International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2020): 7.803

Visual Word Recognition in Adults

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Abstract: ***The act of seeing a word and instantly and without conscious effort recognizing its pronunciation is known as word recognition. When reading words necessitates deliberate, effortful decoding, there is little attention available for text comprehension. Because reading comprehension is the ultimate aim in teaching children to read, ensuring that they can read words with meaning is a key early goal. Reading relies heavily on visual word identification. Although readers appear to have little trouble recognizing visually displayed words, the mechanisms that transfer orthography to phonology and semantics are far from simple. There are limited informative data available in typical population and across gender. As a result, the current research compares the durational characteristics of sense and non-sense words in male and female participants. The aim of the study was to compare the durational aspects in visual word recognition in male and female. 30 Adults in the age range of 18-24 years further divided into 15 male and 15 female and all participants were native of Kerala and fluent in reading and writing in Malayalam. The finalized wordlists were presented through a computer to each individual. The data was recorded from each individual in a quit well illuminated and noise free room with a computer display kept at a distance of 1feet from the individual. Individual responses were measured from the onset to the termination of word utterance. The obtained values were subjected to statistical analysis and found that female have more word duration than male, but when it compared sense and non-sense words, high significant (p=0.00) was noted. The obtained data is useful for speech and language pathologists in the management of dementia, aphasia and other language disorders were naming of the object is affected. Also the results can be helpful for the audiologists in speech recognition tests.***

Keywords: visual word recognition, gender comparison, durational aspects, context in word recognition, Mishal, male and female comparison, sense and non sense word comparison

1. Introduction

Speech perception defined as the set of (neural, computational, and cognitive) procedures that convert auditory input signals into representations that can make contact with internally stored information: a listener's mental lexicon. (Poeppel, 2015)

Word recognition known as the process of extracting word properties (including orthographic, phonological, and semantic information) from an input letter string. (Dijkstra, 2005).

The act of seeing a word and instantly and without conscious effort recognizing its pronunciation is known as word recognition. When reading words necessitates deliberate, effortful decoding, there is little attention available for text comprehension. Because reading comprehension is the ultimate aim in teaching children to read, ensuring that they can read words with meaning is a key early goal. Reading relies heavily on visual word identification. Although readers appear to have little trouble recognizing visually displayed words, the mechanisms that transfer orthography to phonology and semantics are far from simple.

In visual word recognition, a full word may be seen at once (if it's short enough), and recognition occurs when the stimulus's properties match the orthography (i.e., spelling) of a mental lexicon entry.

Semantic and Syntactic representations in spoken and written word recognition is widely accepted. However, there has been considerable debate regarding whether spoken and written words have different lexical representations. Some academics suggest that in order to obtain semantic and grammatical information about a word, it must first be converted into a sound representation. If this is the case, each word simply requires a phonological representation (e.g., one that shows the sequence of component phonemes and the stress pattern). However, extensive neuropsychological data shows that words have independent phonological and orthographic representations, and that access to word meaning for written words can occur without phonological conversion. According to recent neuroimaging data, certain brain areas are selectively active in grapheme-to-phoneme conversion during visual word recognition, whereas others are selectively activated in direct lexical access without such conversion. Nonetheless, the phonological representation of a written word appears to be computed automatically (via an implicit "sounding out" or "letter–sound" translation process) for healthy persons.

Gender (Dancer, Krain, Thompson, Davis & Glen, 1994; Hrström and Traunmüller, 2004; Irwin, Whalen, & Fowler, 2006; Strelnikov, Rouger, Lagleyre, Fraysse, Deguine and Barone, 2009) and age (Sommers, Tye-Murray and Spehar, 2005; Winneke & Phillips, 2011) discrepancies in the use of visual speech have been documented in behavioural studies. Females have been shown to be better speech-readers than males (Johnson, Hicks, Goldberg and Myslobodsky, 1988; Dancer, Krain, Thompson, Davis & Glen, 1994; Watson, Qiu, Chamberlain and Li, 1996; Strelnikov, Rouger, Lagleyre, Fraysse, Deguine & Barone, 2009) and to be more influenced by the visual signal in audio-visual (AV) speech perception (Aloufy, Lapidot & Myslobodsky, 1996; Hrström & Traunmüller, 2004; Irwin, Whalen & Fowler, 2006). Furthermore, neuroanatomical studies have shown that when exposed with visual speech, females had a greater activation in speech perception brain regions than men (Ruytjens, Albers, VanDijk, Wit & Willemsen, 2006, Ruytjens, Georgiadis, Holstege, Wit, Albers & Willemsen, 2007). Gender differences in speech lateralization have also been shown by neuroanatomical research (Shaywitz, Pugh, Constable, Skudlarski & Fulbright, 1995; Jaeger, Lockwood, VanValin, Kemmerer, Murphy & Wack, 1998), with females having more bilateral processing for word recognition (Walla, Hufnagl, Lindinger, Deecke & Lang, 2001) and tasks involving phonology and grammar (Pugh, Shaywitz, Shaiwitz, Fulbright, Byrd & Skudlarski, 1996; Jaeger, Lockwood, VanValin, Kemmerer, Murphy & Wack, 1998).

