Resolving the spell-out timing paradox in Irish historic tense lenition

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Initial consonant mutation in Irish

Initial consonant mutation (ICM)

Systematic **phonological alternation** of word-initial consonants, depending on **morphosyntactic context**

(1)   a.   ***ní   dh****íolfaidh siad é* [***d****íolfaidh*]
           NEG **L**.sell.FUT they it
           'They will not sell it.'   (**L** = "Lenition")

      b.   ***an   gc****reideann   tú í?* [***c****reideann*]
           Q   **E**.believe.PRS you her
           'Do you believe her?'   (**E** = "Eclipsis")

      c.   ***d'   fh****ágfainn*   [***f****ágfainn*]
           HIST **L**.leave.COND.1SG
           'I would leave.'

Trigger word account of ICM

- Floating phonological material on the right edge of a trigger word

(2)   a.   *ní-*{**L**} *díolfaidh* ⟶ *ní **dh**íolfaidh*
       b.   *an-*{**E**} *creideann* ⟶ *an **gc**reideann*
       c.   *d'-*{**L**} *fágfainn* ⟶ *d' **fh**ágfainn*

<div align="right">(e.g. Lieber 1983; Iosad 2014; Breit 2019)</div>

- **Prediction:** conditions for insertion of trigger word cannot be sensitive to the post-mutation identity of the target

- Demonstrably fails to hold for "historic tense particle" *d'*

My proposal: Two distinct exponents of historic tense

Exponents of historic tense in Irish

- Historic tense prefix {**L**}- triggers lenition
- Historic tense particle *d'* inserted separately

$$d' \quad \{\text{L}\}\text{-}fágfainn$$

historic tense particle   historic tense prefix
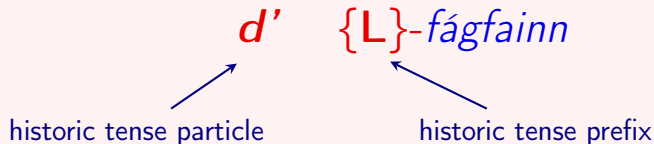
Crucially: mutation takes place **before** historic tense particle *d'* is inserted

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- Morphology is fundamentally concatenative
- Phonologically defective morphemes

    (e.g. Trommer 2011; Bye & Svenonius 2012; Zimmermann 2017)

Floating phonological material + Target consonant ⟶ Mutated target

e.g. floating features (Lieber 1983)

floating elements (Breit 2019)

floating geometric structure (Iosad 2014)

Advantages:

- Compatible with strict modularity (Scheer 2010; Bermúdez-Otero 2012)
- No ad hoc diacritics (cf. Hamp 1951; Pyatt 1997)
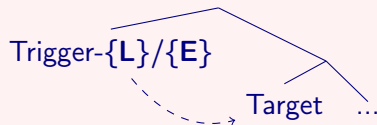- Captures phonological regularities (cf. Stewart 2004; Green 2006)

ICM in an autosegmental framework

- **Type 1:** Mutation material at right edge of a trigger word
- **Type 2:** Mutation material as a prefix on the target word

Type 1:

Trigger-{**L**}/{**E**}

Target ...

Type 2:

(Trigger)

{**L**}/{**E**}-Target ...

- **Both sources** are necessary to account for the Irish ICM data

ICM in an autosegmental framework

In the Irish clause...

- All pre-verbal particles are associated with mutation on the verb

Lenition		Eclipsis	
a^L	direct relative particle	a^N	indirect relative particle
má	conditional particle	*go*	complementiser
ní	negative particle	*an*	interrogative particle
		nach	negative complementiser
d'	historic tense particle	*dá*	conditional particle
all *-r* forms of dependent particles		*cá*	'where'

- Lexical property of each pre-verbal particle

ICM in an autosegmental framework

- Mutation triggered on **any** following consonant

(3) a. *go   **dt**uigim*
         COMP E.understand.1SG
         '...that I understand'   (Christian Brothers 1960:213)

    b. *hata a   **dh**'   oirfeadh   dom*
        hat REL.DIR L.HIST suit.COND to.me
        'a hat that suited me'   (Gaois.ie 2022)

    c. *go   **mb**a   mhór   an ónóir   í*
        COMP E.COP.HIST L.great the honour it
        '...that it was a great honour'   (Gaois.ie 2022)

Hypothesis: All pre-verbal particles are mutation "trigger words" (Type 1)

The puzzle of the historic tense particle

Two classes of tense/mood combinations:

- **Historic**: past indicative, past habitual, conditional, past subjunctive
- **Non-historic**: everything else

Markers of historic tense:

- Pre-verbal particles
    - Historic tense particle *d'*
    - *-r* forms: *ní* vs. *níor*; *an* vs. *ar*
- "Historic tense lenition"

The puzzle of the historic tense particle

- Appears only before words that are underlyingly vowel- or *f*-initial

(4) a. **d'** *ól* *mé* ← empty consonantal slot
         HIST drink I
         'I drank.'

    b. **d'** **fh**ág *mé* ← empty consonantal slot
         HIST **L**.leave I
         'I left.'

