

THE ENGLISH “ARAB RULE” WITHOUT METRICS

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OUTLINE

- Vowel reduction in English
- The “Arab Rule”
- Formal analysis
- Testing the predictions
- Concluding remarks

VOWEL REDUCTION IN ENGLISH

- In English, many unstressed vowels reduce to schwa:

e.g. *atom* ['æ̩tə̩m] vs. *atomic* [ə'tɒmɪk]

- Following Wells (2008), we also treat these cases as reduced:

fiesta [fi'estə]

tuition [tju'ɪʃən]

eponymous [ɪ'pɒnɪməs] (cp. *eponym* ['epənɪm])

WHAT DETERMINES VOWEL REDUCTION

- Vowels in open syllables are more likely to reduce than vowels in closed syllables (Halle & Keyser 1974; Burzio 1994: 113; Fudge 1984).
- Vowels in syllables closed by obstruents are less likely to reduce than vowels closed by sonorants (Pater 2000).
- Vowels in syllables closed by non-coronals are less likely to reduce than vowels closed by coronals (Dahak 2011; Burzio 1994, 2007; Fudge 1984).

WHAT DETERMINES VOWEL REDUCTION

- Initial pretonic closed syllables normally do not reduce except if that syllable is a prefix (SPE: 118; Halle & Keyser 1971: 37; Liberman & Prince 1977: 284-285; Guierre 1979: 253; Selkirk, 1980; Hayes 1982; Halle & Vergnaud 1987: 239; Pater 2000; Hammond 2003; Collie 2007: 129, 215, 318-319).
- More frequent words show more reduction than less frequent words (Fidelholtz 1975).
- The existence of a morphological base in which the vowel is stressed can reduce its chances to reduce (SPE: 112, e.g. *reláx* *rèlaxátion*), even more so if that base is more frequent than the derivative (Bermúdez-Otero, 2012: 32, after Kraska-Szlenk 2007: §8.1.2).

THE “ARAB RULE”

(Collie 2007, Hayes 1980, Pater 1995, 2000, Ross 1972)

- It has been claimed that vowels in syllables closed by non-coronal obstruents do not reduce.
- However, reduction does occur when the preceding syllable is stressed and if it is light (*Arab* ['æɾəb]) but not when it is heavy (*Arab* ['eɪɾəb]).

		Right context	
		[+cor] coda	[-cor] coda
Left context	Heavy σ	Reduction	No reduction
	Light σ	Reduction	Reduction

THE OT ANALYSIS

Pater (1995, 2000)

(11) FTBIN, PARSE- σ , TROCH » WEIGHT-TO-STRESS

Input: <i>Alexander</i>	FTBIN	PARSE- σ	TROCH	WEIGHT -TO-STRESS
(Àlex) ánder ✓				*
A(lèx) ánder		* !		
(À)(lèx) ánder	* !			
(Alèx) ánder			* !	

(12) Tableau for H σ_0

Input: <i>Timbucktoo</i>	FTBIN	PARSE- σ	TROCH	WEIGHT -TO-STRESS
(Tìmbuck) tóo				* !
Tim(bùck) tóo		* !		*
(Timbùck) tóo			* !	*
(Tìm)(bùck) tóo ✓				

AIMS

- Evaluating the efficiency of the “Arab Rule” in the final syllable of dissyllables
- Represent (and unify) without metrics within CVCV-phonology
- Extend and test the analysis with word-internal syllables

THE DATA ON THE ARAB RULE

- All the words with the following properties were taken from Wells (2008):
 - Dissyllabic
 - Main stress on the first syllable
 - One single non-coronal coda
 - No morphological structure

THE DATA ON THE ARAB RULE

- 7 words for which the weight of the first syllable varies have been left out (e.g. *zineb* ['zɪneb] ~ ['zɪneɪb])
- Dataset: 210 words
- Token frequencies collected from SUBTLEX-UK (Van Heuven et al. 2014) and log-transformed so as to resemble the way “humans process frequency information” (Hay & Baayen 2002)
- Only the main variant was taken into account for this study.

RESULTS

- Binary Logistic Regression was conducted. It shows that both frequency and weight of the first syllable are significant predictors of vowel reduction.

