

# Synchronic evidence for diachronic pathways of change:

/g/-deletion and the life cycle of phonological processes

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@grbails

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The University of Manchester

# 1. Introduction

Velar nasal plus

Diachrony and synchrony

The life cycle

## 2. Conversational data

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Summary

# Velar nasal plus

(Wells 1982: 365)

- Presence of post-nasal /g/ in varieties spoken in the North West and West Midlands of England
  - **Birmingham** (Thorne 2003); **Cannock** (Heath 1980); **Liverpool** (Knowles 1973); **West Wirral** (Newbrook 1999); **Manchester** (Schleef et al. 2015); **Cheshire** (Watts 2005); the **Black Country** (Mathisen 1999; Asprey 2015)
- Well-attested in dialectological literature but the nature of its variation is comparatively understudied
- Envelope of variation can be split into two distinct environments:

**(ing)** → [ɪn] [ɪŋ] [ɪŋg] e.g. *thinking*

**(ng)** → [Vŋ] [Vŋg] e.g. *wrong*

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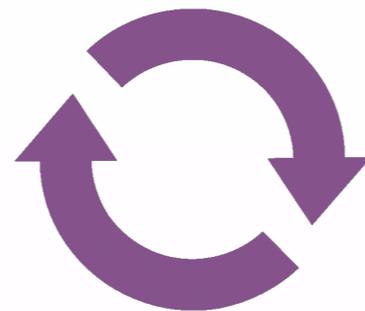
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# Diachrony and synchrony

- Historical origin and development of post-nasal /g/-deletion has been discussed in detail
- Claimed that this rule, which deletes coda /g/ after nasals, follows the ‘life cycle of phonological processes’ (Bermúdez-Otero 2013)
- The life cycle makes strong predictions about how this rule should behave synchronically, which have yet to be tested
- This talk aims to:

show how diachronic accounts of /g/-deletion can explain its synchronic variation



provide synchronic evidence to support theories of its diachronic development

- It also explores the mechanisms behind what appears to be a recent innovation in pre-pausal position

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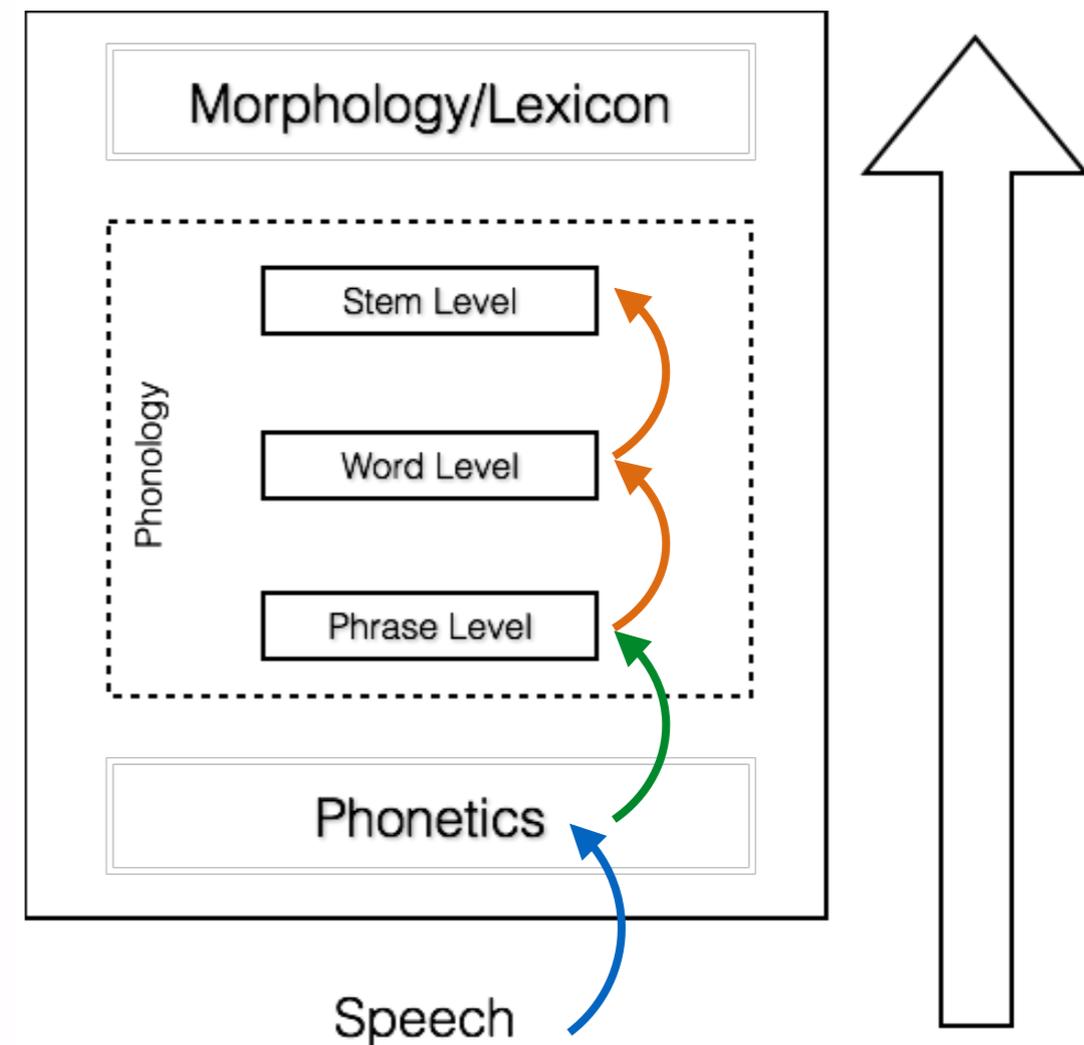
Summary

# The life cycle of phonological processes

(Bermúdez-Otero & Trousdale 2012)

- **phonologisation**: speech > phonetics
- **stabilisation**: phonetics > phonology
- **domain narrowing**: phrase-level > word-level > stem-level

- 
1. PHRASE-LEVEL: can see the whole **phrase**  
she didn't want to **sing aloud**
  2. WORD-LEVEL: can only see the **word** itself  
she didn't fancy herself as a **singer** anymore
  3. STEM-LEVEL: can only see the **stem**  
she didn't fancy herself as a **sing**-er anymore



# The life cycle: diachronic predictions

- Deletion in *sing*|| / *sing tunes* when rule reaches **phrase-level**
- Deletion in *sing it* only when rule reaches **word-level**
- Deletion in *singer* only when rule reaches **stem-level**
- Deletion never occurs in *finger*\*

Stage	Surface form of underlying /ŋg/				Level reached by rule	Language variety/register
	<i>finger</i>	<i>sing-er</i>	<i>sing it</i>	<i>sing</i>    <i>sing tunes</i>		
0	[ŋg]	[ŋg]	[ŋg]	[ŋg]	-	Early Modern English
1	[ŋg]	[ŋg]	[ŋg]	[ŋ]	phrase	Elphinston (formal)
2	[ŋg]	[ŋg]	[ŋ]	[ŋ]	word	Elphinston (colloquial)
3	[ŋg]	[ŋ]	[ŋ]	[ŋ]	stem	Present Day English

Adapted from Bermúdez-Otero (2011: 2024)

# The life cycle: synchronic predictions

- Synchronic implication under a cyclic analysis:
  - more ‘levels’ that meet the rule’s criteria = more chances to apply during the phonological derivation = higher application rate on the surface
- /t,d/-deletion (Guy 1991) and //darkening (Turton 2014, 2017) have been analysed under similar frameworks



	<i>finger</i>	<i>singer</i> _V	<i>sing it</i> _#V	<i>sing ll</i> _#ll	<i>sing tunes</i> _#C
Stem-level	/fɪŋ.gə/	/sɪŋg/	/sɪŋg/	/sɪŋg/	/sɪŋg/
Word-level	/fɪŋ.gə/	/sɪŋ.gə/	/sɪŋg/	/sɪŋg/	/sɪŋg/
Phrase-level	/fɪŋ.gə/	/sɪŋ.gə/	/sɪŋ.gɪt/	/sɪŋg/	/sɪŋg.tʃuːnz/
Chances to apply:	0	1	2	3	

