

The Acquisition of Irish Initial Consonant Mutations and the Universal Hierarchy of Place Features

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1.0 Aims of presentation:

- Present results of pilot study
- Show that realisation of mutation is dependent on place of articulation of the affected consonant.
Coronal > Labial > Dorsal
- Provide an OT analysis
- Implications for theory: Place-specific faithfulness constraints on consonantal features

1.2 OT problem:

- Usually asymmetries between places of articulation are analysed as effect of MARKEDNESS constraints.
- Here we need FAITHFULNESS constraints.

1.3 Introduction to Irish mutations

- What are mutations?
 - Morpho-syntactically triggered alternations of phonological features in morpheme-initial /-final consonants
- What types are there?
 - Lenition (*Séimhiú*)
 - Eclipsis (*Urú*)

1.4 Lenition

		voiceless		voiced	
		plain	palatal	plain	palatal
a.	coronals				
	radical	t	t'	d	d'
	lenited	h	h'	ɣ	ɣ'
b.	labials				
	radical	p	p'	b	b'
	lenited	f	f'	v	v'
c.	dorsals				
	radical	k	k'	g	g'
	lenited	x	x'	ɣ	ɣ'

1.5 Triggering environment

- Nominal lenition:

- Gender:

- Initial consonants of feminine nouns lenite after the definite article

- Example:

		Radical	Lenited
duais ‘prize’	an dhuais ‘the prize’	/d/	/ɣ/
pingin ‘penny’	an phingin ‘the penny’	/p/	/f/
gaoth ‘wind’	an ghaoth ‘the wind’	/g/	/ɣ/

1.5 Triggering environment

■ Verbal lenition

■ Tense:

- Initial consonants of verbs in the infinitive lenite in the aimsir caite

■ Example:

		Radical	Lenited
tit 'to fall'	thit mé 'I fell'	/t/	/h/
pléasc 'to burst'	phléasc 'I burst'	/p/	/f/
glan 'to clean'	ghlan mé 'I clean'	/g/	/ɣ/

2.0 The data sample

- Elicitation: Reading out sentences, substituting radical with past tense form or a picture with the feminine noun;
- Subjects: 3rd – 6th grade students from one Irish Immersion primary school and one English Immersion primary school in the Republic of Ireland (ROI);
- All 10 subjects are native speakers of English;
- Irish is compulsory subject in ROI schools.

2.1 The realisation of mutations

- Overall realisations:

	% Correct IMS	% Correct EMS
Verbs	50	50
Nouns	5	3

IMS = Irish Medium School,

EMS = English Medium School

2.2 The realisation of verbal mutations

	Labial	Coronal	Dorsal
All	52%	60%	33%
Voiceless stops	65%	75%	33%
Voiceless palatal	65%	95%	40%
Voiceless plain	-/-	60%	30%
Voiced stops	65%	50%	30%
Voiced palatal	100%	40%	30%
Voiced plain	30%	60%	30%
Nasals	25%	-/-	-/-
Fricatives	-/-	55%	-/-
Oral stops	65%	63%	54%

2.2 The realisation of verbal mutations

.	All	Coronal > labial > dorsal	60 > 52 > 33
.	Voiceless stops	Coronal > labial > dorsal	75 > 65 > 33
.	Voiceless palatal	Coronal > labial > dorsal	95 > 65 > 40
.	Voiceless plain	Coronal > dorsal	60 > 30
.	Voiced stops	Labial > coronal > dorsal	65 > 50 > 30
.	Voiced palatal	Labial > coronal > dorsal	100 > 40 > 30
.	Voiced plain	Coronal > labial, dorsal	60 > 30, 30
.	All stops	Labial > coronal > dorsal	65 > 63 > 54
.	Manner	Stops > fricatives > nasals	
0.	Coronal stops versus fricatives	Stops > fricatives	

2.3 Summary of results

- Coronal stops are lenited more often than labials;
- Labials perform better than dorsals;
- Voiced coronals lenite to dorsal fricative;
- Voiced coronals still perform better than dorsals.

2.3 Explanation 1

- Dorsal fricative [x, ɣ] is not part of English sound inventory in word-initial position
- Problem:
 - this does not explain why voiced coronal stops perform better than voiced dorsal stops when both lenite to a voiced dorsal fricative
- Voiced palatal labial performs better than all others: Only one item tested, *bí* 'to be' which is high frequency and suppletive in English.