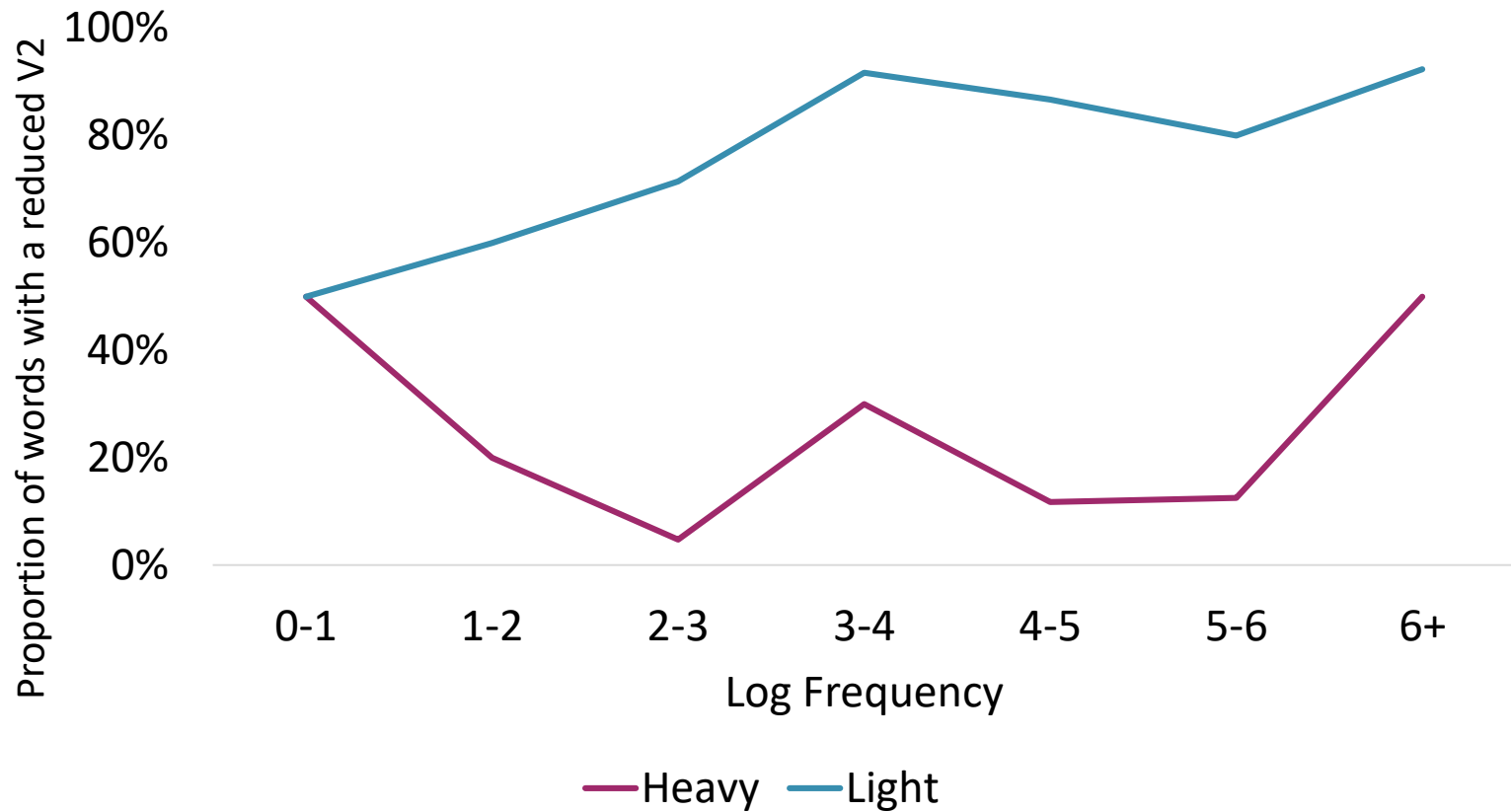
	95% C.I.			p-value
	Lower	OR	Higher	
WeightOfFirstSyllable - Light	8.60	17.15	36.40	8.60 e-15
LogFrequency	1.13	1.34	1.60	0.00105

RESULTS

		Second syllable	
		Reduction	No reduction
First syllable	Heavy	18 (16%) <i>Joseph</i> <i>ketchup</i> <i>lilac</i>	92 (84%) <i>Murdoch</i> <i>rhubarb</i> <i>tarmac</i>
	Light	77 (75%) <i>Derek</i> <i>stomach</i> <i>havoc</i>	26 (25%) <i>Barack</i> <i>kayak</i> <i>fennec</i>

RESULTS

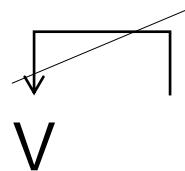
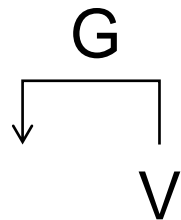
Reduction rate of V2, weight of S1 and frequency



