

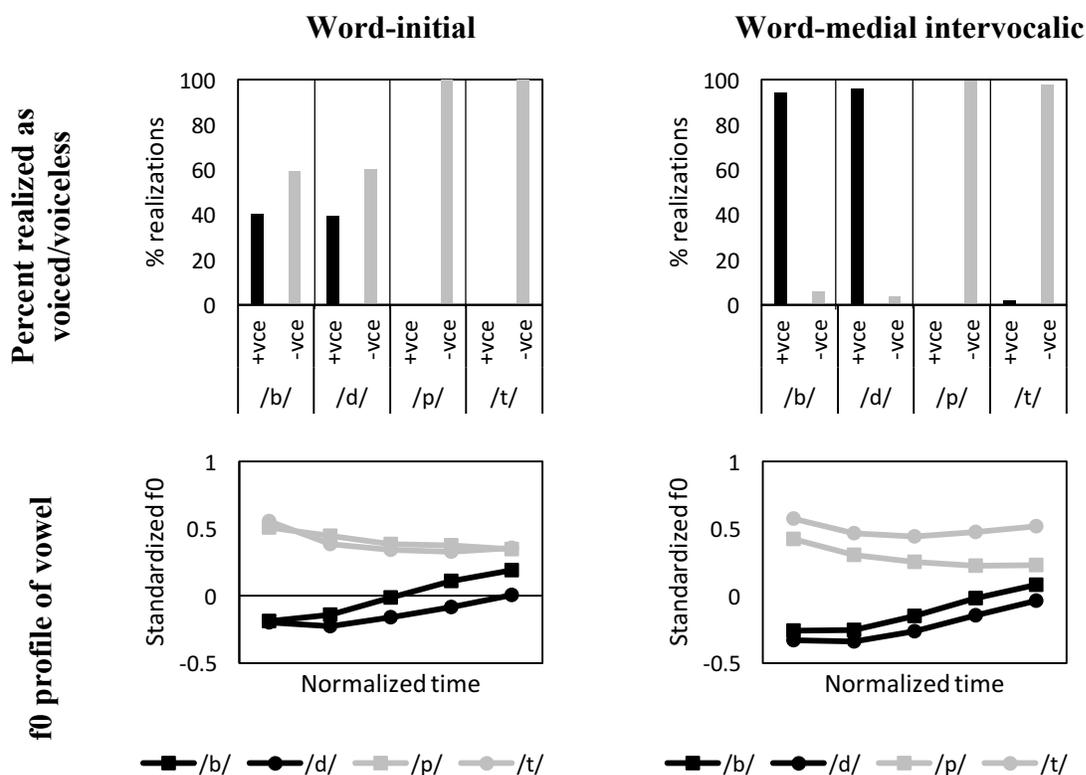
## Tone and plosive voicing in Afrikaans: an imbalanced system of contrast

In this paper, we present evidence for the development of an imbalanced system of phonological contrast in Afrikaans. Specifically, we show that Afrikaans is developing a system where plosives contrast for voicing intervocalically but not word-initially, and where vowels contrast for high/low tone after word-initial plosives but not word-medial plosives.

**Background:** The plosive system of Afrikaans is traditionally described as contrasting prevoiced and voiceless unaspirated plosives (/b d/ → [b d] vs. /p t/ → [p t]). In a recent study, however, Coetzee *et al.* (2014) have shown that the voicing contrast is collapsing word-initially with prevoiced plosives being replaced by voiceless plosives. Coetzee *et al.* also found that the loss of the voicing contrast does not result in a concomitant loss of lexical contrast. Lexical contrast, rather, is preserved on the following vowel, with vowels after historically voiced plosives being realized with low f<sub>0</sub> and those after historically voiceless plosives with high f<sub>0</sub> (i.e. the original voicing contrast is being replaced by a tonal contrast).

**Current study:** The Coetzee *et al.* study focused on word-initial plosives only and therefore left unanswered whether word-medial, intervocalic plosives were undergoing a similar process. In this paper, we present the results of a follow-up study investigating Afrikaans plosive voicing both word-initially and word-medially. Data were collected from nine native speakers of Afrikaans, each of whom read 40 monosyllabic words (10 each with initial /b d p t/) and 40 disyllabic words (10 each with intervocalic /b d p t/). See (2) for example stimuli.

Figure 1: Percent plosives realized as voiced/voiceless (averaged across speakers), and normalized f<sub>0</sub> profile of post-plosive vowel (averaged across speakers).



Acoustic analysis confirmed the results of Coetzee *et al.*, showing that the majority of historically voiced word-initial plosives are realized as voiceless, but that the lexical contrast is preserved as an f0 contrast on the following vowel (see Figure 1). As for word-medial plosives, both a robustly maintained voicing contrast and an f0 difference on the following vowel were found. In word-medial position, the lexical contrast is therefore cued by both plosive voicing and the f0 of the vowel following the plosive (see Figure 1).

**Discussion:** These data provide evidence for two ongoing sound changes in Afrikaans. (i) Plosive voicing is being lost in word-initial position. (ii) A tonal difference is being introduced on post-plosive vowels in both initial and medial positions, with high tones occurring after historically voiceless, and low tones after historically voiced plosives. Since voicing is being lost only word-initially while the tonal difference is being introduced both initially and medially, an imbalanced system is being created. The system is summarized in (1), with examples of words as they are realized in this system given in (2).

(1)		<b>Word-initial</b>	<b>Word-medial intervocalic</b>
	<b>Voicing</b>	Non-contrastive (voiceless only)	Contrastive (voiced vs. voiceless)
	<b>Tone</b>	Contrastive (high vs. low)	Non-contrastive (predictable based on plosive voicing)

(2)		<b>Word-initial</b>	<b>Word-medial intervocalic</b>
	<b>Labial</b>	/b̥ɔs/ [p̥ɔs] <i>bush</i> /p̥ɔs/ [p̥ɔs] <i>mail</i>	/xlub̥a:l/ [xlub̥à:l] <i>global</i> /apart/ [apárt] <i>separate</i>
	<b>Alveolar</b>	/d̥ak/ [t̥ák] <i>roof</i> /t̥ak/ [t̥ák] <i>branch</i>	/xəd̥əx/ [xəd̥əx] <i>poem</i> /prut̥əs/ [prut̥és] <i>protest</i>

*An imbalanced system of contrast:* Once the voicing loss has been completed such that all word-initial plosives are realized as voiceless, Afrikaans will have a plosive voicing contrast word-medially but not word-initially. On the other hand, a tonal contrast will be observed after word-initial plosives but not after word-medial plosives (word-medially the tonal property of the vowel will be predictable from the voicing of the preceding plosive). Such imbalanced systems tend to be unstable, and we therefore predict that this system will eventually develop into a more balanced system where the voicing contrast is either lost (or reintroduced) everywhere, or where the tonal contrast spreads to all positions (or is lost altogether).

*Individual variation:* As is typical in a situation of sound change, variation is observed among individual speakers. Although the majority of the speakers in our study have production patterns representative of the averages shown in Figure 1, there are speakers that deviate meaningfully from this pattern. Specifically, there are two speakers who have maintained a more robust word-initial voicing contrast but who have only a limited f0 contrast. These represent speakers who are, for the most part, not participating in either of the ongoing sound changes. There is also a speaker who has lost the word-initial voicing contrast but who also lacks an f0 contrast, representing a speaker who has participated in only one of the two sound changes. We will consider the importance of this kind of individual variation in the light of current theories of sound change.