

On the Origins of the Prosodic Word in Russian

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Abstract

The Prosodic Word (PwD) is a foundational notion in phonological theories, being relevant for the statement of many phonological generalizations. In spite of their importance, there are basic open questions about prosodic words. Where do they come from? Can their structure in one language vs. another be predicted? In this paper I suggest a research program that attempts to address such questions by viewing prosodic words as emergent over time from the interaction of phonetics, phonologization, and syntactic structure.

Index Terms: prosodic word, domain generalization, Russian

1. Introduction

The Prosodic Word (PwD) occupies a central position in the theory of Prosodic Phonology, e.g. [1], [2], [3], [4], [5]. A key motivation for the PwD, as separate from the morphosyntactic word, is the lack of isomorphism between the two kinds of word. For example, word-final devoicing in Russian affects open-class lexical items but not prepositions, leading to contrasts like *sat mi'xaila* 'Mikhail's garden' vs. *pəd mes'kvoj* 'near Moscow', in which the underlying /d/ of /sad/ 'garden' is devoiced (cf. *sada* 'garden (gen.)') but the /d/ of the preposition /pod/ is not. This contrast, among other facts, leads many researchers to conclude that the first phrase consists of two prosodic words, i.e. [sat]_{PwD} [mi'xailə]_{PwD}, while the second consists of one, i.e. [pəd mes'kvoj]_{PwD}, and to assume that devoicing affects consonants at the end of the prosodic word [6], [7], [8], [9], see discussion and references in [10].

The word is relevant to phonetic theories as well. For example, phonetic domain-initial strengthening and domain-final lengthening are most strongly observed at the highest level of the prosodic hierarchy such as the utterance and are more weakly present at the level of the word [11], [12]. There is also evidence that degree of coarticulation can depend on whether the relevant segments span a prosodic word boundary or are within a prosodic word [13].

In spite of their importance, there are many basic questions about prosodic words that remain unanswered (see discussion in [14]). How many prosodic categories are there? Are they innately given or emergent constructs, and if the latter, what explains their emergence and the precise form they take? What are the constraints on the structure of prosodic categories? It is much easier to ask these questions than to answer them, and this paper has the modest goal of suggesting a research program in which prosodic words (and possibly other higher prosodic constituents) are viewed as constructs that emerge over time through the interaction of phonetics, phonologization, and syntactic structure. A key component of this pursuit is something called *domain generalization*.

2. Domain generalization

Word-final devoicing as in Russian is attested in many unrelated languages. The account of it detailed in this section follows [15].

2.1. Phonetics-phonology mismatch

Many researchers have posited that final devoicing originates as a phonologization of utterance-final phonetic devoicing (e.g., [16], [17]). Gradient utterance-final devoicing occurs in many languages and can be attributed to a drop in sub-glottal pressure toward the end of an utterance [18] as well as spreading of the vocal folds in anticipation of non-speech breathing posture (e.g., [19], [20]). In addition, it has been argued that an obstruent voicing contrast might be hard to perceive unless the relevant obstruents directly precede a sonorant consonant or vowel [21]; since utterance-final consonants precede a pause, there may be perceptual as well as articulatory underpinnings to devoicing. These phonetic underpinnings are relevant to utterance-final position, but not word-final position (putting aside words that happen to be utterance-final). In phrasal contexts like *sat mi'xailə*, in which the word-final obstruent is utterance-medial and precedes a sonorant, there are no articulatory or perceptual underpinnings for word-final devoicing analogous to those described above. Yet many languages have phonologized final devoicing specifically at the level of the word all the same.

2.2. Domain generalization

The idea of *domain generalization* is that language learners, even while encountering a generalization about utterance-final position, are predisposed to learn them as word-final. Suppose that phonological generalizations are built from a store of lexical representations [22], [23]. It is plausible to assume also that we store many more words than phrases or utterances. First, we encounter many more words than utterances (since words make up utterances). Second, words are also easier to remember, because they tend to be shorter than utterances, and a given word is reinforced in memory more often by repeated exposure than a given utterance. Words are therefore a more likely source of generalization.

Domain generalization implies that word-final devoicing comes about in the following way. At an initial stage of a given language (here we entertain the scenario using Modern Russian forms), devoicing begins as a phonetically motivated utterance-final process, as in Stage 2 below. At this stage words like /sad/ 'garden' are realized with final devoicing when they occur in utterance-final position but not elsewhere. But under the influence of the many stored devoiced variants like [sat] of words like /sad/, the learner generalizes devoicing to *all* words. This is Stage 3. This process can be seen underway in Polish, where some dialects maintain utterance-final devoicing and others have innovated word-final devoicing [24].

