


EYE MOVEMENTS IN READING BY DEAF AND HEARING RUSSIAN SIGN LANGUAGE SPEAKERS

A. Kromina (1)*, A. Laurinavichute (1, 2)

nastya.kromina@gmail.com*

1 - National Research University «Higher School of Economics», Center for Language and Brain, Moscow; 2 – University of Potsdam



DISTINCTIVE CHARACTERISTICS OF DEAF INDIVIDUALS

Receive most of the information with their eyes → may have improved visual perception which helps them read

May be bilinguals

Later spoken language acquisition may lead to poor language skills and difficulties in learning to read

TWO TYPES OF SIGN LANGUAGE SPEAKERS

Deaf people:

Have **no** access to sounds.

Do **not** rely on phonological codes while reading.

Hard-of-hearing people:

Have limited access to sounds.

May rely on phonological codes while reading.

PARTICIPANTS

	Number of participants	Age (mean)	Age of RSL acquisition (mean)	Subjective assessment of RSL proficiency (mean)	Estimated vocabulary size in Russian (mean)	Education in years (mean)	Speech usage	RSL usage	At least one parent is deaf
Deaf individuals	13	29	7 years	10/10	35846 words	15,5	Seldom or never	Daily	3
Hard-of-hearing individuals	13	25	7 years	8/10	54538 words	14	Often	Daily	7

READING EXPERIMENT

Equipment:

Desktop eye tracker “Eyelink 1000+”.

Materials:

144 sentences from the Russian Sentence Corpus

In 58% of cases - questions about the content of the sentences

Average sentence length = 9 words

Example of the sentence:

The road leads into the deep forest, winding along the slopes.

Question and suggested answers:

Where does the road lead?