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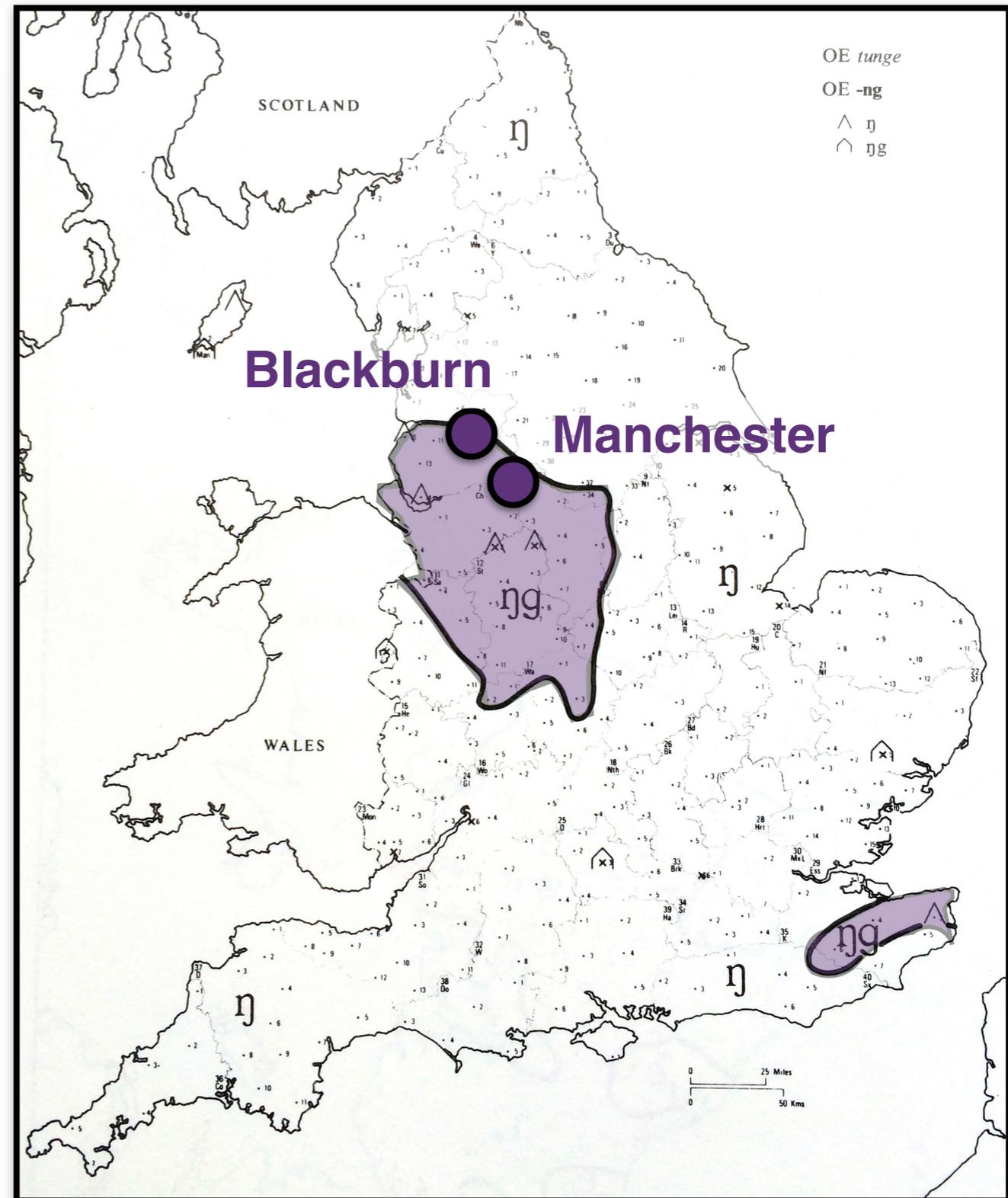
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# Methodology

- Quantitative approach using twenty-four sociolinguistic interviews conducted with North Western speakers
  - ▶ two speakers recorded in 1971 for a real-time component
- Stratified by age and sex (all 'working class' speakers)
- Dependent variable coded auditorily for [g]-presence/absence
- Mixed-effects logistic regression using `lme4` in R, with *speaker* and *word* as random factors
- **941 tokens of (ng)**



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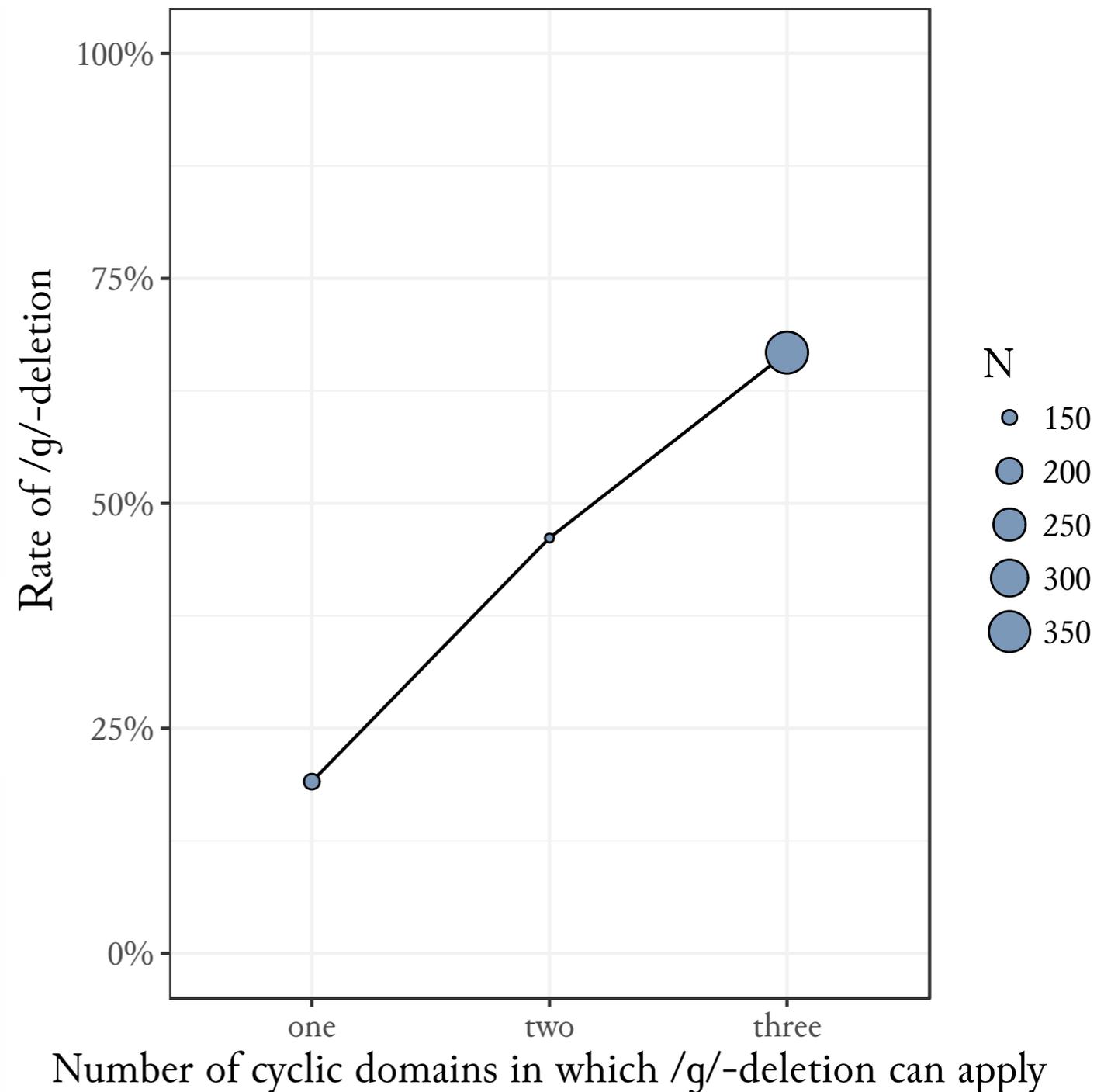
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# Life cycle's predictions