Stage 1 (No devoicing)	/sad vixodʲit v drugoj sad/ [sad vixodʲit v drugoj sad] ‘The garden lets out onto another garden’
Stage 2 (Utterance- final devoicing)	/sad vixodʲit v drugoj sad/ [sad vixodʲit v drugoj sat]
Stage 3 (Word- final devoicing)	/sad vixodʲit v drugoj sad/ [sat vixodʲit v drugoj sat]

2.3. Artificial grammar experiment

In order to test the hypothesis that learners are biased toward word-based generalizations, as domain generalization implies, two artificial grammar experiments were carried out in [15]. Participants were exposed to constructed languages in which both voiced and voiceless obstruents occurred in syllable onset position but word-final obstruents were only observed in utterance-final position and were only voiced or voiceless (depending on experimental condition). Participants were thus implicitly given information about the voicing of word-final obstruents in utterance-final position, but no information about word-final obstruent voicing otherwise, a poverty of stimulus design ([25], [26], [27]). Results showed learning of the utterance-final devoicing (or voicing) generalization, and also extension of the learned pattern to word-final position even for words in utterance-medial position, supporting domain generalization.

3. The Russian prosodic word

3.1. The prosodic word as emergent

What facts motivate the Russian Pwd? As noted above, an important motivation comes from the facts of final devoicing and prepositions. According to this diagnostic, a preposition (or string of prepositions) plus one open-class lexical item constitute a prosodic word, e.g., [pəd məsʲkvoʲ]P_{wd}, ‘near Moscow’. Devoicing is Pwd-final, accounting for the lack of devoicing in /pod/ ‘near’. Voicing assimilation among obstruents also occurs within the Pwd, as in [pət ˈpapəʲ]P_{wd} ‘under papa’ from /pod ˈpapa/.

Russian also has various enclitics, and these also trigger voicing assimilation, as in [ˈsog zʲi] ‘juice (emphatic)’ from /sok zʲe/, cf. [ˈsok tə] ‘juice (topical)’; or [ˈsat tə] ‘garden (topical)’ from /sad to/, cf. [ˈsad zʲi] ‘garden (emphatic)’. Such voicing assimilation does not occur as readily across the boundaries of open-class lexical items, suggesting that enclitics are also incorporated into the Pwd. However, final devoicing applies before these enclitics, as can be seen whenever an enclitic begins with a sonorant, e.g. [ˈsok lʲi] ‘juice (interrogative)’ and (crucially) [ˈsat lʲi] ‘garden (interrogative)’. If devoicing is Pwd-final, then enclitics cannot be within the prosodic word in such examples.

Such considerations lead researchers to posit two ‘word-like’ prosodic levels for Russian, which we might call the ‘prosodic word’ and ‘clitic group’ or the ‘minimal’ and ‘maximal’ prosodic word, or which we might distinguish in some other way. One structure argued for is shown in Figure 1 (see [10], [28] for detailed arguments). In this structure the

preposition /iz/ and noun /knʲig/ group together as a Pwd (notated ω). However, the interrogative enclitic /ʲi/ is outside of this Pwd (incorporated directly into the prosodic phrase), accounting for the final devoicing of /knʲig/.

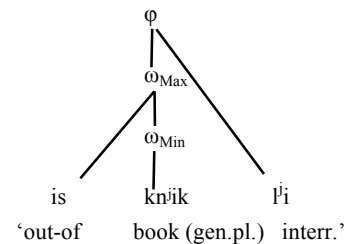


Figure 1: Prosodic structure for proclitics vs. enclitics

Though this structure succeeds in capturing the necessary distinctions, it raises the question: what explains the structure? From the point of view of prosodic theory the structure could just as easily be as in Figure 2.

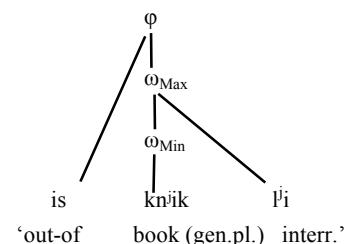


Figure 2: Prosodic structure for proclitics vs. enclitics

In the conventional approach to this problem, phonological facts like final devoicing are seen as (partly) determined by prosodic structure. As an alternative approach to answering the question above, we might instead try to derive the prosodic structure from the phonological facts. Final devoicing, as we have seen, arises historically when utterance-final devoicing (which is phonetically motivated) is generalized to the ends of all words. A word class that stands apart in not undergoing final devoicing, and which therefore motivates the Pwd, is the class of prepositions. Yet prepositions are a class of word that can never appear in utterance-final position in Russian, because they cannot be stranded (with marginal exceptions, see [29]).

The idea, then, is that domain generalization, assumed here to be the source of word-final devoicing, did not affect the class of prepositions, because Russian speakers had no experience of utterance-final prepositions and therefore no experience of devoiced prepositions. It is the array of facts this scenario engendered that leads the phonologist to posit the Pwd.

It does not follow from this idea that notions like the Pwd are imaginary or relevant only to linguists. Russian learners might well posit an organizational unit like the Pwd in response to the Russian facts, especially if this unit is useful in other ways. (See below.) However, the suggestion here does imply an understanding in which the Pwd is not, for example, an innate category provided by a universal grammar (see also [30] on this point). Rather, it *emerges* from a complex interaction of factors, including phonetic facts (providing the underpinning of utterance-final devoicing), phonologization (with domain generalization a key component of

phonologization, extending the generalization to open-class words in any position, and syntactic structure (explaining the exceptionality of prepositions).

