Exploring Basic Orthographic Syllable Structure in Russian

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Background. One of the central issues in the theories of visual word recognition is whether the lexical access is mediated by some sublexical units. In the AUSTRAL framework [1], one such unit is the Basic Orthographic Syllable Structure (BOSS), defined as a first root syllable, plus the consonants following the first vowel as long as they form a legal word-boundary cluster (e.g., *ank* in *ankle*; the cluster *kl* is illegal at word boundaries) [2]. Despite some evidence supporting word activation via BOSS, its psychological reality is questioned [3]. Some previous studies confounded BOSSes with roots or syllables, and the findings from English might not generalize to other languages [4].

Our study. Two experiments were designed to study the role of BOSS in activating words in Russian. Sixty Russian native speakers (M = 22.9, sd = 6.04) participated in the experiments. A lexical decision task with priming (prime duration = 50 ms) was used.

Experiment 1 aimed to detangle the BOSS from the root: the stimuli were CVCCV words with a 4-letter root, but a 3-letter BOSS, as the 3rd and 4th consonants formed an illegal boundary cluster. Primes differed from targets in the 1st, 4th, or 5th letter, or were dissimilar controls. We expected 1st letter substitutions to be the least efficient primes (BOSS and root disrupted); 4th letter substitutions (BOSS intact, root disrupted) to show a larger facilitatory effect; and the highest facilitation in 5th letter substitutions (root and BOSS intact). Primes differing in the 1st, 4th, or 5th letter indeed produced graded facilitation effects (10, 28, and 53 ms, respectively; Table 1), but the difference between positions 1 and 4 was not significant (Table 3).

Experiment 2 contrasted the BOSS with the word-initial syllable using prefixed CVCVC words whose final three letters formed the BOSS. As prefixes are excluded from the BOSS, only primes with real prefixes share the target's final three-letter BOSS. Primes included: 1st letter substitutions, either creating a real prefix or not, 5th letter substitutions, disrupting the BOSS, and dissimilar controls. All conditions produced significant priming (Table 2). Real-prefix primes yielded greater facilitation than non-prefix primes (63 vs. 45 ms, not significant, Table 4), yet the strongest effect followed 5th letter substitutions (77 ms), contrary to the hypothesis.

In summary, the results do not align with the BOSS framework: neither prefix status nor consonant cluster legality significantly modulated priming, and the strongest facilitation was observed when the BOSS was disrupted, suggesting that the BOSS is unlikely to be a viable unit in Russian. Interestingly, facilitatory effects were consistently strongest at the final position, pointing toward positional mechanisms, possibly attentional, as in the BRAID model [5].

References

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Figures and Tables

Table 1. Summary of a linear mixed effects model on the Experiment 1 data.

	b	*SE*	*t*	*p*
Intercept	-1.467	0.044	-33.03	<0.001
1st l. subs.	-0.044	0.018	-2.409	0.016
4th l. subs.	-0.070	0.017	-4.071	<0.001
5th l. subs.	-0.142	0.017	-8.257	<0.001

Table 2. Summary of a linear mixed effects model on the Experiment 2 data.

	b	*SE*	*t*	*p*
Intercept	-1.403	0.045	-30.87	<0.001
1st l. pref.	-0.122	0.028	-4.369	<0.001
1st l. no pref.	-0.087	0.028	-3.074	0.002
5th l. subs.	-0.142	0.028	-5.073	<0.001

Table 3. Pairwise comparisons (Exp. 1):

	1st l.	*4th l.*	*5th l.*
1st l. subs.			
4th l. subs.	0.439		
5th l. subs.	<0.001	<0.001	
control	0.076	<0.001	<0.001

Table 4. Pairwise comparisons (Exp. 2):

	1st pref.	*1st no pref.*	*5th l.*
1st l. pref.			
1st l. no pref.	0.567		
5th l. subs.	0.894	0.187	
control	<0.001	0.012	<0.001

Supplementary table 1. Example stimuli from Experiment 1.
Target word *“канва” (kanva)* – “canvas”, root: *kanv,* inflectional affix: *-a,* BOSS: *kan.*

Condition	Prime	Root / BOSS status
1st l. subs.	*санва (sanva)*	root disrupted, BOSS disrupted
4th l. subs.	*канба (kanba)*	root disrupted, BOSS intact
5th l. subs.	*канвэ (kanvė)*	root intact, BOSS intact
dissimilar control	*санбэ (sanbė)*	root disrupted, BOSS disrupted

Supplementary table 2. Example stimuli from Experiment 2.
Target word “*повар” (povar)* – “cook”, prefix: *по-,* root: *-var-,* BOSS: *var.*

Condition	Prime	Root / BOSS status
1st l. subs. — real prefix	*совар (sovar)*	root & BOSS intact, BOSS segm. correctly
1st l. subs. — no real prefix	*шовар (šovar)*	root & BOSS intact, BOSS segm. incorrectly
5th l. subs.	*пован (povan)*	root disrupted, BOSS disrupted
dissimilar control	*чорас (čoras)*	root disrupted, BOSS disrupted

Note. Real-prefix primes contained an existing Russian prefix, promoting segmentation of the final three letters as the BOSS.