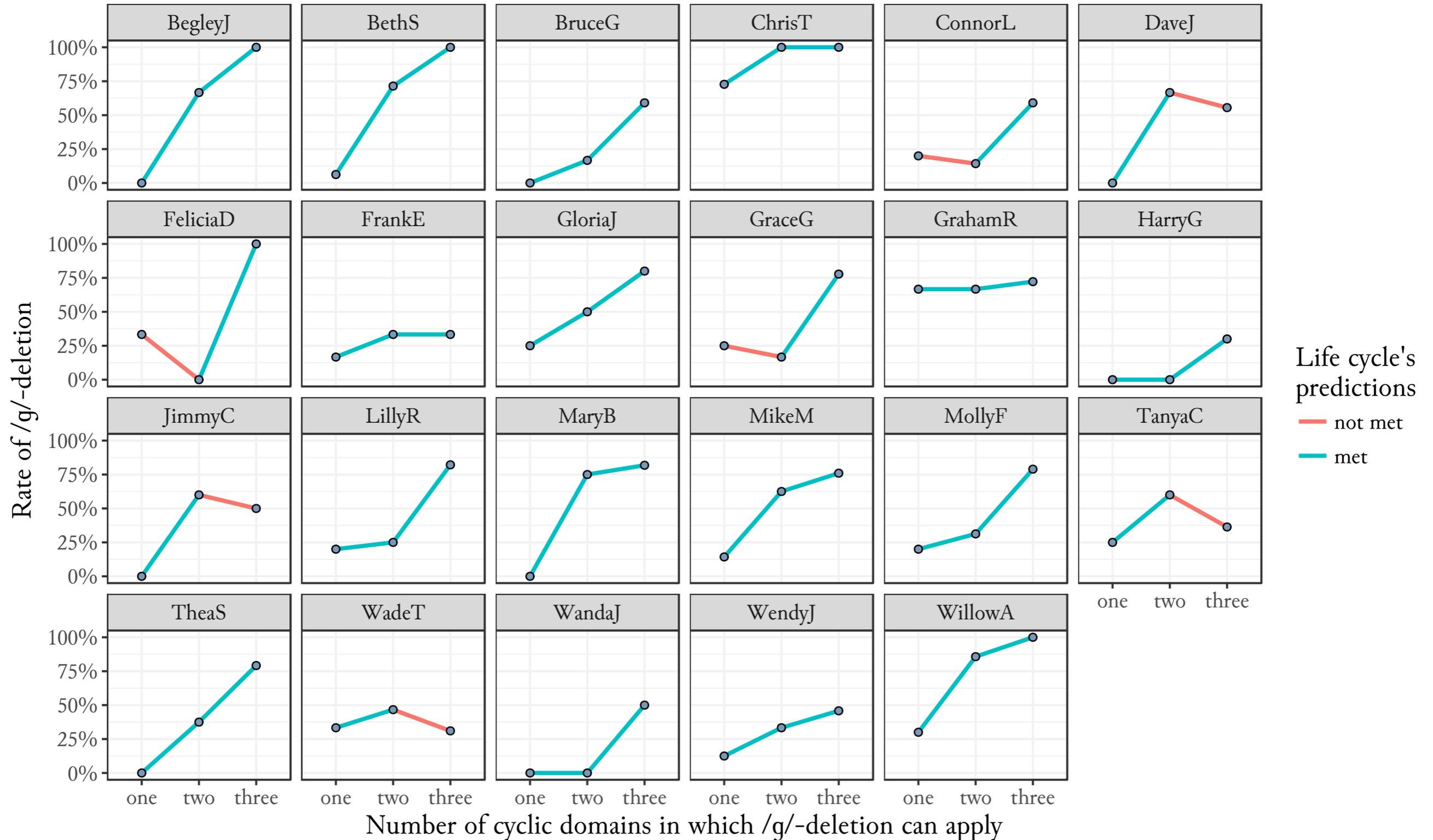
## Morphophonological effects

- Prediction: correlation between surface rate of application and the number of cyclic levels in which it had *chance* to apply
- Turns out to be the strongest predictor of [g]-presence
  - *one chance*: 19% deletion
  - *two chances*: 46% deletion
  - *three chances*: 67% deletion



# Life cycle's predictions

## Morphophonological effects



# Life cycle's predictions

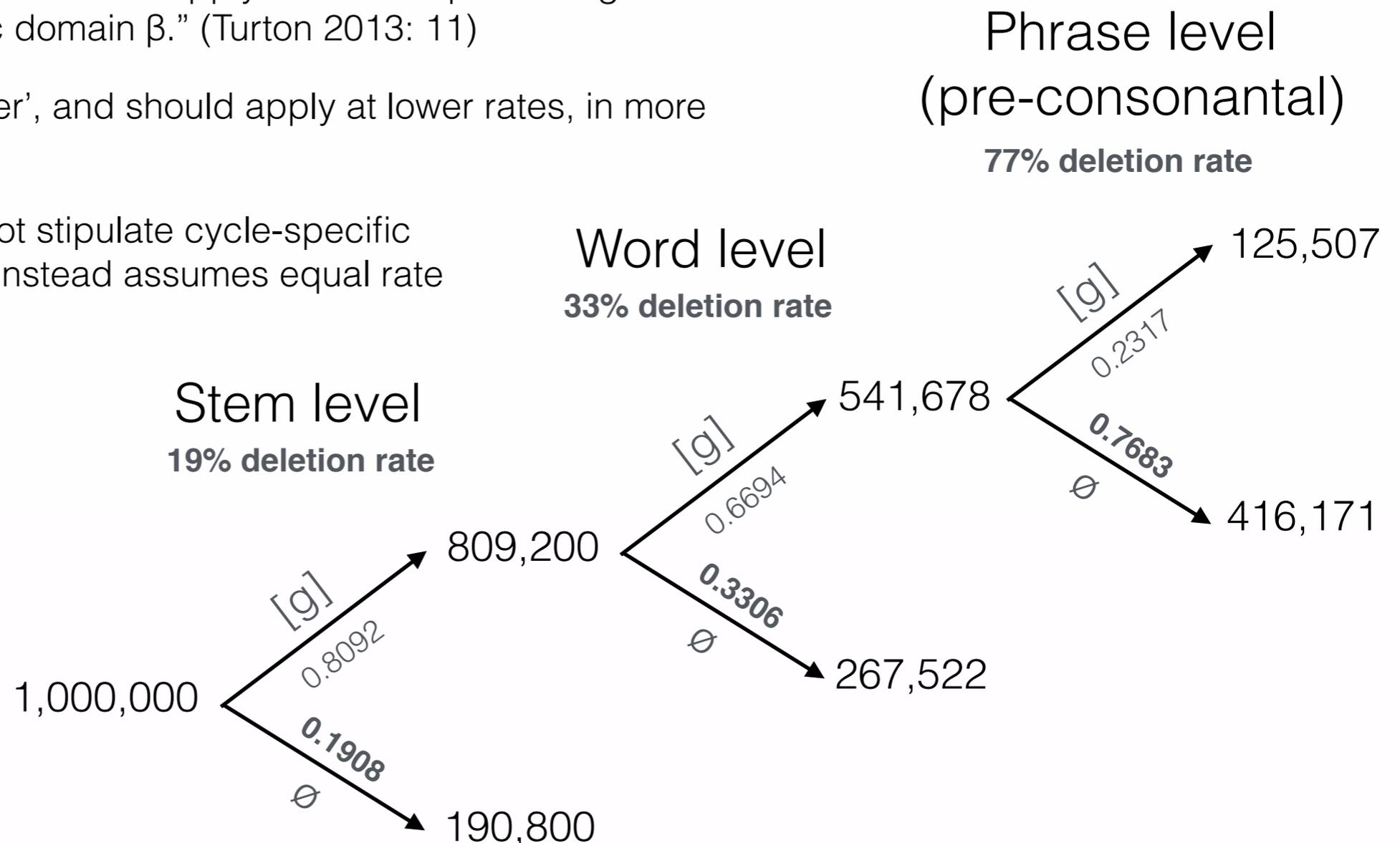
## Cycle-specific deletion rates

- **Variation corollary of the Russian Doll Theorem**

- “if a phonological process  $\pi$  shows a rate of application  $x$  in a small embedded domain  $\alpha$ , then  $\pi$  will apply at a rate equal to or greater than  $x$  in a wider cyclic domain  $\beta$ .” (Turton 2013: 11)

- The deletion rule is ‘younger’, and should apply at lower rates, in more embedded domains

