



## Introduction

- Phonological neighbourhood density refers to the number of words that can be formed from a given word by substituting, adding or deleting one phoneme.
- A word with many similar sounding neighbours, such as *bat* (*rat, mat, fat, pat...*), has a dense neighbourhood, whereas a word with few or without neighbors, like *squirrel*, is said to have a sparse neighbourhood.
- In English, words with sparse neighbourhood are perceived more accurately and faster than words with dense neighbourhood (Metsala, 1997; Yates et al., 2008). By contrast, dense neighbourhood impedes word recognition in Spanish in terms of accuracy and reaction time (Vitevitch & Stamer, 2006). This cross-linguistic difference was explained by more complex inflectional system of Spanish in comparison to English.
- Almost all studies were done with adults.

## Materials and Method

### Method

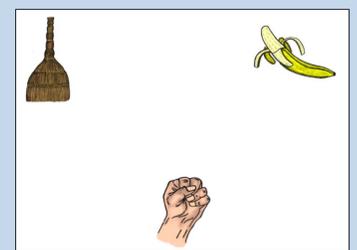
- **Participants:** twenty-five 4-6-year-old Russian children and 20 Russian adults.
- **Stimuli:** 15 pictures correspond to words with dense neighbourhood and 15-sparse neighbourhood.
- **Procedure:** Each trial starts with the presentation of three pictures for 2000 ms. Then the stimulus word was played, and the participant has to look at the named picture as fast as possible. The program advanced to the next trial after the fixation duration of 2000 ms in the AOI.
- We measured the reaction time (RT) from the stimulus word onset to the first fixation on the relevant picture.

### Equipment and Stimulus Screen

- **Equipment:** portable RED SMI eye-tracker (Figure 1)
- Example of stimulus screen (Figure 2)



(Figure 1)

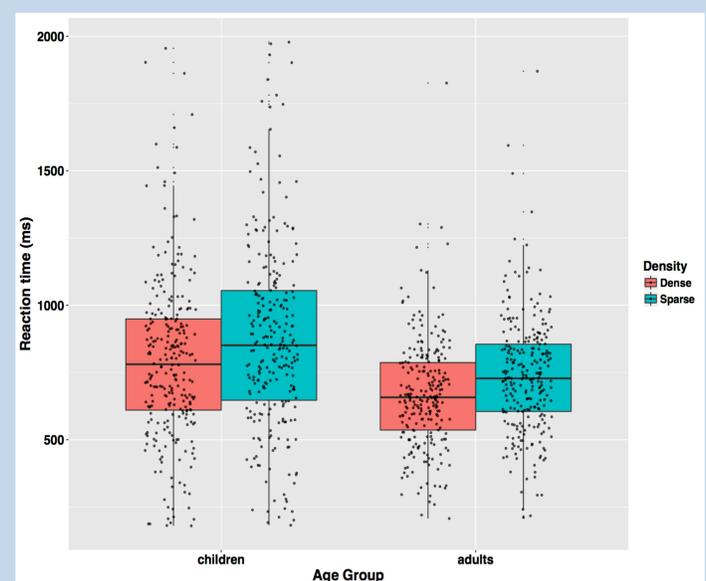


(Figure 2)

## Results and Discussion

- The analysis of the eye tracking data showed that there is a significant difference in RT between pictures corresponded to words with dense versus sparse phonological neighbourhoods both for children and adults (see Table 1 for statistical comparison).
- Four-six-year-old Russian children recognize words with dense neighbourhood on average 85 ms faster than words with sparse neighbourhood, and Russian adults recognize words with dense neighbourhood to about 80 ms faster than words with sparse neighbourhood (Figure 3).

	Reaction time		
	Estimate	Standard error	p
<b>Fixed Parts</b>			
(Intercept)	6.581	0.024	<.001
Age group	0.152	0.040	<.001*
Density effect in adults	0.105	0.042	.017*
Density effect in children	0.102	0.042	.019*
<b>Random Parts</b>			
$\sigma^2$		0.129	
$\tau_{00, \text{subject}}$		0.011	
$\tau_{00, \text{stimulus}}$		0.005	
$N_{\text{subject}}$		43	
$N_{\text{stimulus}}$		30	
Observations		1031	
$R^2 / \Omega_0^2$		.053 / .161	



(Figure 3)

- Thus, both Russian children and adults show the same phonological neighbourhood density pattern as was showed in Spanish adults. It means that morphological complexity of a language, indeed, influences the phonological neighbourhood density effect in word comprehension.