Into the forest

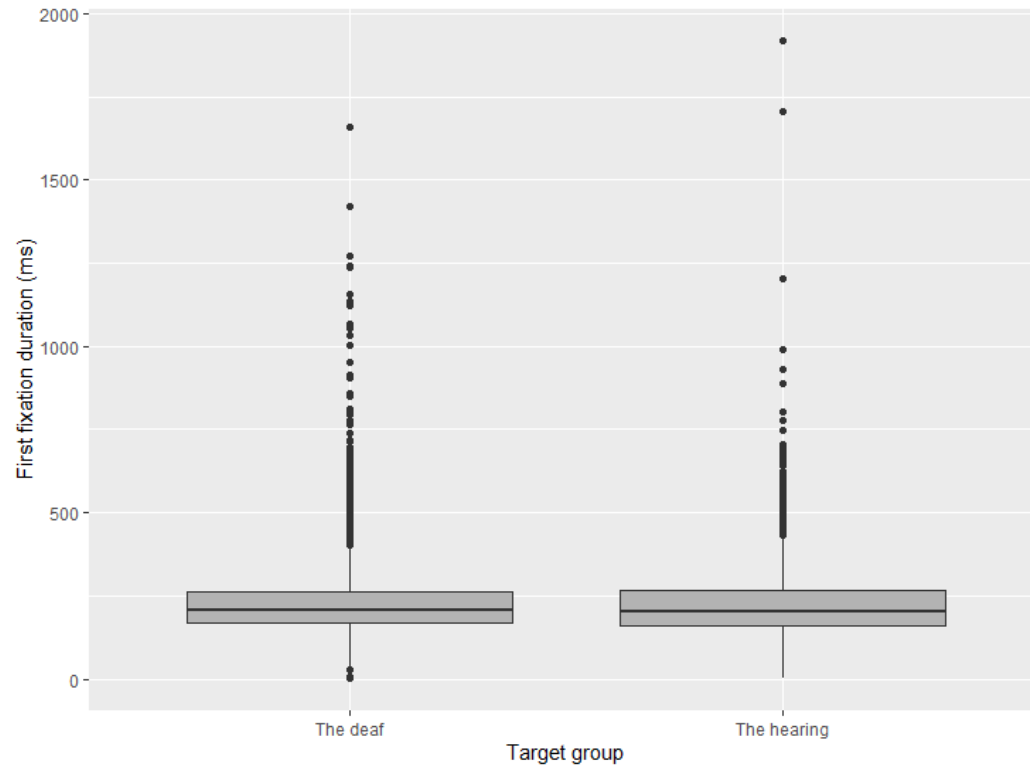
Into the garden

Into the village

RESULTS

COMPARABLE READING SKILLS

FIRST FIXATION DURATION

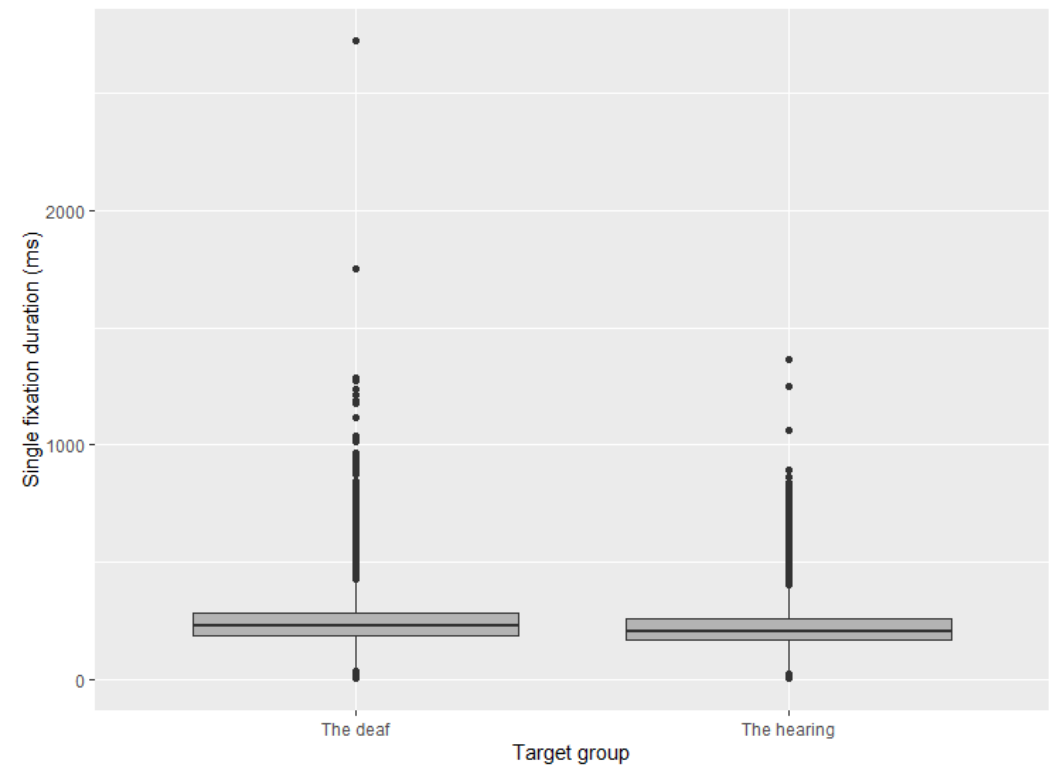


Mean values:

Deaf individuals – 230,5 ms

Hard-of-hearing individuals – 225 ms

SINGLE FIXATION DURATION



Mean values:

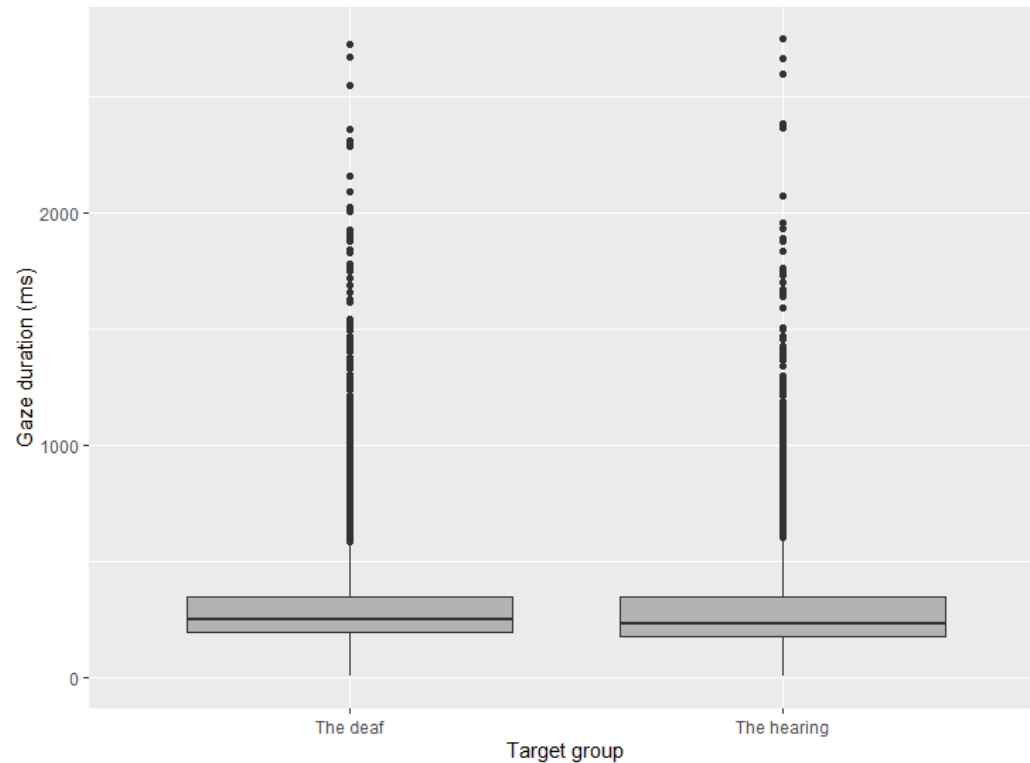
Deaf individuals – 243,5 ms

Hard-of-hearing individuals – 225 ms

RESULTS

COMPARABLE READING SKILLS

GAZE DURATION

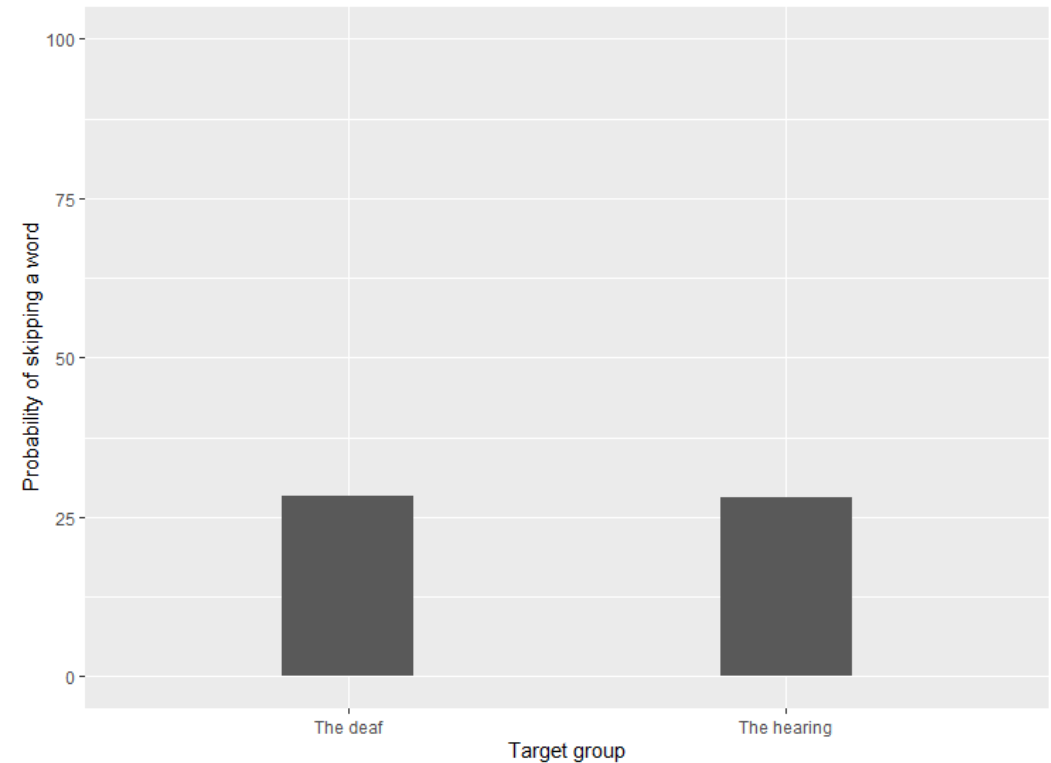


Mean values:

Deaf individuals – 297 ms

Hard-of-hearing individuals – 286 ms

PROBABILITY OF SKIPPING A WORD



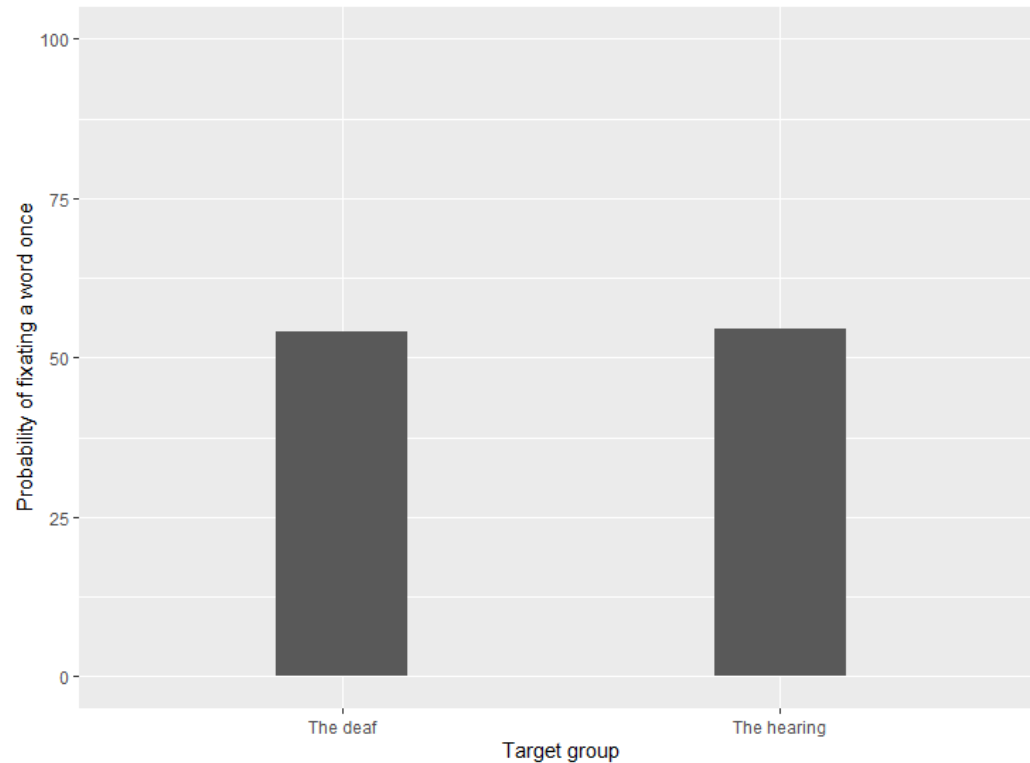
Deaf individuals – 28%

Hard-of-hearing individuals – 28%

RESULTS