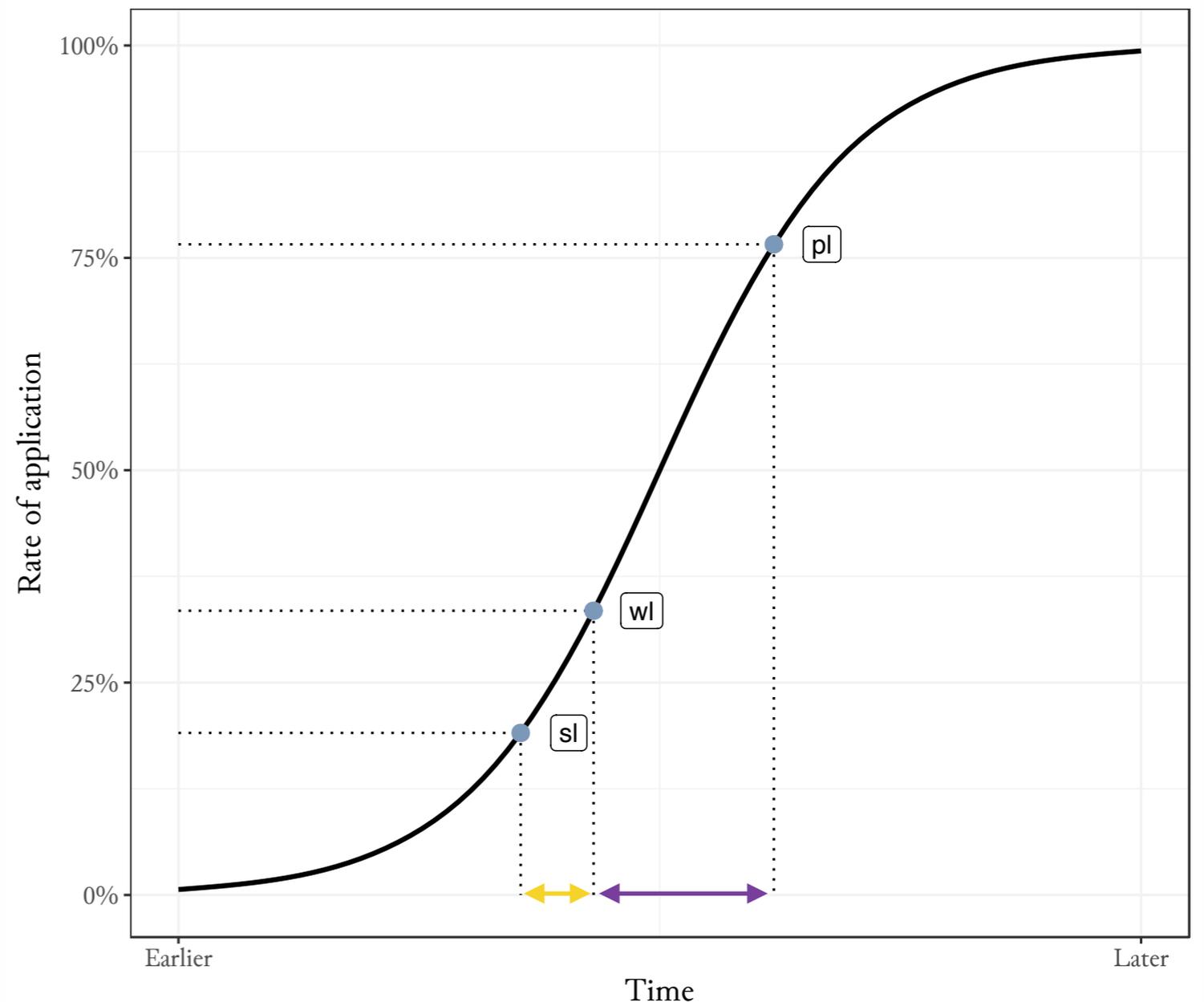
- cf. Guy (1991) who does not stipulate cycle-specific deletion rates for /t,d/ and instead assumes equal rate of application



# Life cycle's predictions

## Cycle-specific deletion rates

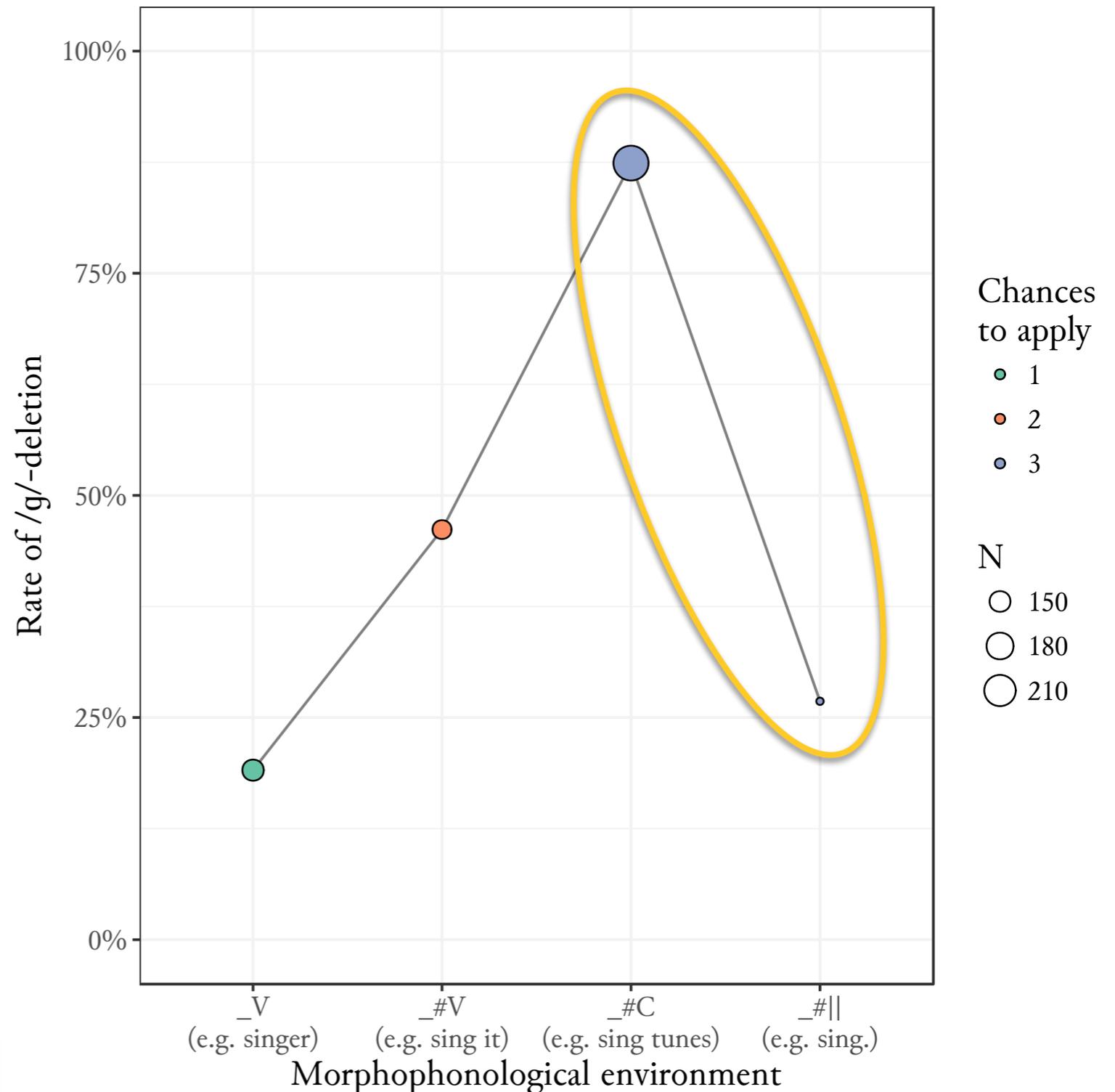
- Assuming each domain's deletion rule follows a traditional 'S-shaped' curve of language change, there is evidence that the word-level rule is much closer to the stem-level rule in time
- Supports the simulations of Lignos (2012), who shows that word-level deletion is very susceptible to domain narrowing
- Represents a more general trend of coda-targeting processes in Modern English being particularly vulnerable to domain narrowing at the word-level, due to the language's 'impoverished' inflectional system (Bermúdez-Otero 2013)