THEORETICAL ANALYSIS

Reduction and inhibition Harris (2005), Kaye et al. (1990), Scheer (2000)

- Reduction is an inhibitory process
- Inhibition is prevented if a vowel:
 - governs
 - is ungoverned



THEORETICAL ANALYSIS

Reduction and left-hand context [Scheer \(2000\)](#)

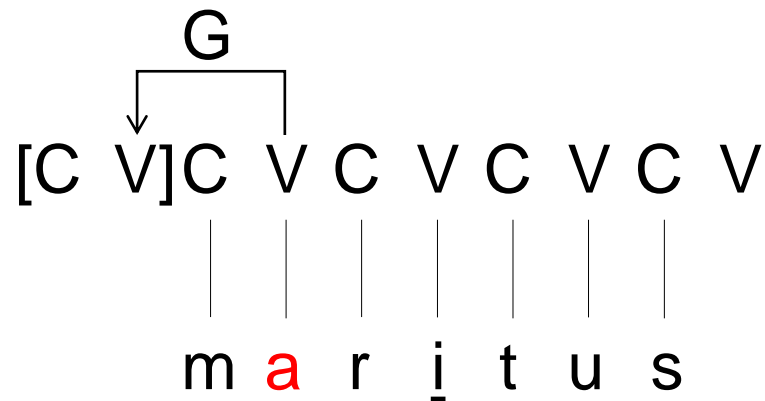
- Reduction is blocked in:
 - The initial position when unstressed

Unstressed initial V		Stressed V	
Latin	French	Latin	French
<i>marítus</i>	<i>mari</i>	<i>Alamánia</i>	<i>Allema^agne</i>
<i>valére</i>	<i>valoir</i>	<i>liberáre</i>	<i>livrer</i>
<i>laváre</i>	<i>laver</i>	<i>silváticus</i>	<i>sauvage</i>

THEORETICAL ANALYSIS

Reduction and left-hand context [Scheer \(2000\)](#)

- Explanation: The vowel governs.



> *ma*ri

THEORETICAL ANALYSIS

Reduction and left-hand context [Jacobs \(1989:21\)](#)

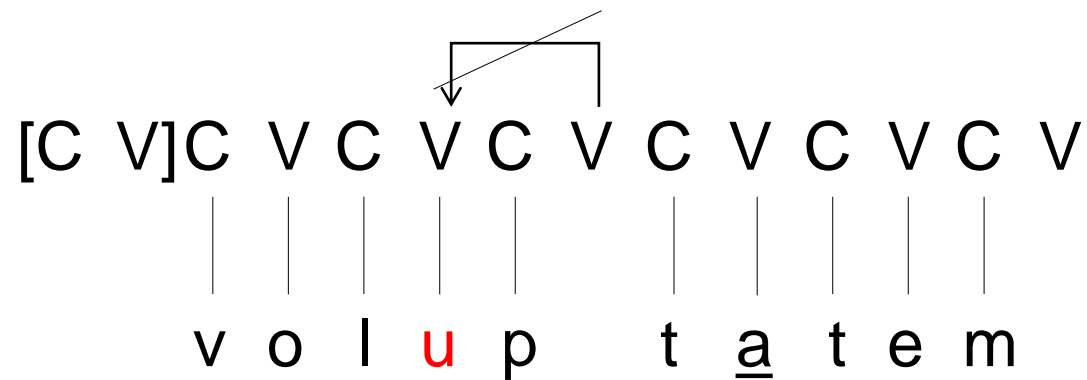
- Reduction is blocked in:
 - closed syllables

CV		CVC	
Latin	French	Latin	French
<i>civitátem</i>	<i>cité</i>	<i>papiliónem</i>	<i>pavillon</i>
<i>bonitátem</i>	<i>bonté</i>	<i>tabernárium</i>	<i>tavernier</i>
<i>computáre</i>	<i>compter</i>	<i>voluptátem</i>	<i>volupté</i>

THEORETICAL ANALYSIS

Reduction and left-hand context [Jacobs \(1989:21\)](#)