COMPARABLE READING SKILLS

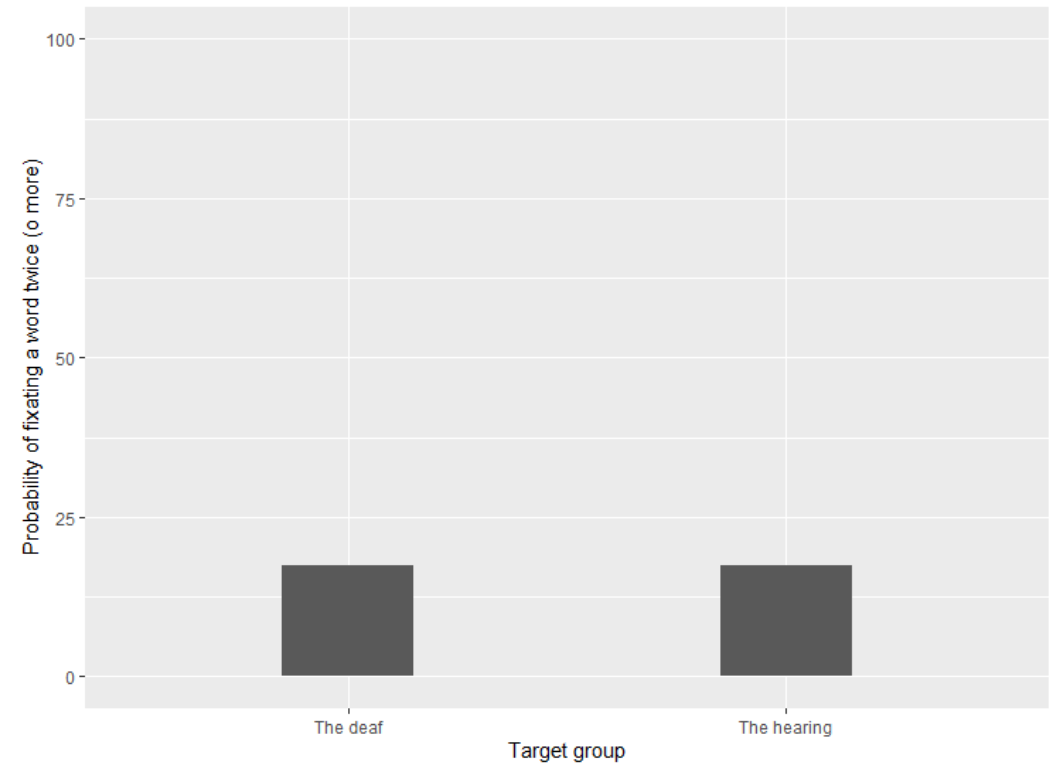
PROBABILITY OF FIXATING A WORD ONCE



Deaf individuals – 54%

Hard-of-hearing individuals – 54%

PROBABILITY OF FIXATING A WORD TWICE