3.0 Markedness of Place

- Coronal is the preferred/unmarked place of articulation for stops (after laryngeal; Lombardi 2002) (Kean 1975, Kiparsky 1985, Avery & Rice 1989, Paradis & Prunet 1991, Mohanan 1993, Prince & Smolensky 1993, Hume 1996, Wilson 2001)
- Prince & Smolensky (1993):
 - Coronal > dorsal, labial
 - Universal ranking of markedness constraints:
*[dorsal], *[labial] >> *[coronal]

3.1 Formal analysis step 1

- Representation of lenition:
Representation as constraint violation (Golston 1996)

/past tense/	* [+cont]	SPECIFY[place]
	*	*

Coronals: Lenition = debuccalisation (Ní Chiosáin 1991)

3.1 Formal analysis step 1

- Inserted as LENITE! In hierarchy

	*[+cont]	SPECIFY [place]
/p/ ~ [p]		
/p/ ~ [f]	*	
/p/ ~ [h]	*	*
/p/ ~ [ʔ]		*

LENITE!
**
*
*

3.1 Formal analysis step 2

Constraints:

- IDENT[cont]:
‘Consonants are faithful to their underlying continuancy feature.’
- LENITE!: ‘Do lenition.’ (see above)
- *[dors, +cont]: ‘No dorsal continuants.’ *[x, ʏ]

Irish has no lexical dorsal fricatives word-initially:

*[dors, +cont] >> IDENT[cont]

Irish dorsal fricatives emerge as result of lenition:

LENITE! >> *[dors, +cont] >> IDENT[cont]