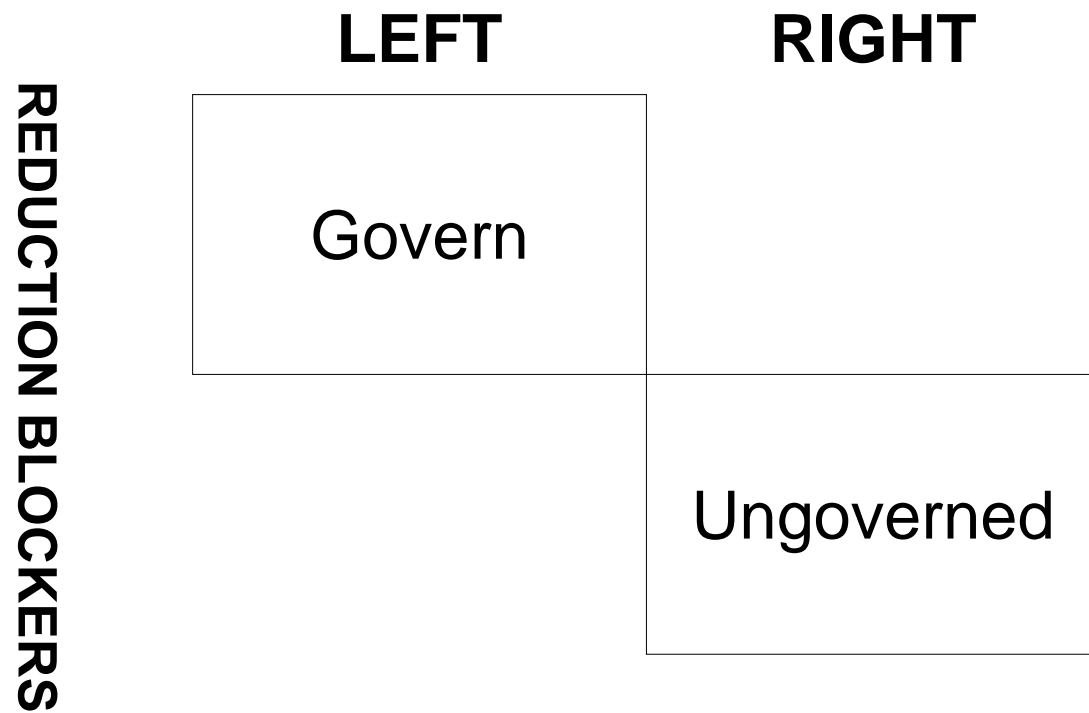
- Explanation: The vowel is ungoverned



> volupté

THEORETICAL ANALYSIS

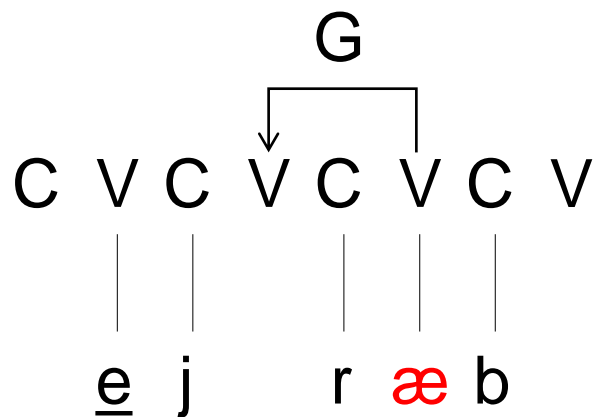
Summary



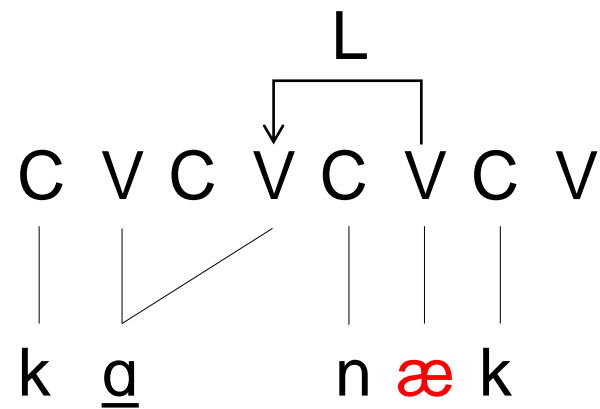
THE ARAB RULE WITHOUT METRICS

Left-hand context

- Heavy syllable = governs



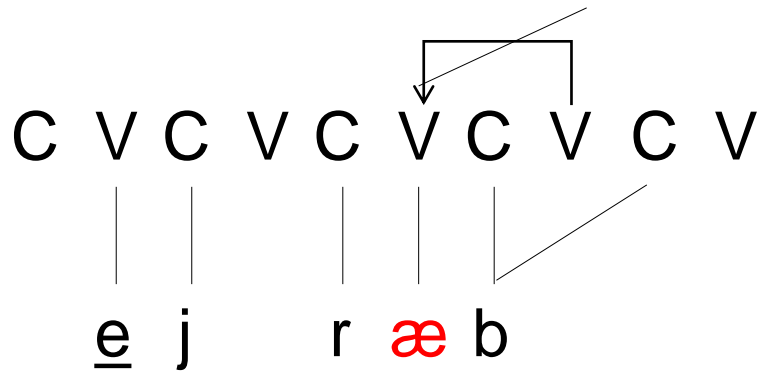
'Arab'



