Phonetics, phonology and Poznań /d/-voicing*

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1 Introduction

1.1 Kraków-Poznań voicing

Southwestern dialects of Polish are reported to display a sonorant-triggered process of voice assimilation, otherwise known as ‘Kraków-Poznań voicing’. Gussmann (1992) and Rubach (1996) report that word-final obstruents become voiced when followed by a sonorant across a word boundary, as shown in (1).

(1) Poznań - Kraków voicing (Rubach, 1996)

\[
\begin{align*}
\text{[samoxud leona]} & \quad /\text{samoxud leona}/ \quad \text{‘Leon’s car’} \\
\text{[samoxud ojtsa]} & \quad /\text{samoxud ojtsa}/ \quad \text{‘father’s car’} \\
\text{[brad ojtsa]} & \quad /\text{brat ojtsa}/ \quad \text{‘father’s brother’} \\
\text{[brad naf]} & \quad /\text{brat naf}/ \quad \text{‘our brother’}
\end{align*}
\]

The process is said to affect word-final obstruents only.

1.2 Phonetics or phonology?

Various phonological accounts have been put forward to explain how non-contrastively voiced sonorants spread [voice], and why the voicing only targets word-final obstruents (Gussmann, 1992; Rubach, 1996). However, what is missing is evidence that ‘Poznań - Kraków voicing’ is a phonological process at all. An alternative hypothesis is that word-final obstruents are passively voiced in the phonetics: a word-final obstruent, having been stripped of its own laryngeal features, sustains passive voicing for longer, and so

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it can be perceived as voiced [Jansen (2004) on West Flemish]. The current experiment set out to investigate the phonetics of pre-sonorant stop voicing in Poznań Polish in an attempt to decide whether the process is categorical or gradient.

## 2 Experiment

### 2.1 Method

- 6 speakers of Poznań Polish (all females aged 24-26) read 2 repetitions of a randomised list of 14 meaningful Polish sentences (2). Each sentence contained a token of a word-final coronal stop followed by a sonorant in the next word. In addition there were four control conditions involving a word-final coronal stop followed by a labial stop in the next word, as well as three fillers (at the beginning of the task).

- The potential assimilation undergoers (/t/, and /d/) were placed in disyllabic words and were preceded by the vowel /u/.
(2) A sample test sentence:

*Kryzys gospodarczy powoduje nawrót lęku w społeczeństwie.*

‘The economic crisis triggers a return of anxiety in the society.’

- A control group of 6 Warsaw Polish speakers (all females aged 20-25) was recorded performing the same task.

- The test tokens were labelled manually upon a visual inspection of the spectrograms in Praat. The following measurements were made:
  - duration of the stop closure;
  - duration of the burst;
  - duration of voicing into the stop closure;
  - duration of the preceding vowel;
  - F0 and F1 of the preceding vowel at 10 ms intervals between 50 and 10 ms before the offset of the vowel.

3 Results

Duration of voicing throughout the stop closure was found to be the only significant correlate of voicing. Analysis of stop closure voicing yields the following patterns in the observed populations.

1. All the Poznań subjects, but one, realised their underlying /t/s as voiceless or with a limited voicing tail continuing from the preceding vowel (Figure 1). An underlying /d/ could be realised in two ways: fully voiced, or partially voiced (like an underlying /t/).

2. All the Warsaw subjects (Figure 2) were found to realise both /t/ and /d/ with a voicing tail of 16 ms on average, making the two phonetically indistinguishable (*t* = 1.3384, df = 137.974, *p* = 0.1830).

3. One Poznań speaker, P2, was found to fully voice all of her underlying /d/s (Figure 3). In addition, the speaker showed a gradient voicing effect of the underlying /t/, from no to full voicing.

4 Summary and discussion

- None of the Poznań subjects was found to consistently voice her word-final stops when a sonorant followed in the next word.
• However, the Poznań subjects’ voicing was found to be distinct from that of the controls. Unlike the controls, Poznań speakers realised at least some of their underlying /d/s as fully voiced.

• Partial voicing, as found in all /t/s, and some /d/s was found for all subjects, and is best analysed as a phonetic process.

• Full voicing of some /d/s as found in all Poznań speakers cannot be a purely phonetic effect, given its extent, and the fact that it is not available for underlying /t/s.

• Full voicing of the /d/ cannot be a result of phonological assimilation to a sonorant, as such assimilation would be expected to affect /t/ as well.

• In the light of the current data ‘Poznań voicing’, appears to be optionality of final devoicing, rather than a rule of assimilation.

• For the speaker P2 it is proposed that the has ‘Poznań voicing’, under its current definition, as well as a gradient phonetic rule of voice assimilation.
5 Conclusion

The current data challenge the descriptive tradition on Polish, where Poznań voicing is a categorical assimilation process operating on obligatorily delaryngealised word-final targets. However, they do not support a strictly gradient phonetic account either. Instead, it is proposed that ‘Poznań voicing’ consists primarily in an optional realisation of final devoicing for underlyingly voiced obstruents.

References


Figure 3: Realisations of underlying /t/ and /d/ by speaker P2