# Life cycle's predictions

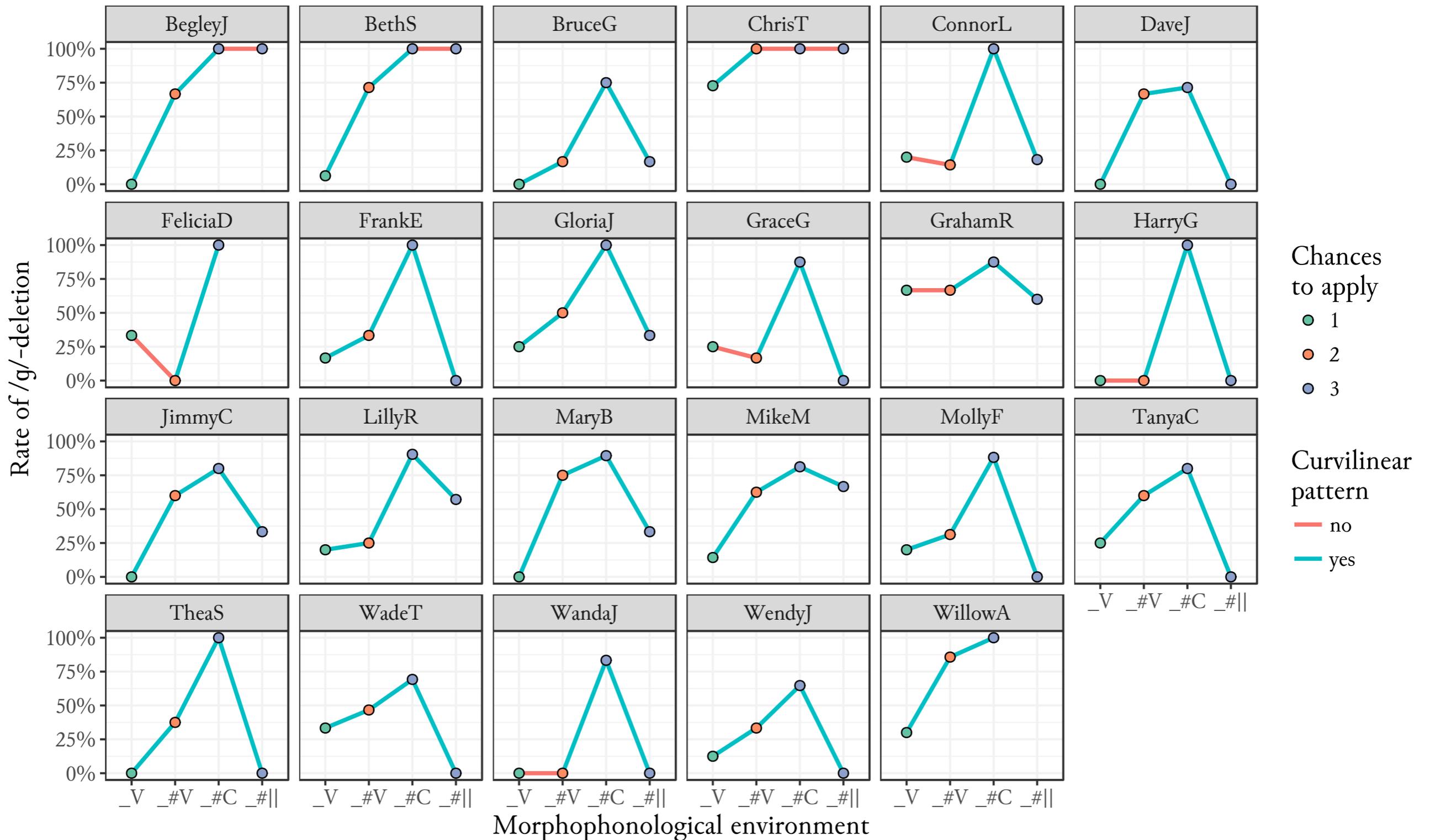
## Morphophonological effects

- A purely cyclic account of /g/-deletion would predict comparable behaviour in pre-pausal and pre-consonantal environments
  - the [g] can not resyllabify as an onset in any cyclic domain
  - the rule has three chances to apply in both
- We actually find high rates of deletion pre-consonantly (as predicted), but extremely *low* rates pre-pausally (not predicted)



# Life cycle's predictions

## Morphophonological effects





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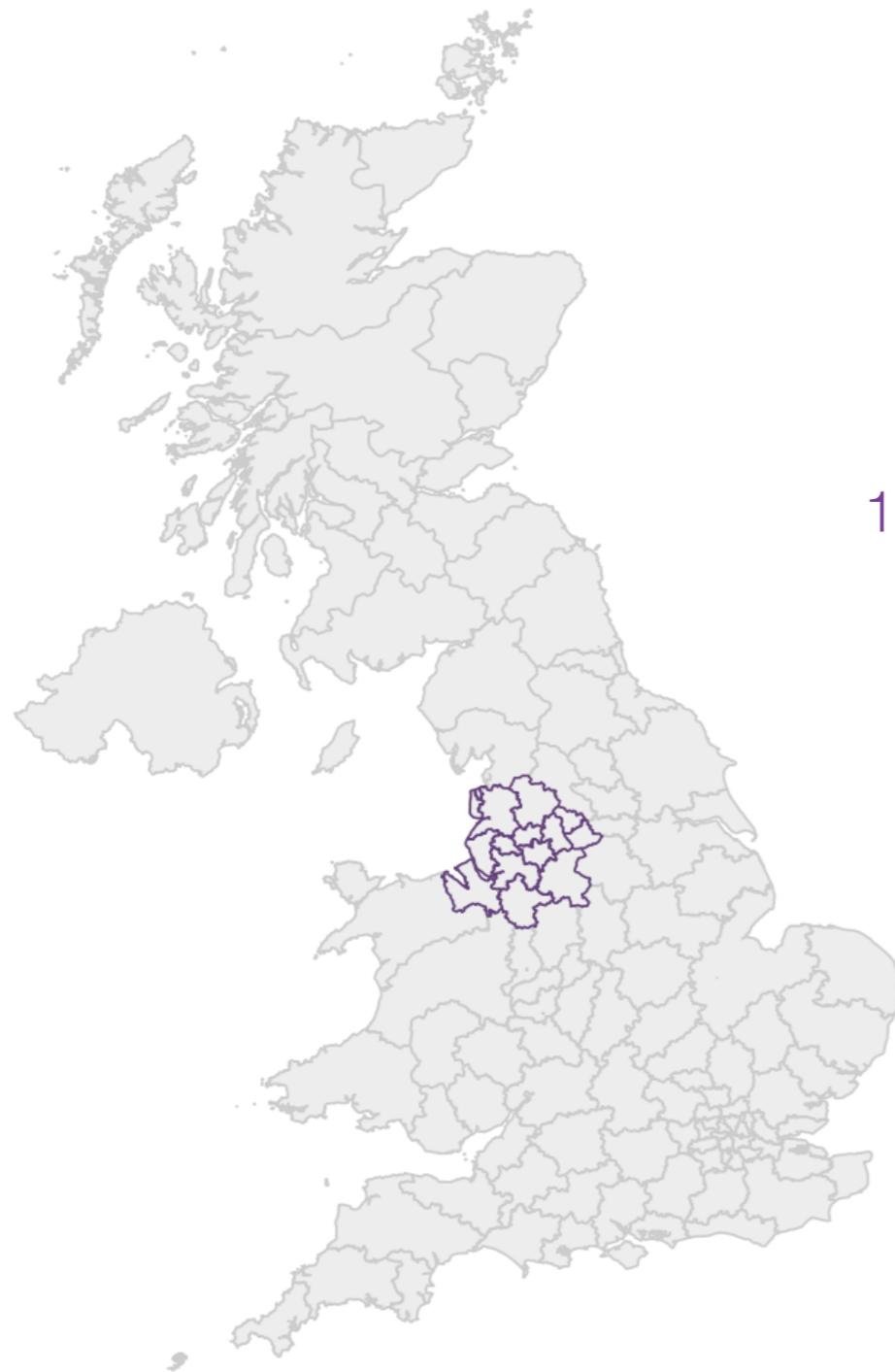
- **Research questions** - is [g]-presence triggered pre-pausally due to the segmental lengthening effects of pre-boundary lengthening or is it a direct effect of prosodic position? Is /g/-deletion best modelled by:
  - ▶ nasal duration?
  - ▶ position in some prosodic constituent (final vs. medial)?
  - ▶ something else (e.g. duration/presence of a following pause)?
- **Methodology** - elicit word-final /ŋg/ before prosodic/syntactic boundaries of different ‘strengths’, adapted from Sproat & Fujimura 1993, that should trigger different magnitudes of lengthening:
  - ▶ **1. Suffix boundary** - e.g. *The [**wrong**]-ful accusation was very insulting*
  - ▶ **2. NP-internal boundary** - e.g. *He liked feeding [**the young** baboon]<sub>NP</sub>*
  - ▶ **3. VP boundary** - e.g. *[**The sting**]<sub>NP</sub> [**became painful**]<sub>VP</sub>*
  - ▶ **4. VP-internal boundary** - e.g. *She sent [**the gang**]<sub>IO</sub> [**potential targets**]<sub>DO</sub>*
  - ▶ **5. Intonational phrase boundary** - e.g. *[“**The film was too long,**”]<sub>IP</sub> Michelle said*
  - ▶ **6. Utterance boundary** - e.g. *[**Her fans didn’t like the new song.**]<sub>U</sub>*
- Controlled for following segment (vowel vs. obstruent) and height of the preceding vowel (equal number of high and low vowels in each boundary context)