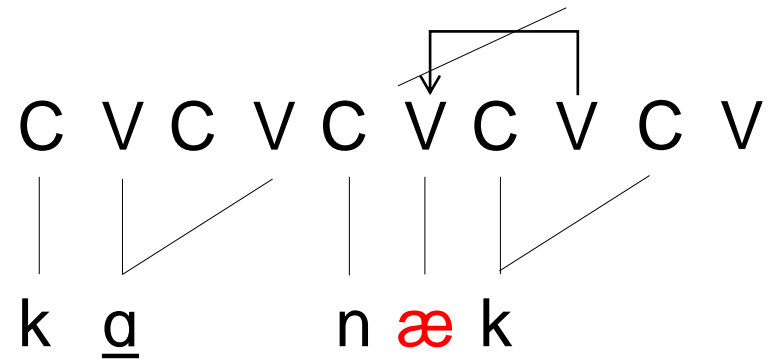
'Carnac'

THE ARAB RULE WITHOUT METRICS

- Non-coronal obstruents: is the vowel ungoverned?



'Arab'



'Carnac'

PARALLEL ISSUE: THE COMPLEXITY OF NON-CORONALS

- [t] is less complex, because
 - It freely alternates with [ʔ]
 - It never opposes to [ʔ]
- [p, k] are more complex
 - They can oppose to [ʔ]
 - They seldom merge with [ʔ]

(In dialects such as Estuary English, see [Brulard & Carr \(2015:253-254\)](#), [Ward \(1929:§250e\)](#), [Wells \(1982:410\)](#))

PARALLEL ISSUE: THE COMPLEXITY OF NON-CORONALS

- That complexity can be represented in two ways that are equivalent ([Lowenstamm 1991](#), [Carvalho 1994](#), [Ségéral & Scheer 2008](#))

vertically

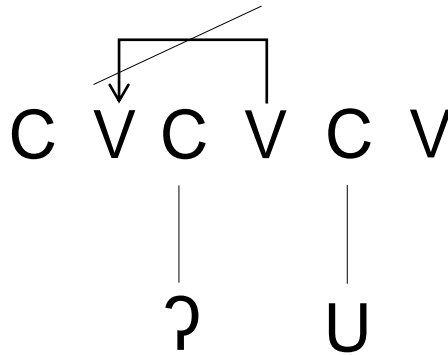
X
|
F
|
F

horizontally

X X
| \
F

PARALLEL ISSUE: THE COMPLEXITY OF NON-CORONALS

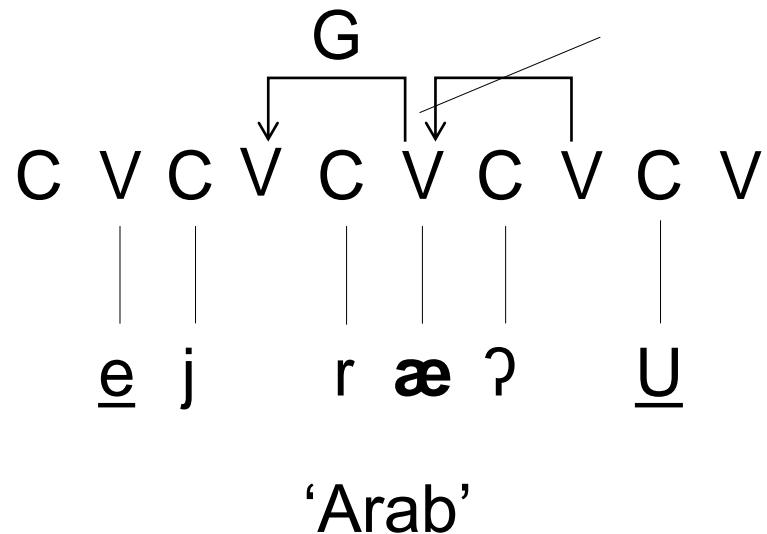
- **Proposal:**
- [p, k] are clusters /?U, ?U/
- They occupy two CV slots, at least word-finally (horizontal complexity).



