words for data collection. Individuals were instructed to pay attention and read the word as quickly and accurately as possible upon the presentation of the stimuli.

Experiment 2

Once the first experiment was performed, a time gap of 1 minute is given to each individual to get familiarized with the words followed by experiment 1 being repeated again.

The responses were recorded with the help of a microphone connected to the computer. Individual's response latencies were measured from the onset to the termination of the word utterances. PRAAT software was used to record the response along with their durations.

Response:

Verbal mode of response was selected for this study. First utterance from the speaker was considered as the target response. So, reaction time is considered as the time duration between stimulus presentations to the onset of the verbal response.

Errors were trials in which the individuals used words other than the target words, repetition at the onset of the word or self-corrected on the earlier response. Lost trials were trials in which the individuals produced cough or stopped performing the task (e.g. asking the experimenter).

Statistical analysis

The obtained data were tabulated and subjected to statistical analysis. Mean word duration in seconds was calculated. Statistical analysis was carried out using SSP version 17. ANOVA was used to note the statistical difference between the sense and nonsense words with and without rehearsal.

RESULTS AND DISCUSSION

The aim of the study was to monitor the durational aspects of sense and nonsense words with the following objectives:

1. To examine the changes in the word duration between sense and nonsense words before rehearsal.
2. To examine the changes in word duration between of sense and nonsense words after rehearsal.

The results were analyzed to evaluate the objective of the study.

1. To examine the changes in the word duration between sense and nonsense words before rehearsal:

	N	Mean	Std. Deviation	95% Confidence Interval for Mean		T test p value	
				Lower Bound	Upper Bound		
SENSE WORDS	12	.5658	.0757	.0757	.0218	.015	Sig
NONSENSE WORDS	12	.6643	.1047	.1047	.0302		
Total	24	.6151	.1025	.1025	.0209		

Table 4.1: Mean and Standard deviation of word duration in sense and nonsense words without rehearsal

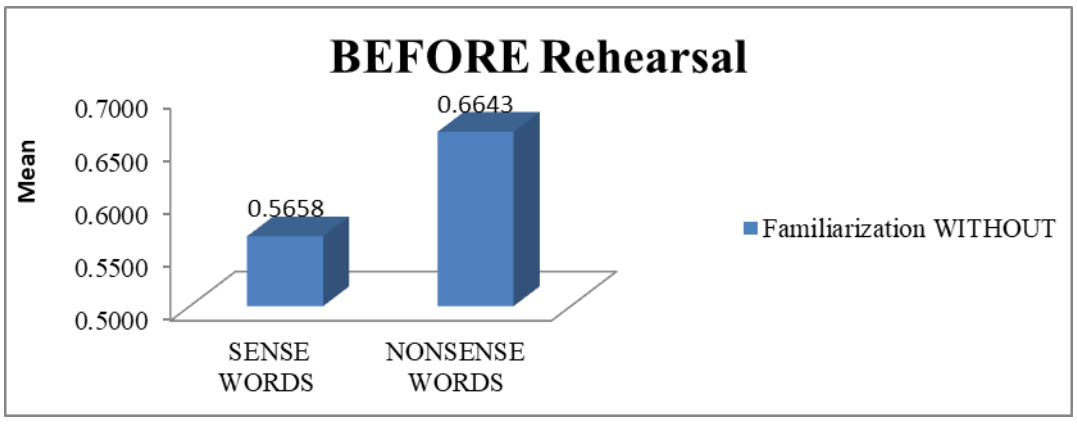

Figure 4 .1 shows the mean values of word duration in sense and nonsense words without rehearsal.

Table 4.1 and figure 4.1 shows the mean and standard deviation of word duration for sense and nonsense words before rehearsal.

From table 4.1 and figure 4.1 it is observed that nonsense words have more word duration than the sense words. On statistical analysis results showed that there is significant difference between the two groups. Calculated 'p' value at 12 degrees of freedom is 0.15 at 5% level of significance.

2. **To examine the changes in word duration between of sense and nonsense words after rehearsal.**

	N	Mean	Std. Deviation	95% Confidence Interval for Mean		t test p value	
				Lower Bound	Upper Bound		
SENSE WORDS	12	.4958	.0613	.0613	.0177	.011	Sig
NONSENSE WORDS	12	.5688	.0678	.0678	.0196		
Total	24	.5323	.0734	.0734	.0150		

Table 4.2: Mean and Standard deviation of word duration in sense and nonsense words with rehearsal

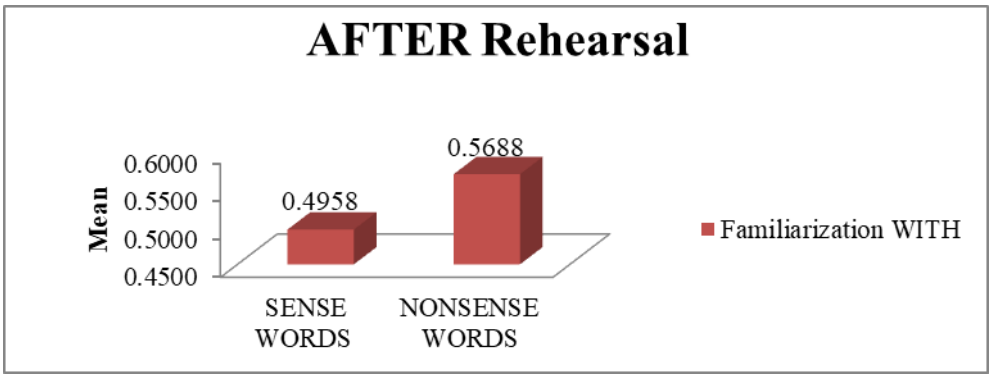

Figure 4.2: The mean values of word duration in both sense and nonsense words after rehearsal

Table 4.2 and figure 4.2 shows the mean and standard deviation of word duration of sense and nonsense words after rehearsal.