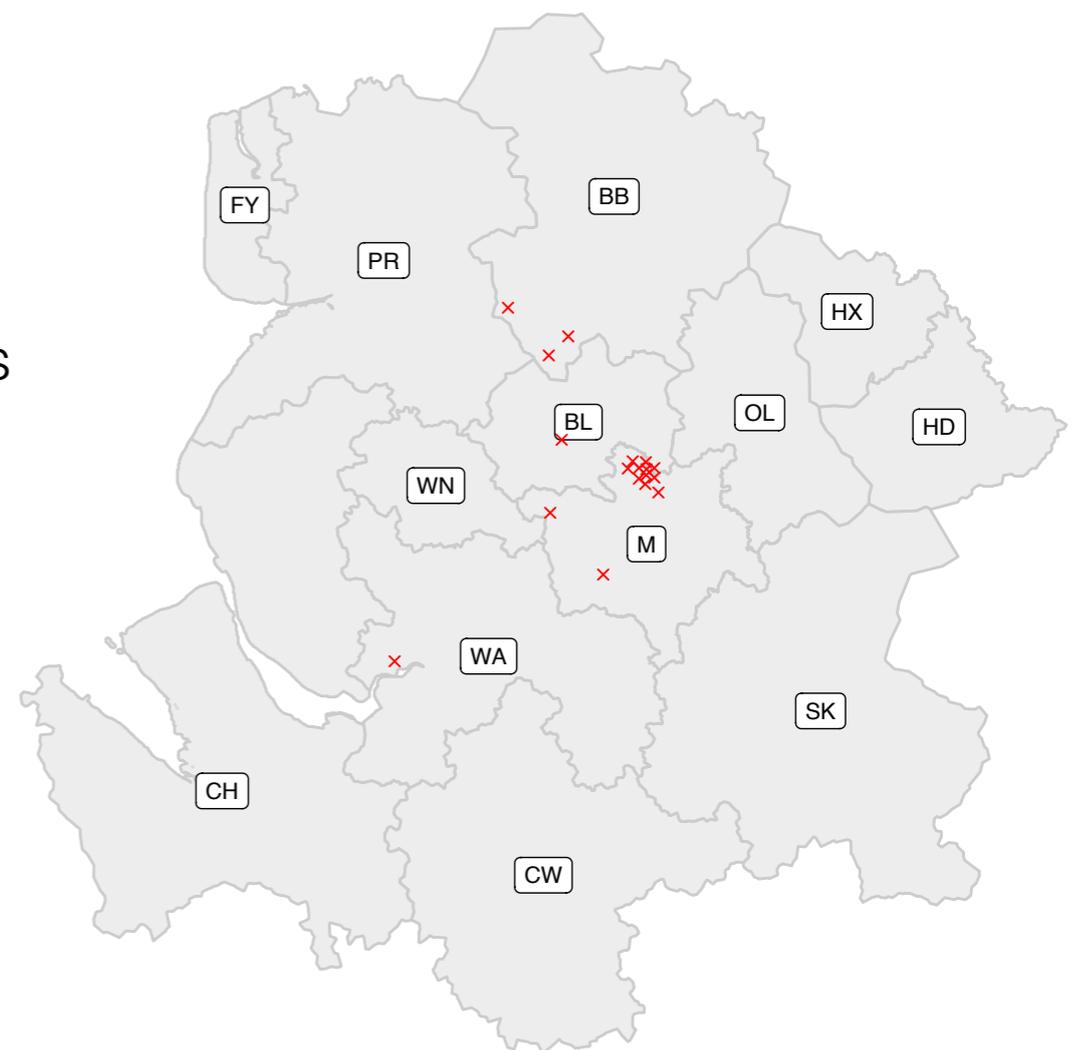
Stronger

# Methodology

Elicitation task



912 tokens from  
19 speakers across  
the North West



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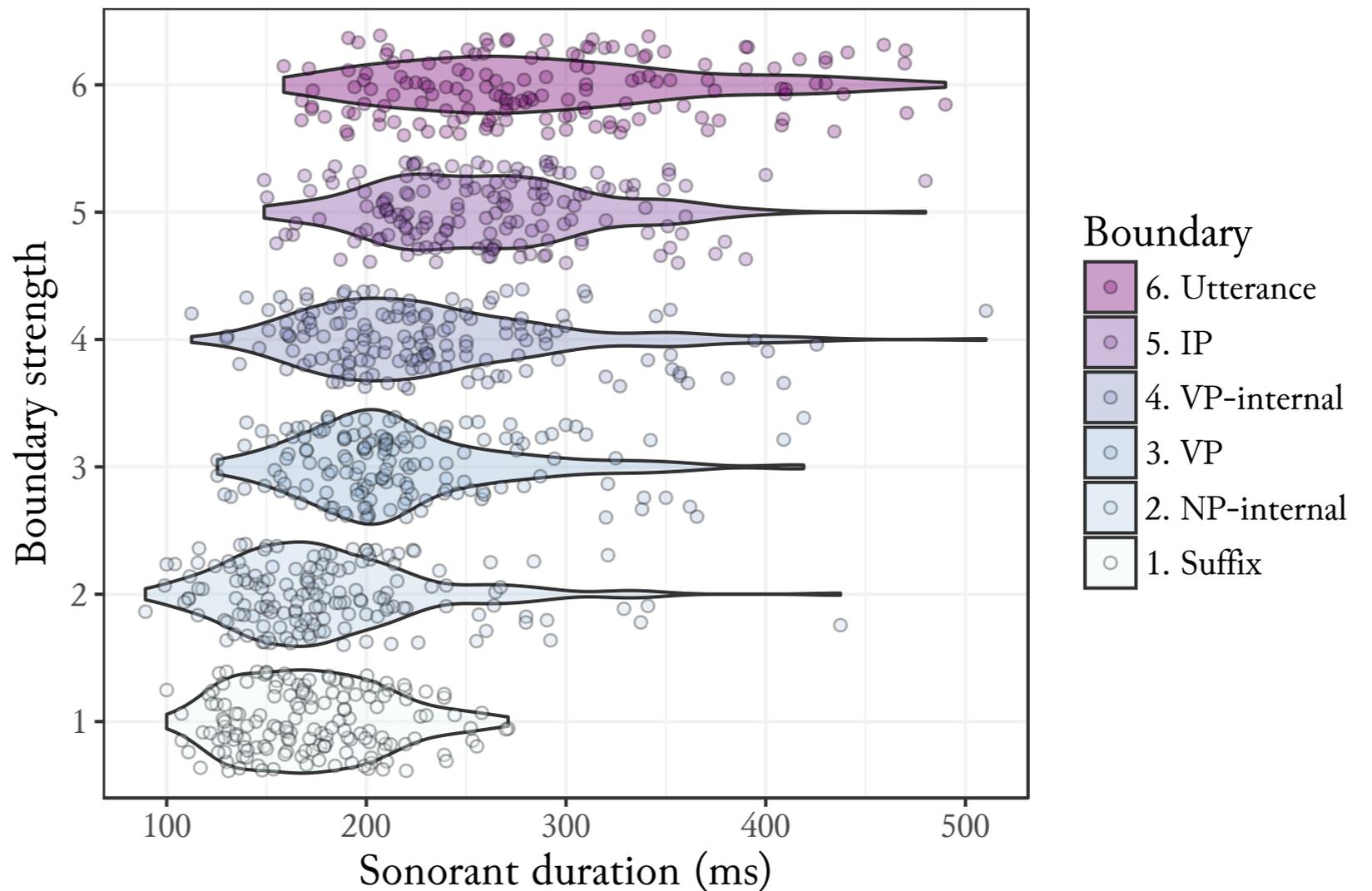
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# Measures of lengthening

- Sonorant duration ‘best’ measure of PBL (V+[η] period)
- Chosen methods/stimuli successfully elicit gradient scale of pre-boundary lengthening
  - positive correlation between perceived boundary strength and sonorant duration ( $\rho = 0.63$ )