THEORETICAL ANALYSIS

Generalisation

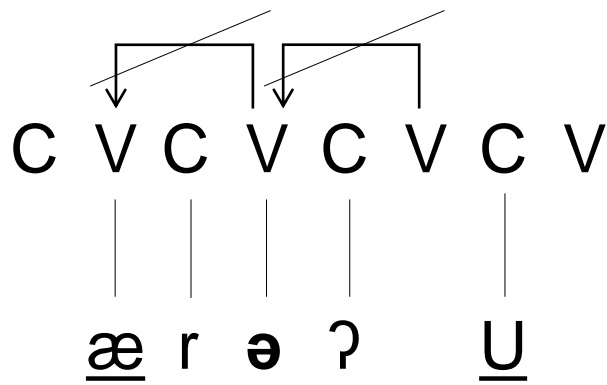
- Reduction is blocked **iff** a vowel governs is ungoverned



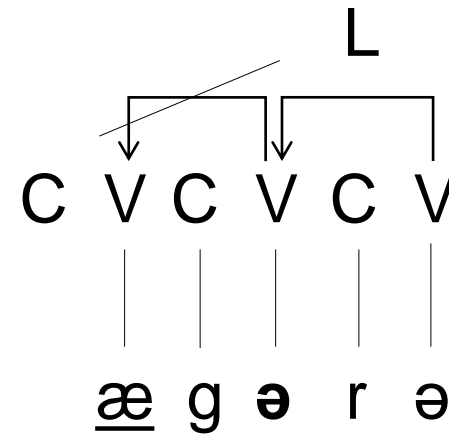
THEORETICAL ANALYSIS

Generalisation

- Elsewhere it is not blocked



'Arab'



'agora'

THEORETICAL ANALYSIS

Prediction

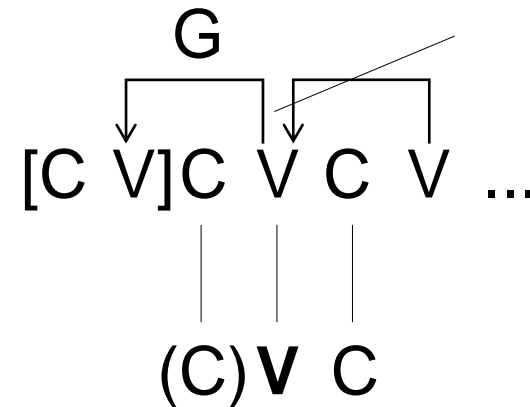
- Reduction is blocked in #(C)VC

[ə]*peritive* but [æ]*pteryges*

[ə]*kimbo* but *b*[æ]*ptize*

c[ə]*lamity* but [æ]*lbino*

c[ə]*sino* but c[æ]*scade*



TESTING THE PREDICTION

- Data taken from Wells (2008).
- Only monomorphemic words or words derived from bound roots.
- Historical prefixes excluded in the relevant positions.
- Names not included (at this stage)
- The prediction was tested in two environments:
 - initial pretonic syllable (e.g. *apéritive*) – n = 1017
 - intertonic syllable (e.g. *pèrsevère*) – n = 478

TESTED VARIABLES

- Open/Closed syllable
 - Nature of the following consonant ((non)coronal, nasal, etc.)
 - Frequency (taken from SUBTLEX-UK, log-transformed)
 - Spelling (monograph/digraph)
 - (Intertonic only: Weight of first syllable)
-
- Tested in a binary logistic regression with vowel reduction as the dependent variable.

RESULTS

- In both contexts, only three significant predictors.