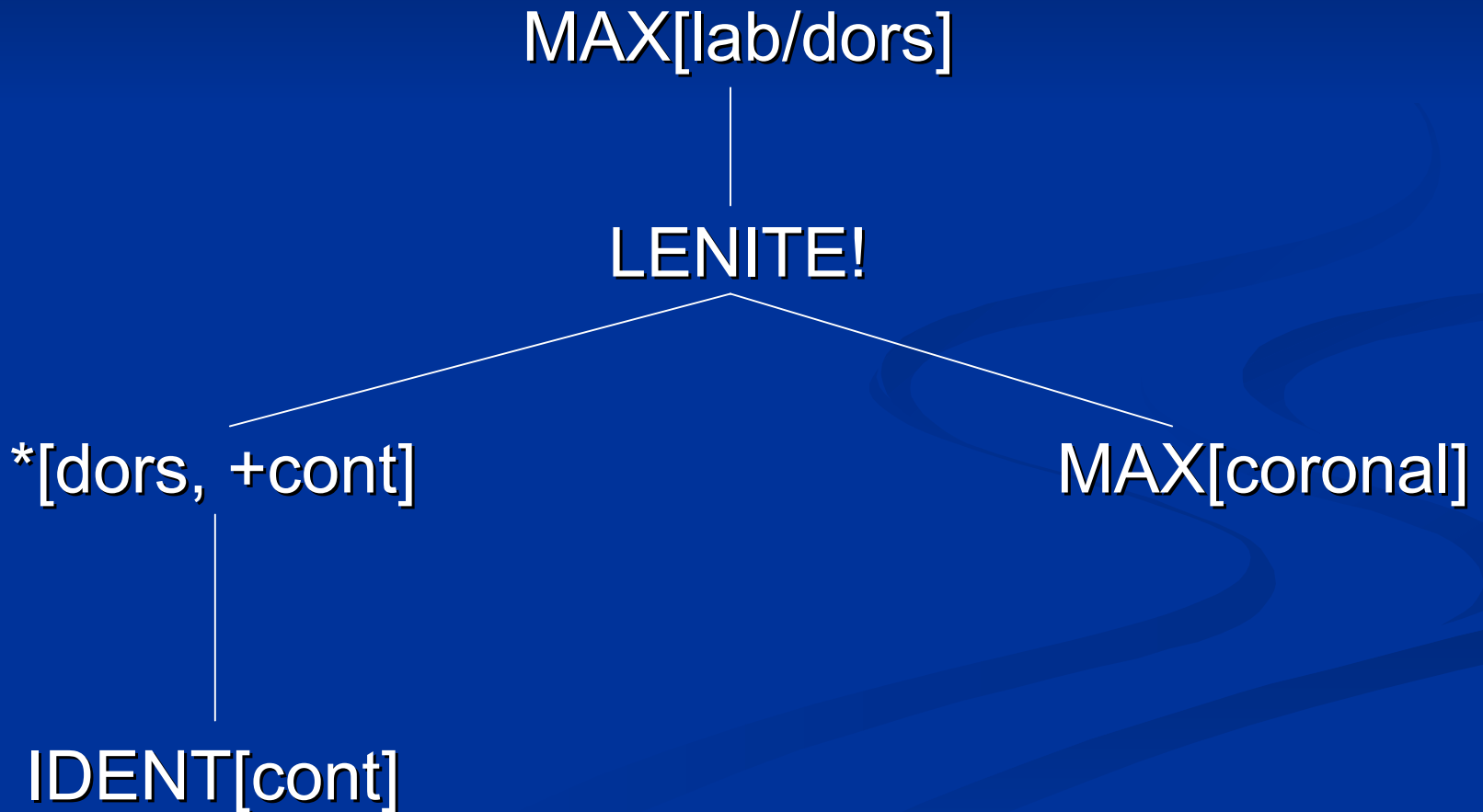
3.1 Formal analysis step 3

- Place-specific Faithfulness constraints (Hume & Tserdanelis' 2002 PRESERVE constraints, de Lacy's (2002) IDENT{dors,lab}, IDENT{dors,lab,cor}):
 - MAX[lab/dors], MAX[coronal]: 'Underlying place specifications are mapped to the surface.'
- More Place-specific Faithfulness constraints:
 - IDENT_{Lab/Dors}[cont]:
'Labials and Dorsals are faithful to their underlying continuancy feature.' (*Lab/Dors&,IDENT[cont])

**Irish labials and dorsals don't debuccalise, coronals do:
MAX[lab/dors] >> LENITE! >> MAX[coronal]**

3.1 Formal analysis step 3

- Ranking for Irish (target ranking for learners):



3.1 Formal analysis step 3

		MAX [lab/dors]	LENITE!	*[dors, +cont]	MAX [cor]	IDENT [manner]
a.	/p/ ~ [p]		**!			
b.	/p/ ~ [h]	*!				*
 c.	/p/ ~ [f]		*			*
d.	/t/ ~ [t]		**!			
 e.	/t/ ~ [h]				*	*
f.	/t/ ~ [s]		*!			*
g.	/k/ ~ [k]		**!			
h.	/k/ ~ [h]	*!				*
 i.	/k/ ~ [x]		*	*		*

3.2 Additions for the /d/ ~ [ɻ] alternation

- IDENT[voice]
- *[z]
- *[ɦ]

		IDENT[vce]	*[z]	*[ɦ]	LENITE!	*[x, ɻ]	MAX [cor]
a.	/d/ ~ [d]				**!		
b.	/d/ ~ [ɦ]			*!			*
c.	/d/ ~ [h]	*!					*
d.	/d/ ~ [z]		*!				
e.	/d/ ~ [ɻ]				*	*	*

4 Acquiring mutations by gradual constraint demotion

- Universal start rankings?
 - $\text{IDENT}_{\text{Lab/Dors}}[\text{cont}] \gg \text{IDENT}[\text{cont}]$
 - $\text{MAX}[\text{lab/dors}] \gg \text{MAX}[\text{coronal}]$
- Start rankings for English native speakers:
 - $*[\text{dors}, +\text{cont}] \gg \text{IDENT}_{\text{Lab/Dors}}[\text{cont}] \gg \text{IDENT}[\text{cont}] \gg \text{LENITE!}$
 - $\text{MAX}[\text{lab/dors}] \gg \text{MAX}[\text{coronal}] \gg \text{LENITE!}$
- Output: No mutations, no dorsal fricatives

4 Acquiring mutations by gradual constraint demotion

Start grammar:



4.1 Fluid rankings

- Boersma (2000):
 - Constraints are ranked on a scale and have to have a significant distance on the scale to be ranked robustly.

4.2 Constraint demotion

*[dors, +cont]

IDENT_{Lab/Dors}
[cont]

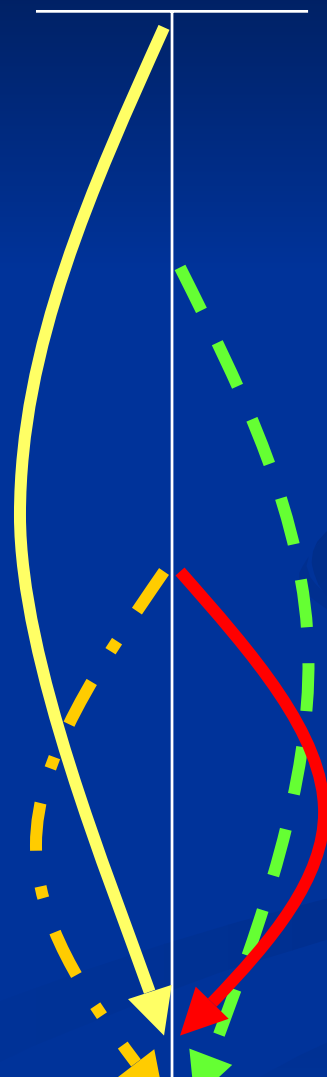
IDENT[cont]

LENITE!

