

Devoicing of /v/ in Dutch: linking perception and production

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Issue

What is the relationship between:
regional variation in speech perception
regional variation in speech production

- Are there **regional differences in speech perception**?
- Do they reflect the **regional differences in speech production**?
- What is the **link between speech perception and production** at the regional and individual level?

Test case: a sound change in progress in Standard Dutch

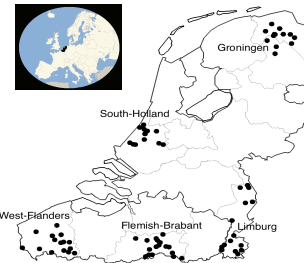
In present-day Dutch voiced labiodental fricatives are devoicing in onset position (Van de Velde et al. 1996).

/v/ -> [f]

Method

A cross-sectional panel study:

- Series of production and perception experiments of the same individuals
- Different regions: representing different stages of this sound change in progress



Participants

100 native speakers of Dutch

- ❖ Origin: **5 regions** -> chosen to represent the different stages of the sound change (Kissine et al. 2003)
- ❖ Young adults (18-28 years)
- ❖ Highly educated

Phonetic variables

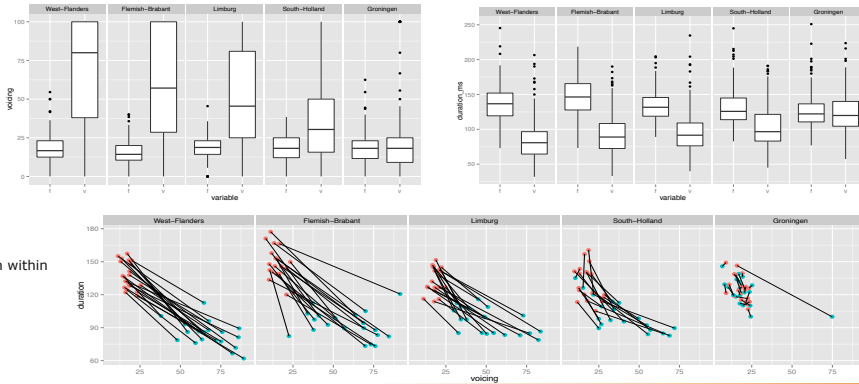
/f/-/v/ 2 dimensions

- ❖ **Periodicity/voicing**
- ❖ **Duration**

Region	Pitch %									
	100	97.5	75	42.5	50	17.5	25	12.5	0	*
66	1	2	3	4	5	6	7	8	9	
97	10	11	12	13	14	15	16	17	18	
14	190	201	211	221	231	241	251	261	271	
111	281	291	301	311	321	331	341	351	361	
128	371	381	391	401	411	421	431	441	451	
145	461	471	481	491	501	511	521	531	541	
162	551	561	571	581	591	601	611	621	631	
179	641	651	661	671	681	691	701	711	721	
196	731	741	751	761	771	781	791	801	811	

Production

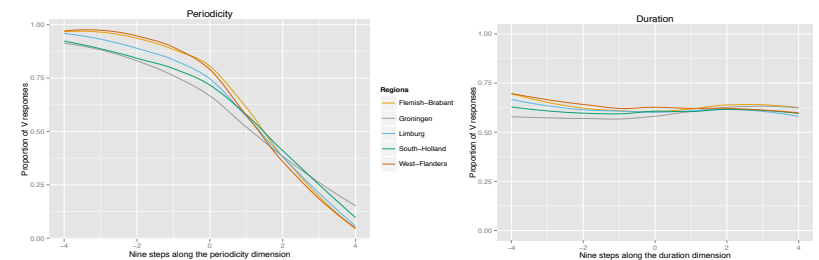
Aim: Collect phonetic realizations of the variable to establish a speech production profile of each speaker
 Speech styles: (1) word reading, (2) carrier sentences, (3) **sentence reading**, (4) semi-spontaneous speech, (5) spontaneous speech



Perception

Speeded identification task: Identify phonetic realizations under time pressure (**binary choice** /f/-/v/)

Mixed model effect logistic regression: region= fixed factor; participant, sound and slope per participants = random factors
 Regional differences in slopes for periodicity, no effect of duration



For each participants: calculation of slope and cut-off point between /v/ and /f/ category.

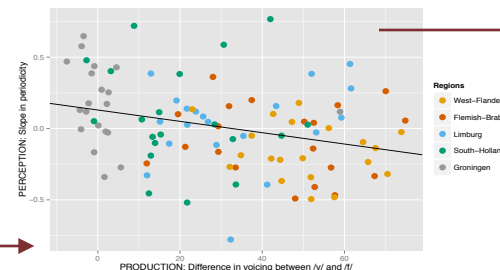
Link between perception & production

Cross-sectional panel study

Link between perception and production: **Perception:** Slope per participants (the more negative, the steeper the slope, the more categorical the perception)

Production: * Difference in voicing between /v/ and /f/ (the bigger the difference, the more contrast in production)
 * Range in voicing of /v/ realisations (the bigger the range, the wider the /v/ category in production)

Correlation: - difference & perception: **r = -0.306** (t = -3.189, df = 98, p = 0.002)
 - range & perception: **r = -0.322** (t = -3.370, df = 98, p = 0.001)



Link between perception and production:

The smaller the range and the difference in production, the less categorical the perception

References:

- Kissine, M., Van de Velde, H., & van Hout, R. (2003). An acoustic study of standard Dutch /v/, /f/, /z/ and /s/. *Linguistics in the Netherlands*, 20, 93-104.
- Van de Velde, H., Gerritsen, M., & van Hout, R. (1996). The devoicing of fricatives in standard Dutch: A real time study based on radio recordings. *Language Variation and Change*, 8(2), 149-175.