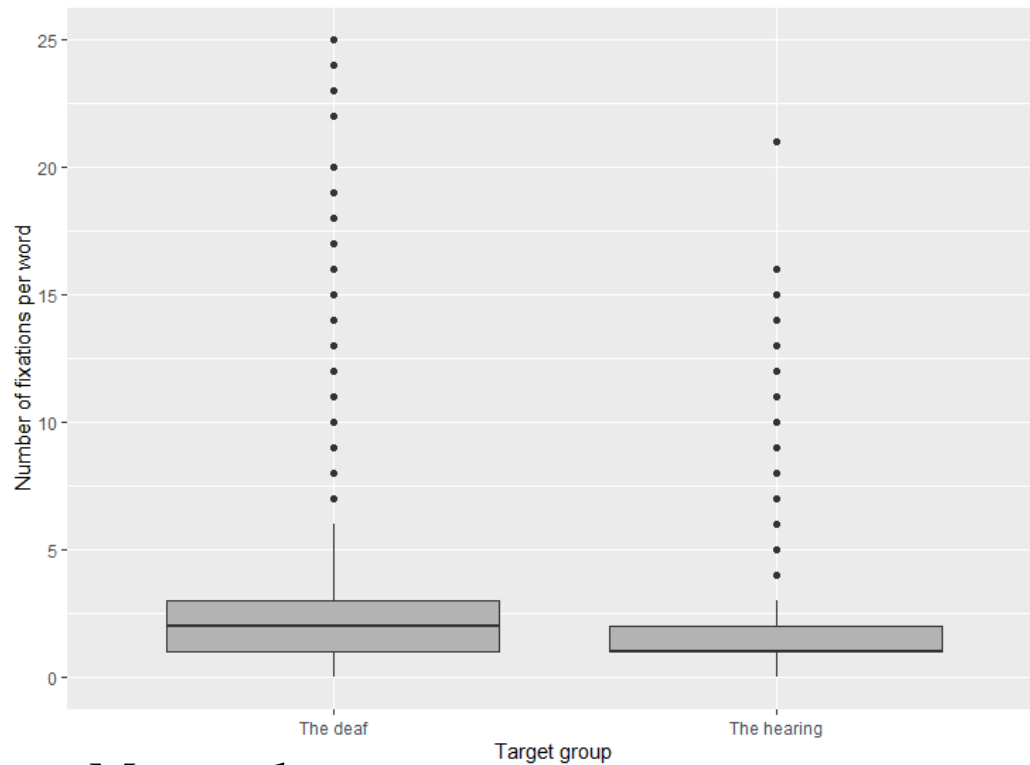
Deaf individuals – 17%

Hard-of-hearing individuals – 17%

RESULTS

COMPARABLE READING SKILLS

NUMBER OF FIXATIONS PER WORD

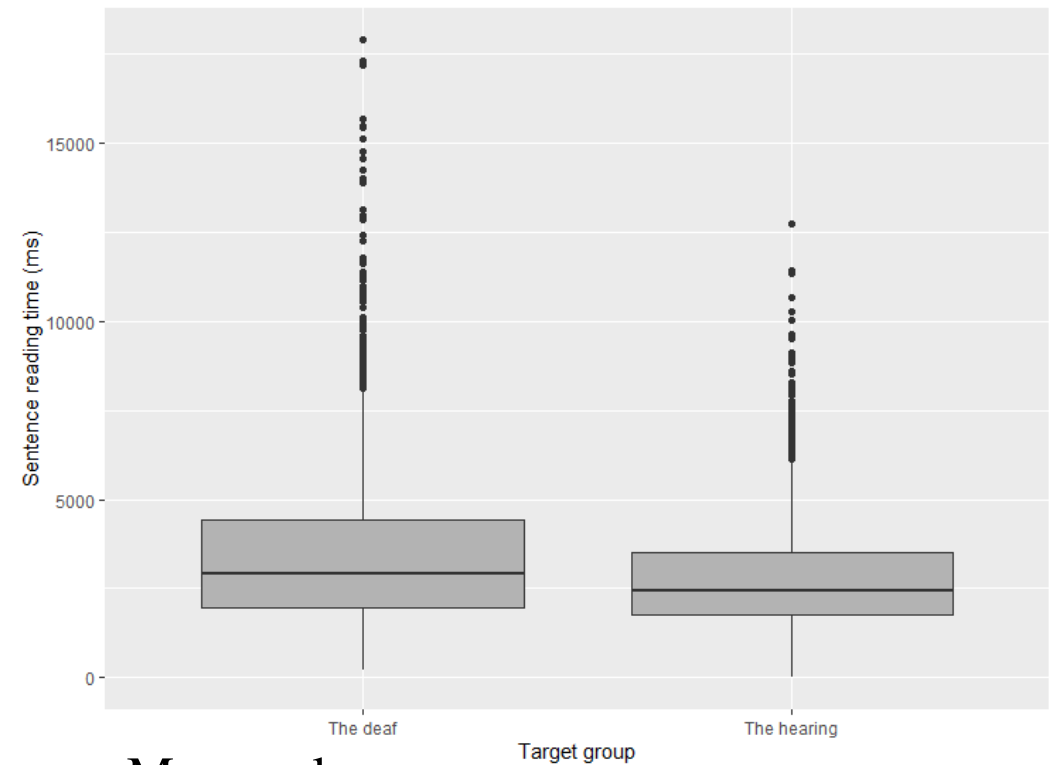


Mean values:

Deaf individuals – 2

Hard-of-hearing individuals – 1,7

SENTENCE READING TIME



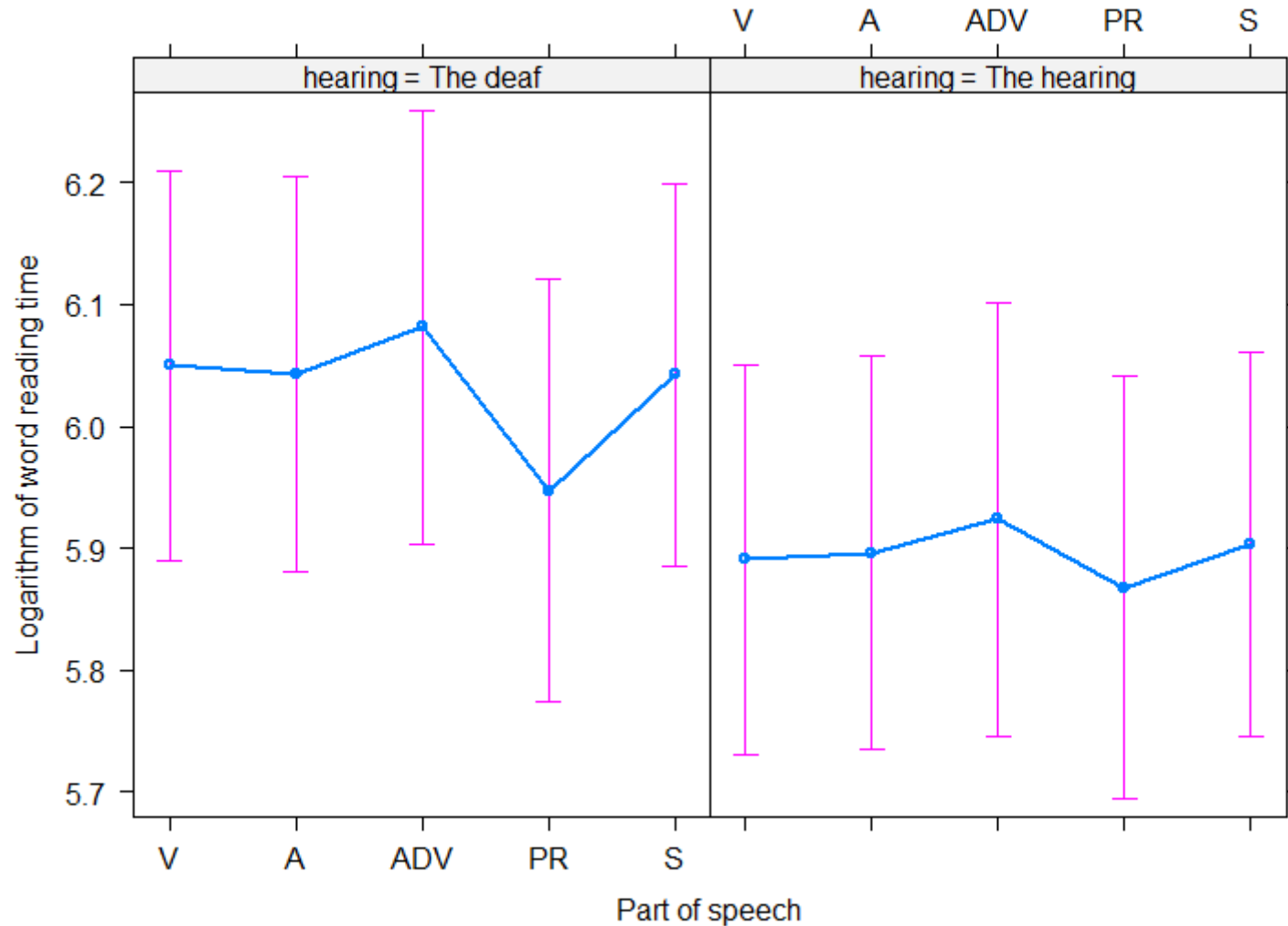
Mean values:

Deaf individuals – 3487 ms

Hard-of-hearing individuals – 2800 ms

RESULTS

TWO DIFFERENCES BETWEEN GROUPS



Lower comprehension questions response accuracy in deaf individuals (70% vs. 80% for hearing individuals).

Short and semantically simple words such as conjunctions, particles, and prepositions facilitate reading for deaf individuals more than for the hearing.

VISUAL SEARCH EXPERIMENT

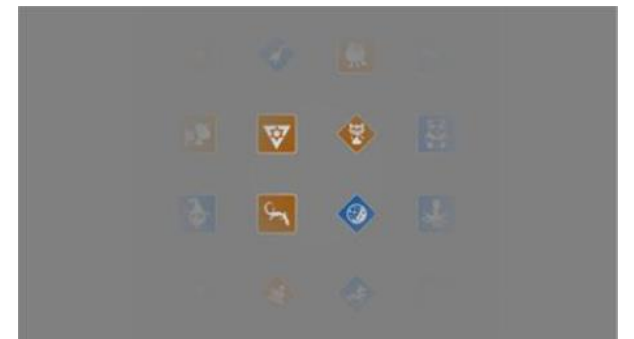
The task was to remember the image and find it among the images on the screen.