MAX[lab/dors]

MAX[coronal]

LENITE!



4.3 Intermediate rankings

Gradual demotion along a ranking scale predicts...

- High probability of voiceless coronals leniting;
- Less high probability of labials leniting;
- Low probability of dorsals leniting properly;
- But still higher probability of voiced coronals leniting.

5.0 L1 evidence for start rankings

- $\text{IDENT}_{\text{Lab/Dors}}[\text{cont}] \gg \text{IDENT}[\text{cont}]$:
Evidence from flapping;
- $\text{MAX}[\text{lab/dors}] \gg \text{MAX}[\text{coronal}]$:
No L1-internal evidence

5.1 Flapping

Lenition in Timugon Murut (Prentice 1971, de Lacy 2002)

balaʔ/	‘inform’	[naka-βalaʔ]	‘has informed’
		[mam-balaʔ]	‘will inform’
balojti/	‘cramped’	[toodʒo βalojti]	‘really cramped’
		[balojti]	‘cramped’
di/	‘of’	[amaʔ ri]	‘father of’
		[anak di]	‘child of’
giti/	‘here’	[mo:nsoj ɣiti]	‘it’s good here’
		[molondom giti]	‘it’s dark here’

5.2 Flapping/lenition in English

- In Murut, labials, dorsals and coronals undergo lenition.
- In English, lenition/flapping is limited to the coronal stops. (Southern Irish ‘slit *t*’)

	Northern /	Southern	Hiberno English
a. letter	[lɛr̥ɹ̩]	[lɛθ̥ɹ̩]	
ladder	[læɾ̥ɹ̩]	[læð̥ɹ̩]	
b. zipper	[zɪp̥ɹ̩]	[zɪp̥ɹ̩]	*[zɪβ̥ɹ̩], *[zɪf̥ɹ̩]
rubber	[ɹ̥ʌb̥ɹ̩]	[ɹ̥ʌb̥ɹ̩]	*[ɹ̥ʌβ̥ɹ̩], *[ɹ̥ʌv̥ɹ̩]
c. cracker	[kɹ̥æk̥ɹ̩]	[kɹ̥æk̥ɹ̩]	*[kɹ̥æɣ̥ɹ̩], *[kɹ̥æx̥ɹ̩]
digger	[dɪg̥ɹ̩]	[dɪg̥ɹ̩]	*[dɪɣ̥ɹ̩], *[dɪɣ̥ɹ̩]

5.2 Flapping/lenition in English

- De Lacy (2002): Failure of non-coronals to lenite/flap is side effect of absence of output from language's inventory (e.g. Abau)
- English:
 - Yes, [ɣ] is out.
 - No, /p,b/ → [β / v] would be ok.
- Consequence:
*[dors, cont] >> IDENT_{Lab/Dors}[cont] >> FLAP >>
IDENT[cont]

5.2 Flapping/lenition in English

	*[dors/ cont]	IDENT _{Lab/Dors} [cont]	FLAP	IDENT [cont]
a. /t/ ~ [t]			*!	
☞ b. /t/ ~ [θ]				*
☞ c. /p/ ~ [p]			*	
d. /p/ ~ [f]		*!		*
☞ e. /k/ ~ [k]			*	
f. /k/ ~ [x]	*!	*		*

6.0 Conclusion

- Grammar of intermediate stages of L2 acquisition is best represented using fluid (stochastic) constraint rankings;
- Constraint ranking only becomes robust in final stage of language acquisition;
- Place-specific faithfulness constraints on place features (i.e., MAX[lab/dors], MAX[cor]);
- The faithfulness ‘pull-effect’: IDENT_{Lab/Dors}[cont];
- Specific faithfulness constraints have to be ranked in initial state. (lab/dors >> cor);

6.0 Conclusion

- Evidence for these rankings from L1?
 - No: $MAX[lab, dors] \gg MAX[cor]$
(or $IDENT\{dors, lab\} \gg IDENT\{dors, lab, cor\}$) is universal.
 - Yes: $IDENT_{Lab/Dors}[cont] \gg IDENT[cont]$
From English flapping. (But might still be a universal ranking.)
- Phonological regularities in acquisition pattern show: mutations are part of the phonology (as opposed to what some sceptics say).

Thank you!
Go raibh maith agaibh!

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