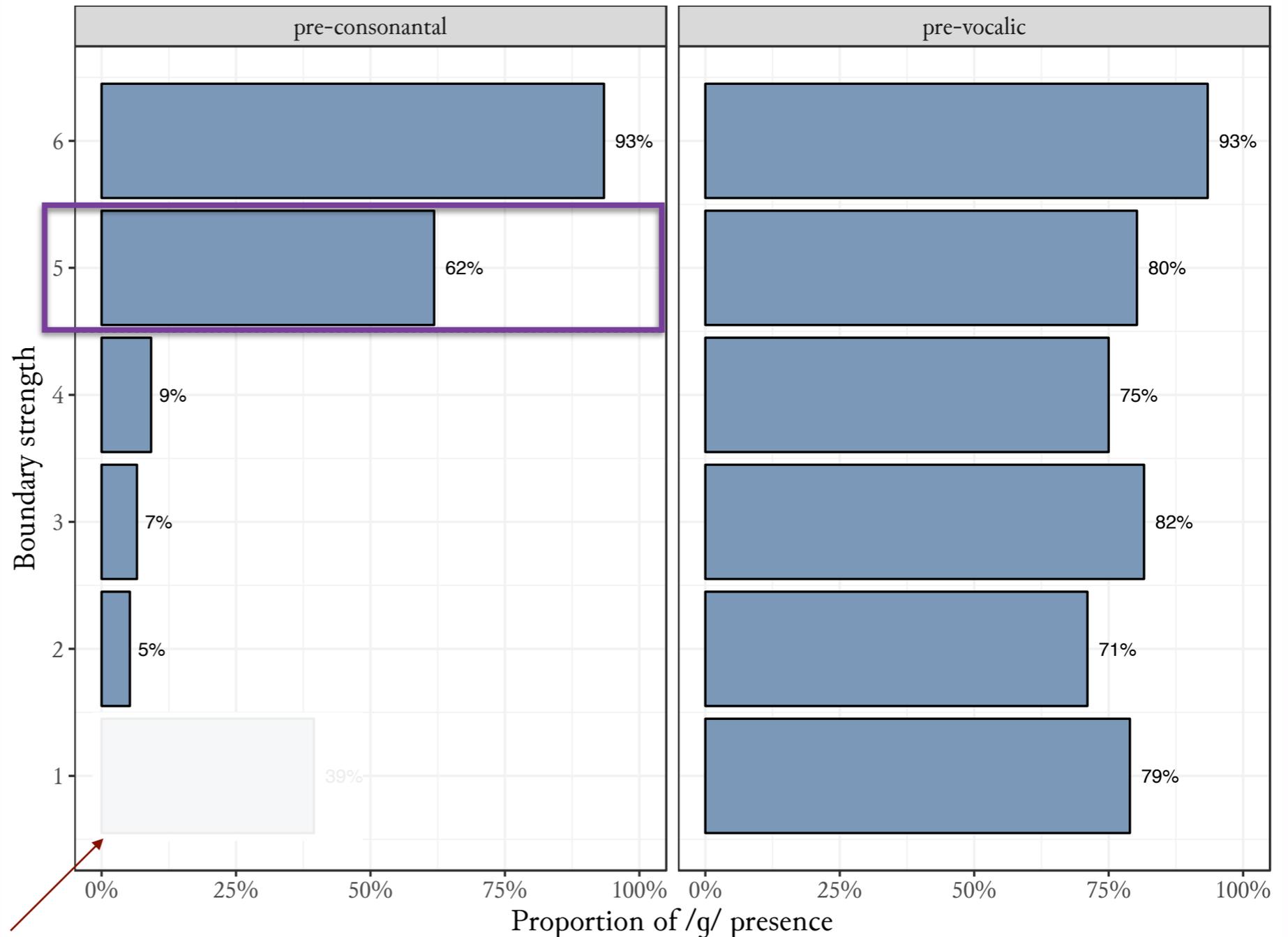
Average sonorant duration (ms) by boundary strength

1	2	3	4	5	6
174	183	218	233	262	292
+9	+35	+15	+29	+30	



# Pre-boundary /ŋg/

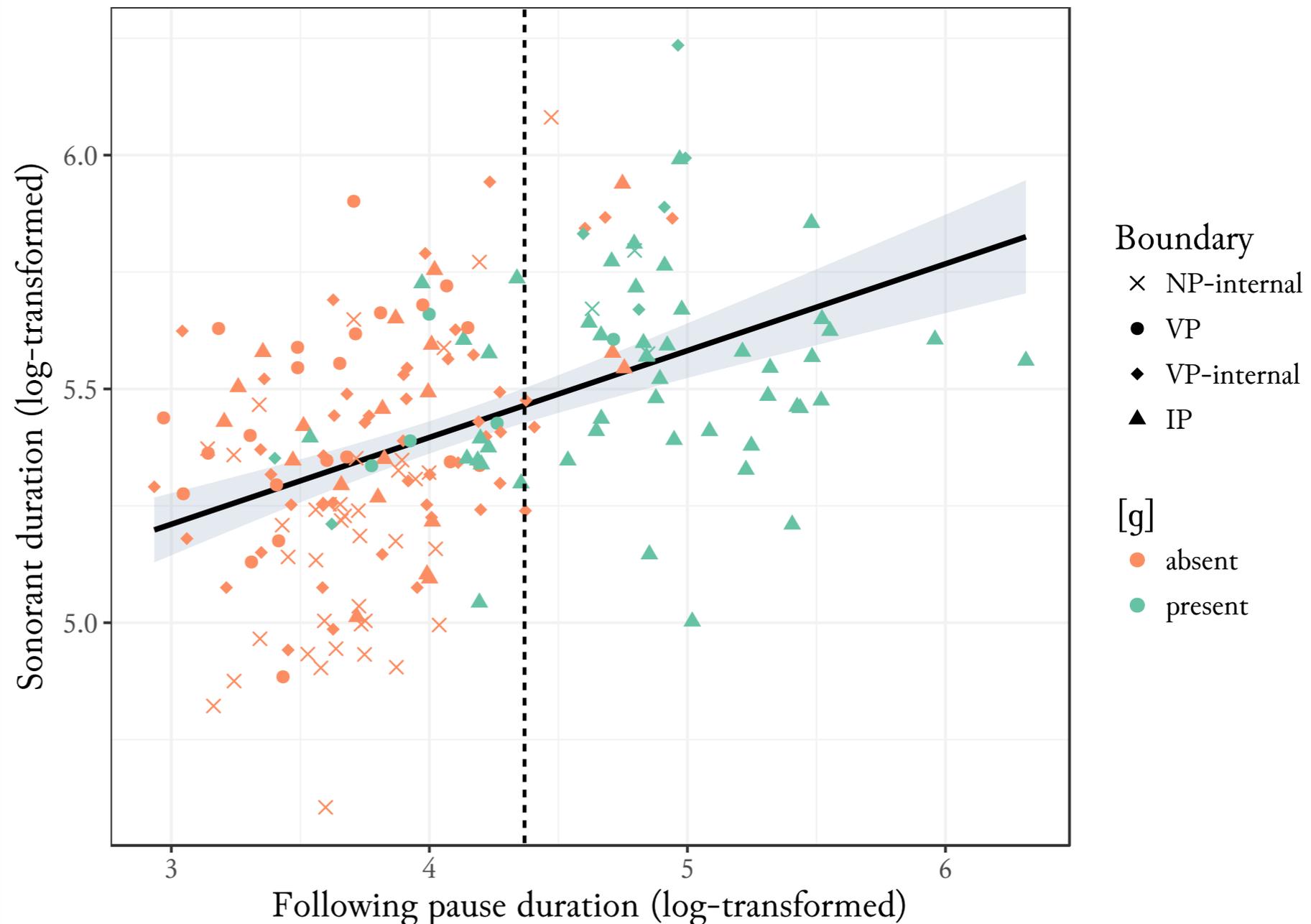
- Strong effect of following segment (already established)
- For pre-consonantal tokens, a gradient scale of [g]-presence is successfully elicited
- But it seems more like a categorical distinction between boundaries 2-4 and boundaries 5-6
  - i.e. IP-medial vs. IP-final
- Why is [g]-presence so variable at the utterance-medial IP boundary though?