It is observed that nonsense words showed more duration than the sense words. Statistical analysis showed there is significant difference between the two groups. Calculated 'p' value at 12 degrees of freedom is 0.11 at 5% level of significance.

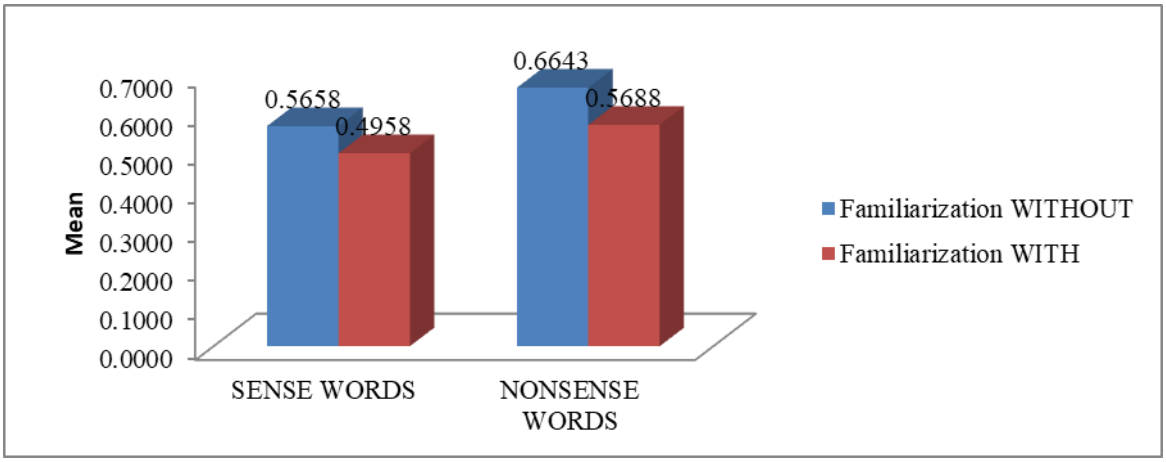

Figure 4.3: the mean values of sense and nonsense words before and after rehearsal.

Figure 4.3 shows the mean values of both groups.

From the figure it is observed that

- Both sense and nonsense have more word duration when uttered before rehearsal.
- Nonsense words are observed to have more word duration than the sense words both before and after rehearsal.

DISCUSSION

Durational aspects of sense and nonsense words before and after rehearsals in young adults have been analyzed and results showed that nonsense words have more duration than the sense words.

From the above attributes it is clear that the comparison of durations between sense and nonsense words which have given significant result at p = 0.15 for before rehearsals and another significance result at p = 0.11 for after rehearsal which can be attributed to the effect of frequency on reading aloud which were explained by proposing that access to entries for high-frequency words within the mental lexicon was quicker than access for low-frequency words. The low-frequency words show a bigger regularity impact, since lexical process are going to be comparatively slow for such words and there'll be longer for the conflicting info from the non-lexical route to have an effect on reading. Acoustically similar things like consonants are auditorily similar, they show very little recency impact, (Darwin and Baddeley, 1974)

Bell, Gregory, Brenier and Jurafsky (2009) studied on how frequency, contextual predictability, and repetition have separate contributions to word duration, despite their substantial correlations in which they have found that frequency or repetition leads to shorter or longer word durations by causing faster or slower lexical access, mediated by a general mechanism that coordinates the pace of higher-level planning and the execution of the articulatory plan while Baker and Bradlow (2009) examined how probability (lexical frequency and previous mention), speech style, and prosody affect word duration, and how these factors interact. Individuals read controlled materials in clear and plain speech styles. The results indicated that more probable words (higher frequencies and mentions) were significantly shorter than less probable words, and words in plain speech were significantly shorter than those in clear speech and second mention reduction effects were observed in both clear and plain speech. The study also revealed an interaction between mention and frequency, but only in plain speech. High frequency words allowed more second mention reduction than low frequency words in plain speech, revealing a tendency to hypo-articulate as much as possible when all factors support it while first mentions were more likely to be accented than second mention therefore supporting the concept of a direct link between probability and duration, rather than a relationship solely mediated by prosodic prominence.

But in contrast, Seyfarth (2014) investigated whether speakers have a context-independent bias to reduce low-informative words, which are usually predictable and therefore usually reduced and found the low-informative words have shorter durations, even when the effects of local contextual predictability, frequency, speech rate, and several other variables are controlled for. The result also supported representational models in which reduction is stored, and where sufficiently frequent reduction biases later production.

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