Varghese and Kumaraswamy (2019) examined the word duration between sense and non-sense words before and after rehearsal and observed that both sense and non-sense word have more duration when uttered before rehearsal.

High-frequency words are comprehended more effectively than low-frequency words, according to the word frequency effect. Although the impact was initially documented over 80 years ago, it has only recently been studied in more depth.

The word frequency effect is one of the most well-known and well-supported results in the literature on spoken word recognition. Those that are used more often in the language are identified more correctly in noise than words that are used less frequently.

Shikora and Balota (2016) investigated visual word recognition in a large sample (N = 148) of adults across the lifespan and across a wide set of stimuli (N = 1,187) in three lexical processing tasks (Pronunciation, lexical decision, and animacy judgment). Although the current study focused on the impact of word frequency, it also looked at a variety of other factors. The main conclusion is that the effect of a variety of factors on visual word recognition is remarkably consistent across the adult age span.

According to the preceding summary of literature, durational elements of speech perception are essential. Studies on the durational characteristics of sense and non-sense words in stutterers have been attempted; however there are limited informative data available in typical population and across gender. As a result, the current research compares the durational characteristics of sense and non-sense words in male and female participants.

2. Need of the Study

According to the preceding summary of literature, durational elements of speech perception are essential. Studies on the durational characteristics of sense and non-sense words in stutterers have been attempted; however there are limited informative data available in typical population and across gender. As a result, the current research compares the durational characteristics of sense and non-sense words in male and female participants.

3. Method

3.1 Aim

The aim of the study is to compare the durational aspects in visual word recognition in male and female

a) To analyze the durational aspects of visual word recognition in male
b) To analyze the durational aspects of visual word recognition in female
c) Compare the durational aspects of visual word recognition in male and female

Participant with Inclusive and Exclusive Criteria

Adults in the age range of 18-24 years further divided into 15 male and 15 female. All participants were native of Kerala and fluent in reading and writing in Malayalam. Adults with speech, hearing, neurological and psychological Problems and adults who weren't fluent speaking, reading and writing in Malayalam language.

Test Material/Stimulus

15 pairs of sense and non-sense words with a total of 30 words based on the frequent usage which was equally divided into sense and non-sense words with an ascending order of syllable combinations. (Appendix 1)

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

Procedure

The finalized wordlists were presented through a computer to each individual. The data was recorded from each individual in a quit well illuminated and noise free room with a computer display kept at a distance of 1feet from the individual. The PowerPoint presentation in which text was typed in black letters on white background. Care was taken for each word recognition was recorded using PRAAT software.

15 sense word and 15 non sense words were presented to each individual and was instructed to read the words quickly and accurately paying attention.

After reading the words a gap of 1minute was given and presentation of words (sense and nonsense words) repeated again. For the study the first verbal utterance from speaker was considered as a target responds.

The responses from each individual were recorded with the help of microphone which was connected to the computer. Individual responses were measured from the onset to the termination of word utterance. The obtained values were subjected to statistical analysis and the results are discussed in the next chapter.

Response

The study's response mode was chosen to be verbal. The target response is determined by the speaker's first utterance. So, Individual responses were measured from the onset to the termination of word utterance.

Statistical Analysis

The data was collated and statistical analysis was performed on it. The mean word duration was calculated in seconds. Collected data was analyzed by mean, Standard deviation Confidence interval and by Unpaired Key test.