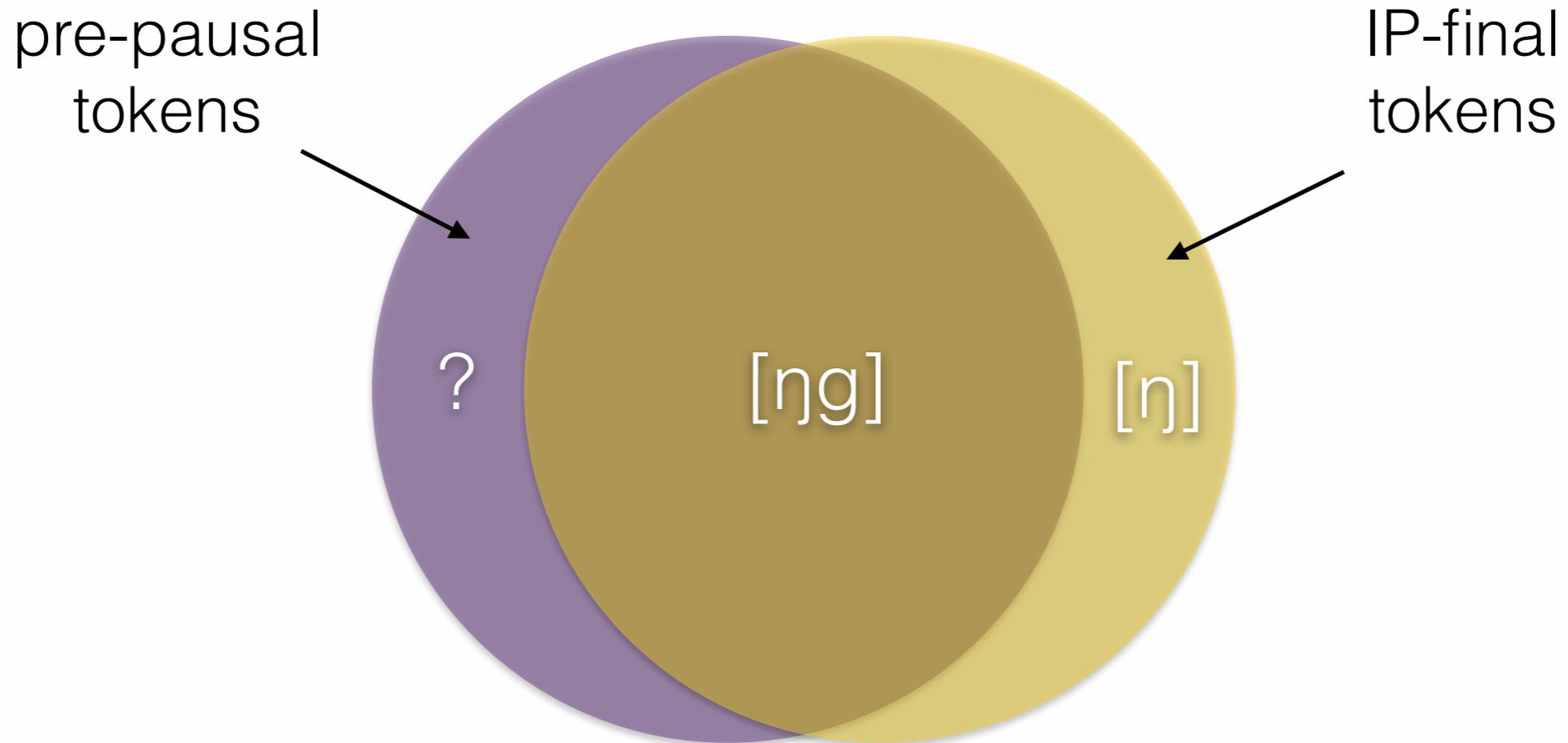
(tokens before the suffix boundary show unusually high rates of [g]-presence; possible excrescence? See Appendix slides)

# Pre-boundary /ŋg/

- Perhaps we still see 38% deletion in this environment because not everybody pauses here!
- Duration of the following pause is a much better predictor of [g]-presence than duration of the sonorant period that precedes it
  - greater separation on the x-axis than the y-axis
- Best-fitting regression model contains IP position *and* pause duration (adding the latter leads to a significant increase in fit by ANOVA comparison,  $p < 0.001$ )



# Pause, IP, or both?



- Do we find high rates of [g]-presence IP-medially before pauses?
  - If so, [g]-presence is likely triggered by a following pause, *independent* of its position in the IP (see also /r/-devoicing in Turkish, Kaisse 1990)

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- Post-nasal [g]-presence predicted almost entirely by assuming cyclic application of deletion across stem-, word-, and phrase-level domains
- Synchronic variation reflects centuries of change, providing empirical evidence in support of the ‘life cycle of phonological processes’ (Bermúdez-Otero & Trousdale 2012)
- New innovation pre-pausally (or IP-finally?) where post-nasal [g] is present almost all the time for younger speakers
- Internal motivations?
  - other coda-targeting lenition processes show similar ‘instability’/variability in pre-pausal position, e.g. /td/-deletion (see Guy 1980; Santa Ana 1996; Tagliamonte & Temple 2005) and /s/-debuccalisation in Spanish (see Harris 1983; Kaisse 1996)
- External motivations?
  - pre-pausal position clearly the most salient environment - could this innovation reflect a change in how velar nasal plus is socially evaluated? Are younger speakers using velar nasal plus as a way of projecting a northern identity?

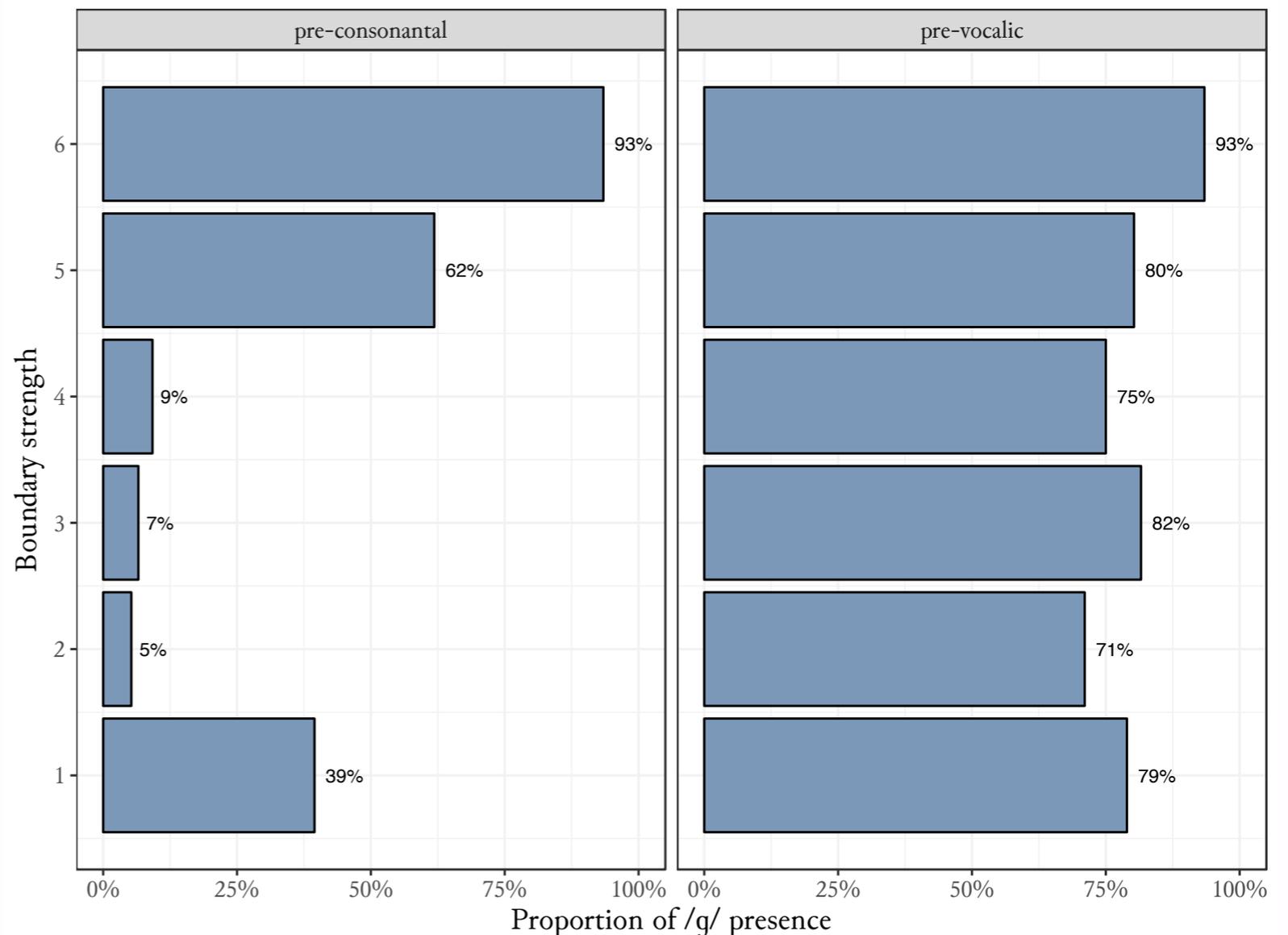
Thanks for listen[ing]

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# What's going on at the suffix boundary?

- Unusually high rate of [g]-presence at the pre-consonantal suffix boundary, e.g. *youngster*, *wrongful*
- Likely to be excrescence
- See similar effects for other nasal +sibilant clusters, e.g.
  - ▶ bilabials: 'hamster' > ham[p]ster
  - ▶ alveolars: 'prince' > prin[t]s



# What's going on at the suffix boundary?

- Spectrogram/waveforms for a **non-VNP** speaker (born and raised in Acton, London) clearly show presence of a stop in words like *gangster* - the nasal+stop+sibilant cluster is identical between *gangster* and *prankster*, providing evidence of excrescence
- Is the same thing happening for our VNP speakers?