3.2. Other evidence for the Russian prosodic word

What other facts motivate the Russian Pwd? There are at least two other noteworthy lines of evidence.

First, the Pwd is traditionally held to be the domain of lexical stress in Russian. Put another way, prepositions are part of the lexical stress domain: they do not carry stress independently; more importantly, a stress that ‘belongs to’ a following noun sometimes retracts onto the preposition itself, as in [‘pod ruku] ‘by the arm’, compare [pəd ru‘koj] ‘at hand’ [6], [7].

Second, the Pwd is relevant to the statement of vowel reduction facts [31], [28]. The vowels /o/ and /a/ reduce to [ə] when unstressed – compare [‘got] ‘year’ to [gədə‘voj] ‘annual’ (from /godo‘voj/) and [‘praf] ‘law (gen.sg.)’ to [prəvə‘voj] ‘legal’ (from /pravo‘voj/. An exception is when these vowels immediately precede the stressed syllable of a word; in such cases the relevant syllable is much longer and the vowel is realized as something like [ɐ] [32], also seen in the examples above. This exception only applies within words, however: the word-final /o/ of /‘malo/ in /‘malo ‘skazano/ ‘little said’ reduces completely even though it precedes a stressed syllable in the following word: [‘malə ‘skazənə]. It is significant, therefore, that pretonic reduction is to [ɐ] also for prepositions, e.g., [pət ‘papə]PwD ‘under papa’ from /pod ‘papa/, further supporting the analysis of such sequences as involving single Pwds.

That fact that at least three independent phonological processes – final devoicing, stress, and vowel reduction – apparently converge on the same Pwd analysis for preposition + word complexes presents a challenge for the view that Pwds emerge from the interaction of syntactic, phonetic, and phonological factors, as suggested here. If a domain such as Pwd is not given in advance but emerges as suggested earlier, how do these independent processes converge on the same domain? One possible answer is that speakers indeed posit Pwds based on facts like those of devoicing (or one of the other processes mentioned above), but that once posited, the Pwd can become relevant for, or even trigger, other phonological processes. In such a view, though not innate, Pwds are real, grammaticized organizational units, we might hold to the expectation that there are few such categories. However, this understanding of Pwds would be very hard to distinguish from the view that they are innate.

The alternative possibility is that different phonological phenomena lead to Pwd-like behavior independently, so that what counts as a ‘PwD’ will depend on what phenomenon is in question; they need not converge on one answer. This is the view advocated in [30], for example, which argues that “prosodic domains are language-particular, intrinsic and highly specific properties of individual phonological rules or constraints” (though [30] allows that if enough processes appear to target the same domain they will have “a gravitating effect within the system, attracting phonological patterns which evolve in the course of sound change”). The discussion of Russian final devoicing here envisions one way that such language-specific organizational units might come about.

Further research is required to understand best how the Russian facts bear on these questions, but some evidence is

already at hand that what we call a Pwd in Russian depends on which phenomenon we look at. One example comes from facts analyzed in [28]. A certain kind of compound can take stress in each member, e.g., ,bomba-u ‘b’iez’i’f’ :ə ‘bomb shelter’ and ,m’ed’v-Inst’i ‘tut ‘medical institute’. This fact suggests an analysis of such compounds as involving two Pwds: [,bomba]PwD-[u ‘b’iez’i’f’ :ə]PwD. Yet a word-final /o/ or /a/ in the first member of such compounds does not reduce to [ə] but to [ɐ] e.g., ,saxəɾɐ-‘varn’i ‘sugar refinery’ from / ,saxarə-‘varn’i/. The vowel reduction facts therefore suggest an analysis of such compounds as involving one Pwd: [,saxəɾɐ-‘varn’i]PwD. (Cf. [‘malə]PwD [‘skazənə]PwD, discussed above.) Likewise final devoicing does not target the first word of such compounds, as the example ,m’ed’v-Inst’i ‘tut shows. Of course, these inconsistencies are a problem only if we expect all phonological processes to point to one and the same ‘PwD’.

4. Conclusions

The sources of evidence for something like the Pwd are diverse, including word-edge segmental phonology like final devoicing, but also facts about rhythm or stress, tone, apparent reference to morphosyntactic features, and effects of frequency. The discussion here has had nothing to say about the potential origins of phenomena other than word-final devoicing and the means by which they also converge on something like the prosodic word. But the point of this paper is that we might begin to make sense of the sometimes conflicting evidence about prosodic words, and explain aspects of their structure, if we view them as organizational constructs that emerge over time from the interaction of independently posited properties of a language. The hope is that this kind of thinking can be applied to these other sources of evidence as well.

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6. References

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