Three experimental conditions:

Full-screen search

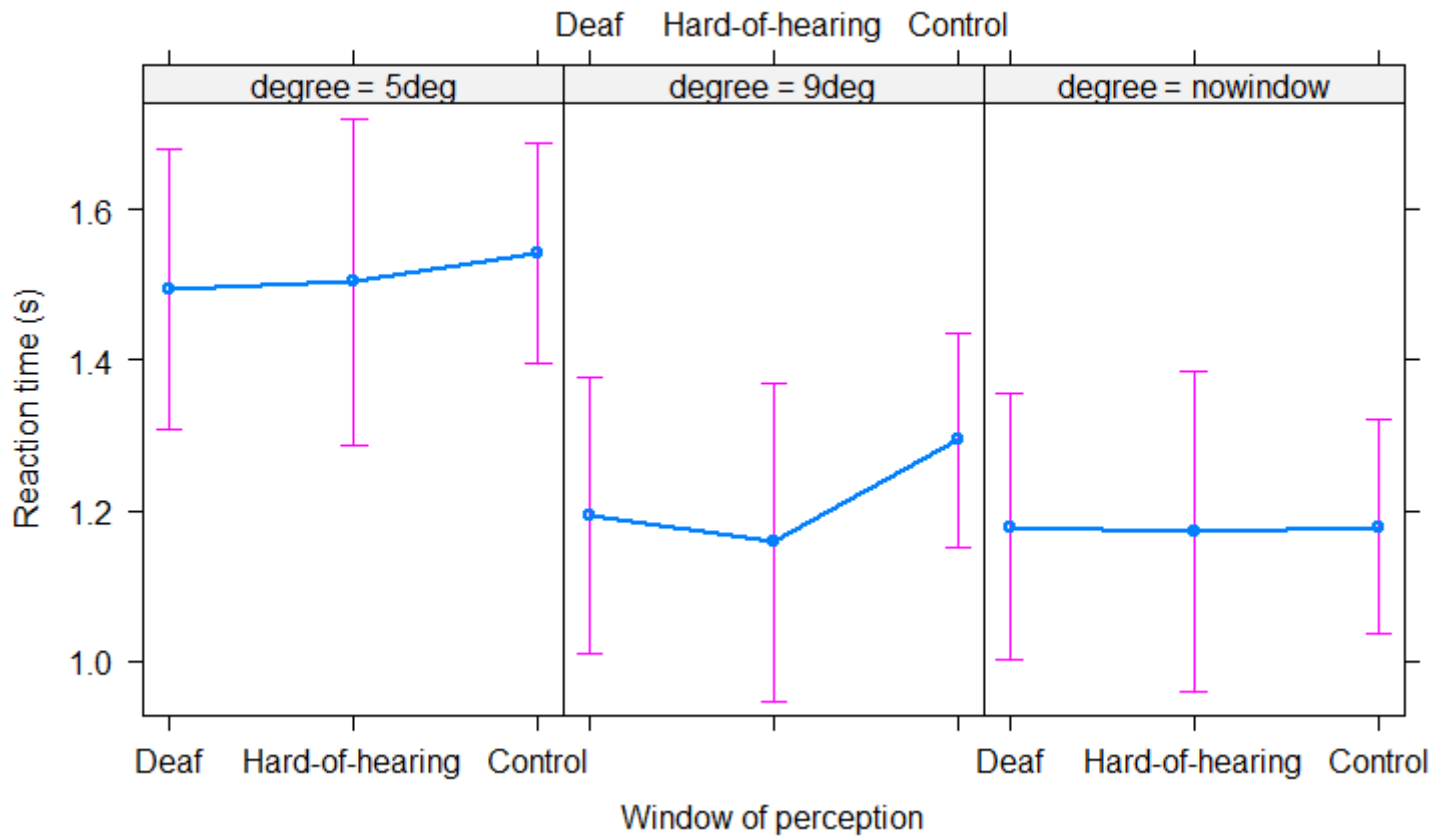
5-degree perception window

9-degree perception window



PERIPHERAL VISION

COMPARABLE WITH CONTROL GROUP PERIPHERAL VISION SIZE



Reading experiment:

Both deaf and hard-of-hearing individuals use peripheral vision while reading.

Visual search experiment:

Comparable searching skills in deaf, hard-of-hearing and hearing control groups.



CONCLUSION

Limited access to speech sounds does not determine reading proficiency in native speakers of Russian Sign Language