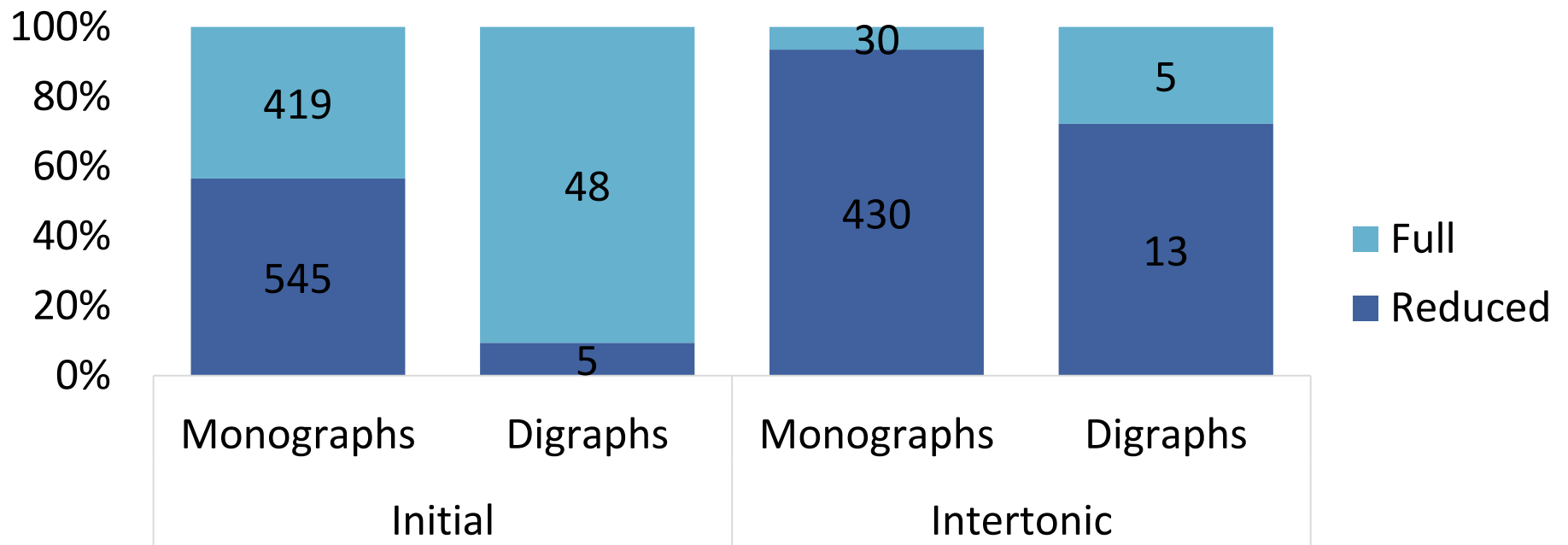
- Initial

	95% C.I.			p-value
	Lower	OR	Higher	
SPELLING-MONO	8.0	19.0	56.1	1.34 e-09
CLOSEDNESS-OPEN	12.2	18.6	29.4	< 2 e-16
LOGFREQUENCY	1.1	1.2	1.3	5.80 e-07

- Intertonic

	95% C.I.			p-value
	Lower	OR	Higher	
SPELLING-MONO	3.1	12.8	28.6	1.55 e-04
CLOSEDNESS-OPEN	5.8	12.3	44.2	2.38 e-10
LOGFREQUENCY	1.1	1.3	1.7	0.011

