VOT and the shape of the Prosodic Hierarchy in Polish

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Research on the interaction between prosodic structure and segmental phonetics is characterized by conflicting findings with respect to the predictions of various theoretical proposals. Findings from English suggest a certain amount of domain-initial strengthening, yielding longer VOT of voiceless plosives at the beginning of higher-level prosodic domains (e.g. Choi 2003, Fougeron and Keating 1997). However, in German, Kuzla & Ernestus (2011) actually observed VOT *shortening* at the start of larger domains. Such conflicting findings may cast doubt on assumptions about the universality of the Prosodic Hierarchy (cf. Schiering et al. 2010) – perhaps it should not be taken for granted that higher-level in one language means the same thing as higher-level in another language.

Schwartz (2016) proposes two mechanisms by which prosodic structure may be built, which allows for two different types of prediction with regard to the phonetics of segments at prosodic boundaries, shown in Figure 1 with respect to the consonant /t/. Prosodic domains may be formed by means of a recursive 'submersion' process, by which larger domains contain embedded iterations of smaller units. In submersion systems, shown in the single tree on right, we should expect significant initial strengthening (Choi 2003 for English), since the first 'segment' is housed at the top of the representational hierarchy. Alternatively, prosody may be built up by means of an adjunction mechanism (left in (1)), which places initial and non-initial segments at the same level. An adjunction system, shown on the left, should have us to expect minimal strengthening effects (cf. Kuzla & Ernestus 2011 for German), since the phrase-initial stop is no higher than medial or final segments.
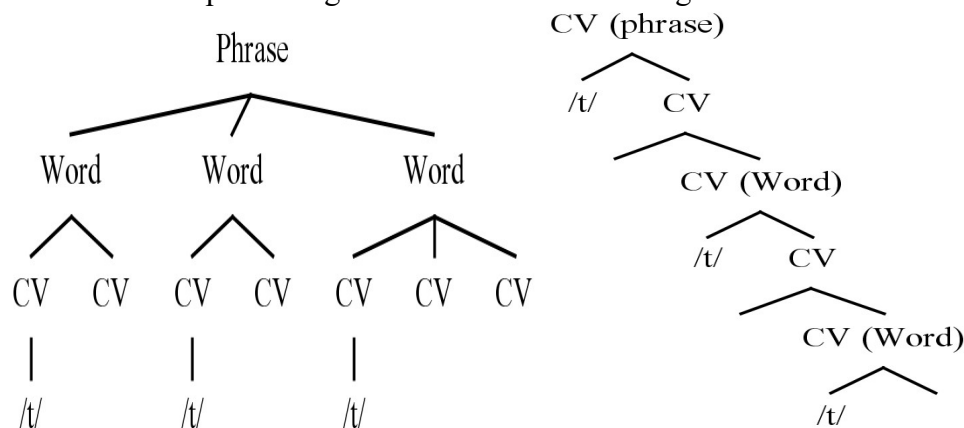

Figure 1. 'Adjunction' (left) and 'submersion' (right) systems (after Schwartz 2016).

This study looks at the VOT of word-initial voiced and voiceless Polish in plosives to see if initial strengthening effects can be found. The dataset was made of 48 disyllabic target words starting with /p,t,k,b,d,g/, counterbalanced for place of articulation and vowel context /a,ɛ,ɔ,ɨ/, and embedded in carrier sentences controlled for the total number of syllables. Items were elicited in three positions, phrase-internal, phrase-initial, and utterance-initial, in both accented and unaccented conditions. The examples in (1) show the three sentence types for the target word *bochen* 'a loaf' (the target word is underlined, the accented item is bolded).

(1) a) Codziennie go wypiekamy. <u>**Bochen**</u> żytniego chleba jest smaczny.
        *We bake it every day. A <u>**loaf**</u> of rye bread is tasty.*
        Sentence type: Utterance-initial, accented.

    b) Codziennie go wypiekamy. <u>Bochen</u> **żytniego** chleba jest smaczny.
        *We bake it every day. A <u>loaf</u> of **rye** bread is tasty.*
        Sentence type: Utterance-initial, unaccented.

c)   Zawsze gdy go wypiekamy, **bochen** pszennego chleba jest chrupki.
*Whenever we bake it, the **loaf** of wheat bread is crunchy.*
Sentence type: Phrase-initial, accented.

d)   Zawsze gdy go wypiekamy, <u>bochen</u> **pszennego** chleba jest chrupki.
*Whenever we bake it, the <u>loaf</u> of **wheat** bread is crunchy.*
Sentence type: Phrase-initial, unaccented.

e)   Od pokoleń wypiekamy **bochen** wiejskiego chleba na mące.
*For generations, we've been baking a **loaf** of rustic bread.*
Sentence type: Phrase-internal, accented.

f)   Od pokoleń wypiekamy <u>bochen</u> **wiejskiego** chleba na mące.
*For generations, we've been baking a <u>loaf</u> of **rustic** bread.*
Sentence type: Phrase-internal, unaccented.

For this project, 50 native speakers of Polish have been recorded in total. Crucially, none of these speakers have had significant contact with English. So far, we have extracted VOT data from 7 speakers, a total of 1008 tokens. Preliminary results are summarized in the boxplots below (/bdg/ on the left; /ptk/ on the right).
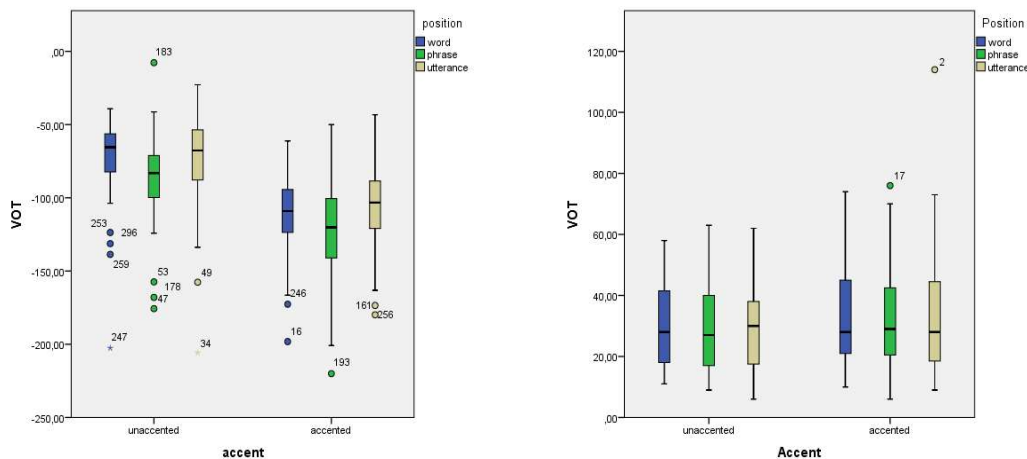
Linear mixed effects models revealed a significant effect of accent for /bdg/ (longer pre-voicing in accented words), but not /ptk/, and no significant effects of position. In other words, so far it appears as though Polish has minimal segmental strengthening effects induced by prosodic position, a finding that is largely compatible with results from Malisz & Żygis (2015). If this pattern holds up over a larger number of speakers, we will have clear evidence that Polish should be characterized as an adjunction system according to the typology shown in Figure 1.

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