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Variable Fricative Voicing in English

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Objectives

This project aims to examine the variable voicing of stem-final fricatives in plural nouns* e.g. whether English speakers produce 'paths' as [paθs] or [paðz]. Questions of interest are as follows:

- What linguistic and social factors condition the variable?
- When compared to American English, are there dialectal differences in how the variable patterns?

Background

- In Old English there was a rule which made underlying voiceless fricatives between two vowels, voiced in the plural suffix [-əs] e.g [wʊlf, wʊlves] 'wolf, wolves'. The [ə] was eventually lost meaning that the fricatives were no longer between two vowels and the environment for the voicing rule was lost. As such the rule is now disappearing from English and is in fact an archaism (Ringe & Eska, 2013). This means that today we have many words with the following alternations: [-f, -vz], [-θ,-ðz] and [-s,-ziz] (Jespersen, 1942).
- Voicing is also attested to be variable in English (Ringe & Eska, 2013, Becker et al., 2012), but no systematic study of this variation has been carried out.

*List of words studied: plural forms of bath, beef, blouse, booth, calf, cloth, dwarf, elf, faith, half, hoof, house, knife, life ,loaf, moth, mouth, oath, path, roof, scarf, self, shelf, spouse, thief, truth, wife, wolf, wreath, and youth.

Method

- Corpora: British National Corpus (BNC), Switchboard, Fisher and Philadelphia Neighbourhood Corpus (PNC).
- Tokens were coded auditorily for a binary distinction in voicing of the stem-final segment. They were rejected if mistranscribed, inaudible, produced by non-native speakers of English or included erroneously. Around 5000 tokens of selves were omitted due to time constraints.
- Reliability testing and kappa statistics were calculated to measure inter-rater reliability between two coders.
- An agreement was reached on coding differences when listening to relevant tokens for a second time. They were rejected if the coders were unable to agree that it was voiced or voiceless.
- Statistical software RStudio was used to explore different independent variables and generate statistics of our coded data.

Variety	Corpora	Tokens
British	BNC	1394
American	Switchboard	468
	Fisher	1623
	PNC	373
Total		3858

Table 1: Total number of tokens coded

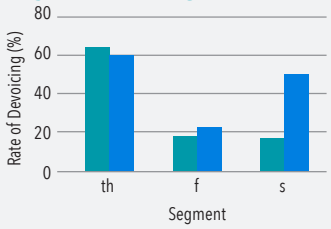
Corpora	Reliability	Kappa
BNC	90%	0.80
Switchboard	84%	0.68
Fisher	88%	0.76
PNC	88%	0.76

Table 2: Inter-rater reliability between coders

Key Findings

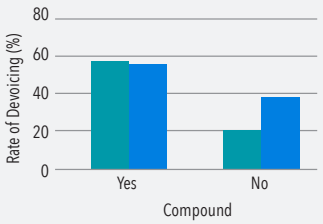
Internal (linguistic) factors

British English American English



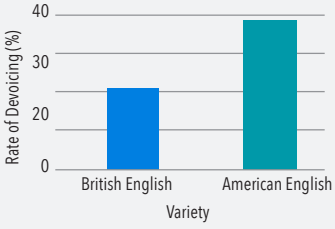
Final Segment

Devoicing is most frequent with th. Although f and s have similar low rates of devoicing in British English, s is devoiced at a much higher rate than f in American English. $\chi^2 = 110.41$, df = 2, p-value < 2.2e-16 (American), $\chi^2 = 110.41$, df = 2, p-value < 2.2e-16 (British).



Compounds

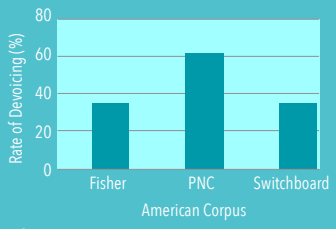
Devoicing is most frequent among compounds than other words, in both American and British English. $\chi^2 = 13.868$, df = 1, p-value = 0.0001961 (American), $\chi^2 = 2.972$, df = 1, p-value = 0.08472(British).



English Variety

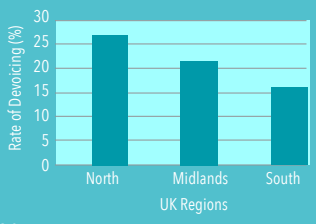
This graph illustrates that American English speakers devoice at a higher rate of 39%, as opposed to the lesser rate of 21% for British English speakers. $\chi^2 = 129.35$, df = 1, p-value < 2.2e-16.

External (social) factors



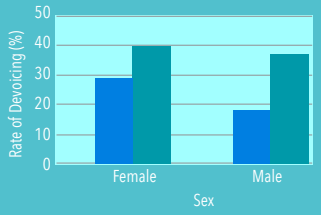
American Corpus

There is a higher rate of devoicing in the PNC when compared to Fisher and Switchboard. $\chi^2 = 95.625$, df = 2, p-value < 2.2e-16.



UK Region

The further north the UK region, the more devoicing occurs. $\chi^2 = 17.765$, df = 3, p-value = 0.0004917.

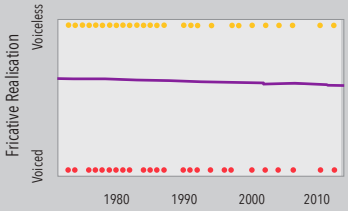


Sex

Women lead in the use of the voiceless variants, most clearly in British English. *$\chi^2 = 1.8449$, df = 1, p-value = 0.1744 (American), $\chi^2 = 29.49$, df = 3, p-value = 1.767e-06 (British).*

Real time data

The PNC corpus had real time data in the form of the year that the sound clips were recorded which allowed us to plot a scatterplot of the data. The regression line shows that there is little fluctuation in the rate of devoicing over time.



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Jespersen, Otto. 1942. A Modern English Grammar on Historical Principles, Part VI: Morphology. Copenhagen:Ejnar Munksgaard [pp. 258–266]
Ringe, Donald, & Joe Eska. 2013. Historical Linguistics: Toward a Twenty-First Century Reintegration. New York: Cambridge University Press.

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