THE ROLE OF SPELLING



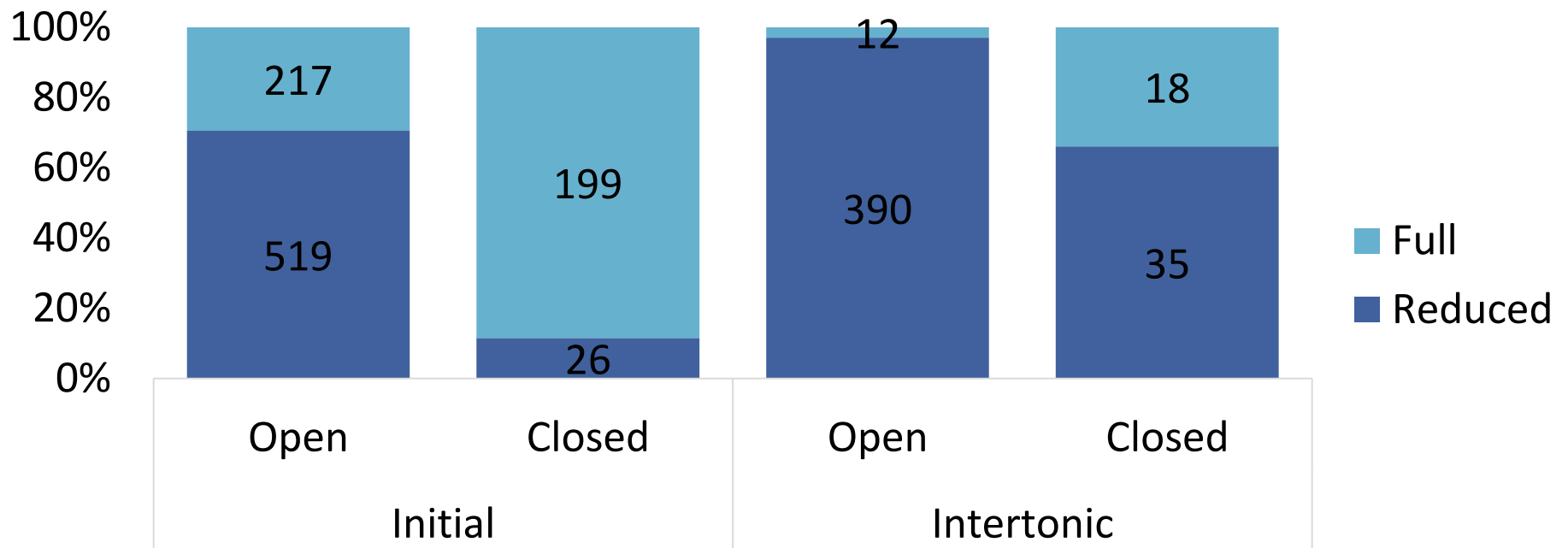
*a*postle
*ba*mboo
*e*nigma

*au*thentic
*bu*tique
*mo*ussaka

*in*canDESCe
*ve*getarian
*vo*lunteer

*de*coupage
*li*mousine
*re*nnaissance

CLOSEDNESS OF THE SYLLABLE (MONOGRAPHS ONLY)



*a*cademy
*ca*nary
*fr*enetic

*a*fghani
*ca*nteen
*mo*ntage

*a*dolescent
*e*locution
*re*ferendum

*ad*ventitious
*chi*mpanzee
*os*tentation

SUMMARY OF RESULTS

- Effect of spelling
- The predictions are verified in the initial position:
 - Almost no reduction in closed syllables
- An effect of the weight of the first syllable would be expected in the intertonic position but is not attested in the data.
- No difference between coronals and non-coronals word-internally
 - Complexity of non-coronals:
 - Horizontal word-finally
 - Vertical word-internally

CONCLUDING REMARKS

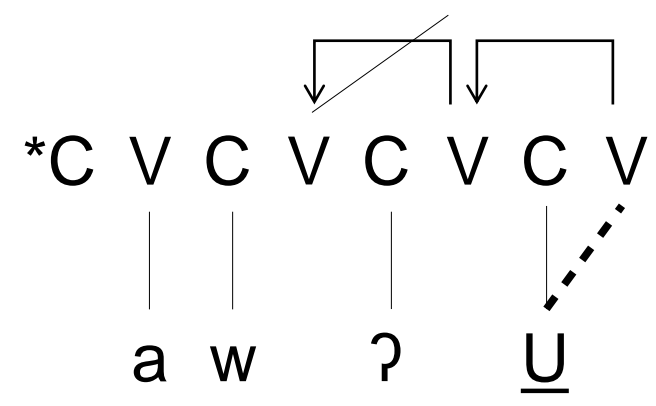
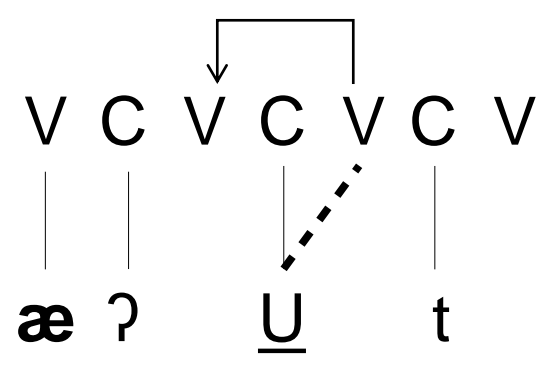
- The Arab Rule can be verified empirically and can be accounted for without feet
- Key proposal: reduction is blocked when the vowel governs and is ungoverned
- Non-coronal obstruents are complex and behave as
 - Monopositional word-internally
 - Bipositional word-finally
- The predictions are borne out word-initially but not in the intertonic position when the first syllable is heavy
- **Future work:** measure the impact of morphology (e.g. prefixation, *condensation* cases), the actual behaviour of coronals, integrate proper names



THANK YOU FOR YOUR ATTENTION!



REPRESENTATION OF NON-CORONALS



[PARALLEL ISSUE]

PROPOSITION

- [p, k] are clusters /ʔU, ʔU/
 - They can be realized as [ʔp, ʔk]
 - They cannot cooccur with /aw, ɔj/

• **awt#** : out, about, ablaut, devout, doubt, drought, flout...

• **awd#** : cloud, crowd, shroud, loud, proud...

• **ojt#** : adroit, coit, dacoit, doit, exploit, entroit, quit...

• **ojd#** : avoid, android, void, adenoid, alkaloid...

• *awp#, *awb#, *awk#, *awg#...

• *ojp#, *ojb#, *ojk#, *ojg#...