4. Results

The aim of the study was to compare the durational aspects of visual word recognition in male and female

a) To analyze the durational aspects of visual word recognition in male
b) To analyze the durational aspects of visual word recognition in female
c) Compare the durational aspects of visual word recognition in male and female

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

a) To analyze the durational aspects of visual word recognition in male:

Table 4.1: Shows the mean and Standard deviation of word duration between sense and non-sense words in male

Words	N	Mean	Std. Deviation	95% Confidence Interval for Mean		t test p value	
				Lower Bound	Upper Bound		
Sense words	15	0.9783	0.04711	0.9522	1.0044	0.000	HS
Nonsense words	15	1.1249	0.03983	1.1029	1.1470		

HS: high significant

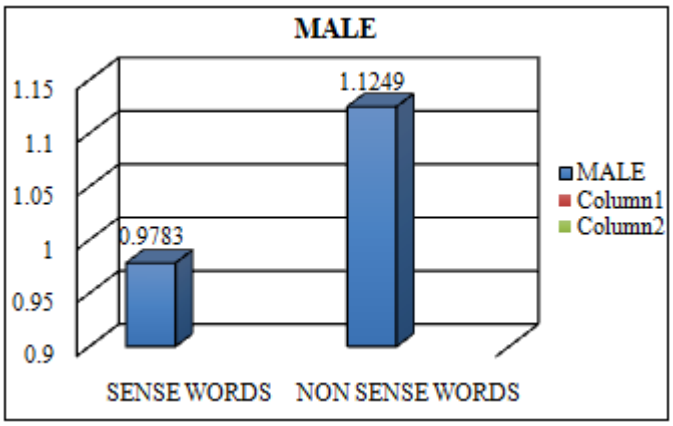

Figure 4.1: Shows the mean values of word duration for sense and non-sense words in male

From table 4.1 and Figure 4.1 it is observed that non-sense words have more word duration than the sense words in male. On statistical analysis results showed that there is high significant difference (p=0.00) between the sense and non-sense word groups.

b) To analyze the durational aspects of visual word recognition in female:

Table 4.2: Shows the mean and standard deviation of word duration for sense and non-sense words in female:

Words	N	Mean	Std. Deviation	95% Confidence Interval for Mean		t test p value	
				Lower Bound	Upper Bound		
Sense words	15	1.1617	0.07085	1.1224	1.2009	0.001	HS
Nonsense words	15	1.2337	0.03353	1.2151	1.2523		

HS: high significant

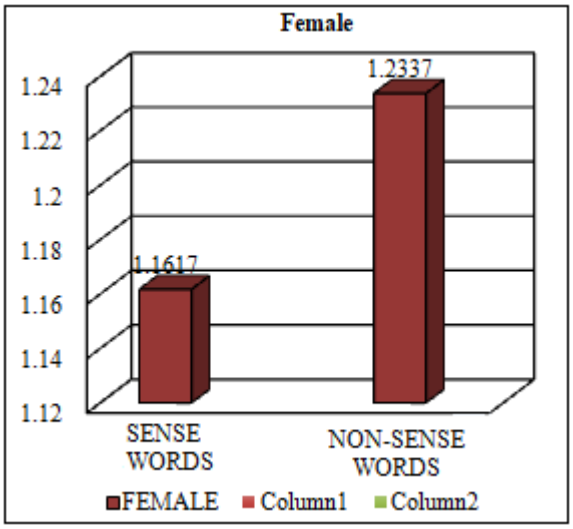

Figure 4.2: Shows the mean values of word duration for both sense and non-sense words in female:

From the table 4.2 and figure 4.2, it observed that non-sense words showed more duration than the sense words in female. Statistical analysis showed high significant difference (p=0.01) between non-sense words and sense words in female.

c) Shows the comparison of the durational aspects of visual word recognition in male and female

Table 4.3: Shows the mean and standard deviation of sense and non-sense words in both male and female:

words		N	Mean	Std. Deviation	95% Confidence Interval for Mean		t test p value	
					Lower Bound	Upper Bound		
Sense words	Female	15	1.16	0.07	1.12	1.20	0.000	HS
	Male	15	0.98	0.05	0.95	1.00		
	Total	30	1.07	0.11	1.03	1.11		
Nonsense words	Female	15	1.23	0.03	1.22	1.25	0.000	HS
	Male	15	1.12	0.04	1.10	1.15		
	Total	30	1.18	0.07	1.15	1.20		

HS: high significant

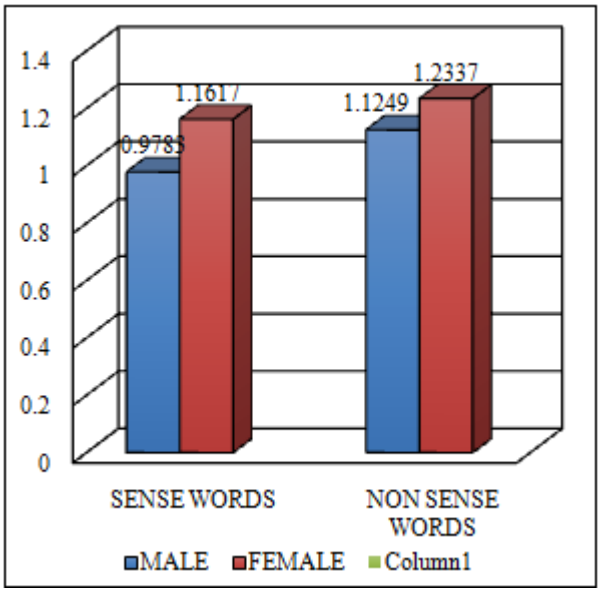

Figure 4.3: Shows the mean values of sense and sense and non-sense words in both male and female:

From the table 4.3 and figure 4.3, it can be inferred that female have more word duration than male, but when it compared sense and non-sense words, high significant (p=0.00) was noted.

5. Discussion

Durational aspects of sense and non-sense words in young male and young female adults have been analyzed and results showed that female have more word duration than male.

From the above attribute it is clear that comparison of word duration in male and female have highly significant (p=0.00) results.

Boys read better when taught to read using a phonics-based strategy, according to Johnston and Watson (2005) and Johnston and Logan (2009). (i.e., synthetic phonics). As a result, males' greater word reading ability with synthetic phonics may be due to their natural disposition for a more phonological approach to reading. Throughout the study, there were no significant variations in reading comprehension between boys and girls (which relies on other skills such as verbal ability). Boys, on the other hand, had a benefit over girls in abilities that rely more heavily on phonics, such as reading (decoding) and spelling (segmenting) norms (Johnston & Watson 2005).

Seyfarth (2014) investigates whether speakers have a context-independent bias to reduce low-informative words, which are generally predictable and thus usually reduced, and found that low-informative words have shorter durations, even after controlling for the effects of local contextual predictability, frequency, speech rate, and several other variables. Words that often appear in predictable settings are reduced in all contexts, even surprising ones. The findings are also consistent with representational models in which reduction is stored and highly frequent reduction affects later production.

Varghese and Kumaraswamy (2019) examined the word duration between sense and non-sense words in young adults and found that non-sense words have more word duration than the sense words.

6. Summary and Conclusion

According to the preceding summary of literature, durational

elements of speech perception are essential. Studies on the durational characteristics of sense and non-sense words in stutterers have been attempted; however there are limited informative data available across gender. As a result, the current research compares the durational characteristics of sense and non-sense words in male and female participants during visual presentation.

Adults in the age range of 18-24 years further divided into 15 male and 15 female. All participants were native of Kerala and fluent in reading and writing in Malayalam.

15 sense word and 15 non sense words were presented to each individual and was instructed to read the words quickly and accurately paying attention. The finalized wordlists were presented through a computer to each individual. The data was recorded from each individual in a quiet well illuminated and noise free room with a computer display kept at a distance of 1feet from the individual. The PowerPoint presentation in which text was typed in black letters on a white background. Care was taken for each word recognition was recorded using PRAAT software.

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

The comparison of word duration between male and female have highly significant (p = 0.0) result for both populations. The present study is in correlated with Varghese and Kumaraswamy (2019), and Johnson, Logan and Watson (2010), where they have said that boys read better than girls.

Limitation of the Study

- Limited sample size
- Restricted age range

7. Future Suggestions

- More number of participants can be included
- More studies can focus on different age group

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Appendix 1

സുപുകsupuka
ഇപിമ ipima
ഈകുമi:kuma
പവപു pavapu
അരവoa:ravam
താമരta:mara

കരടികaɾaʈi
പാവാടpaːʋaːʈa
അരണaɾuʋi
തുളസി ʈuɭasi
കരുണkaɾuɳa
മാലാഖmaːlaːkʰa
അരുവി aɾuvɪ
തവളʈaʋaɭa
വിവരംʋiʋaɾam
എരുമeɾuma
അളവ്aɭaʋə
വിറക്ʋiɾakə
ദുരിതംdɯɾiʈam
എകിഫ ekipʰa
ഒഫിപുofɪpu
കുവിപ kuʋipa
ടപമʈapama
വുപിമʊupima
ലികുമlɪkuma
തുപവ ʈupaʋa
മുഫിവ mufɪʋa
ലഗിവ lagɪʋa
ഗാവുപ gaːʊupa
പഫമpafama