         (Gussmann 1986; Ní Chiosáin 1991)

    c. **(*d')** **bh**uaigh *mé*
         (HIST) **L**.win   I
         'I won.'

Context for insertion of historic tense particle *d'*

An **empty consonantal slot** in the **post-mutation** form of the target word

The puzzle of the historic tense particle

- Surfaces to satisfy onset requirement?
  - No – see (5)

- Surfaces if syllabification does not violate phonotactic constraints?
  - No – see (6)

(5) a. ***d' fh**liuch sí* [...]
         HIST **L**.wet   she
         'She wet [...].'
     b. ***d' fh**reagair sí*
         HIST **L**.answer she
         'She answered.'

(6) a. *(*d') léim sé*
         (HIST) jump he
         'He jumped.'
     b. *(*d') rith sé*
         (HIST) run he
         'He ran.'

The puzzle of the historic tense particle

Context for insertion of historic tense particle *d'*

An **empty consonantal slot** in the **post-mutation** form of the target word

$$\implies \text{Spell-out timing paradox!}$$

- *d'* inserted **before** mutation?
  - cannot be sensitive to post-mutation form of the target
- *d'* inserted **after** mutation?
 - cannot be the origin of mutation-inducing material

The upshot

Given that insertion of *d'* is sensitive to the post-mutation form of the target word, it **cannot be the trigger of lenition**.

My proposal: Two distinct exponents of historic tense

Exponents of historic tense in Irish

- Historic tense prefix **{L}**- triggers lenition
- Historic tense particle *d'* inserted separately

$$d' \quad \text{\{L\}}-fágfainn$$

historic tense particle   historic tense prefix
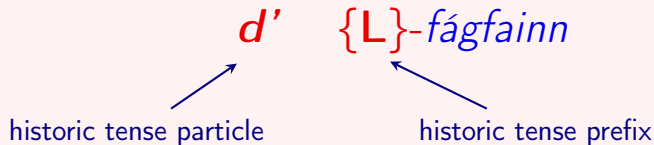
Crucially: mutation takes place **before** historic tense particle *d'* is inserted

My proposal: Background assumptions
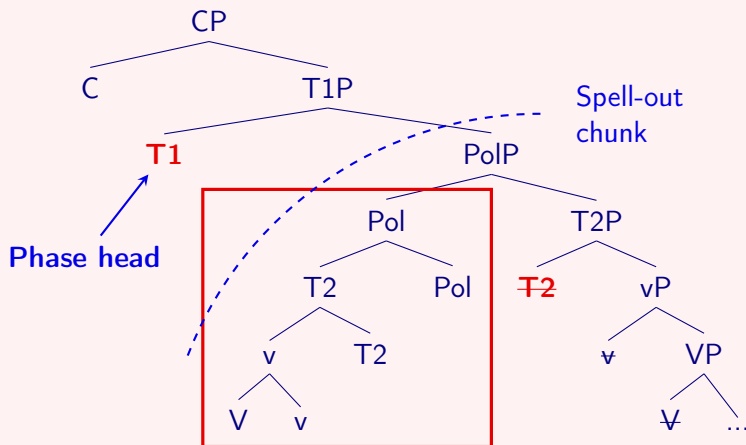
Spell-out process:

- **Late insertion** model

- Syntactic structure built **incrementally** from the **bottom up**

- Spell-out occurs **cyclically in chunks/phases**

- Within a chunk, spell-out proceeds **node-by-node** from the **inside out**

(Embick 2010; Kalin 2021)

My proposal: Background assumptions

Structure of the Irish finite verb clause:

T1: historic/non-historic; **T2:** finer tense distinctions
Verbal complex: {V-v-T2-Pol}

My proposal: Background assumptions

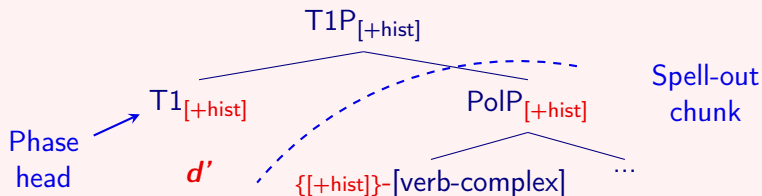After linearisation: **C** - **T1** - {verbal complex} - ...

C-head:
- Hosts all pre-verbal particles *other* than *d'*
- Associated with **Type 1** mutation (trigger word)

T1-head:
- Expresses historic/non-historic distinction
- Hosts historic tense particle *d'*
- Associated with **Type 2** mutation (prefixation on verb)

- Historic tense feature originates on T1
- Inherited by PolP via concord   (Ackema & Neeleman 2020)
- Phase-head T1 triggers spell-out of complement
- [+hist] prefix inserted on leftmost element   (Bermudez-Otero & Payne 2011)
- Pre-verbal *d'* inserted (if phonological conditions met)

- **Example:** *(*d') **bh**uaigh mé* 'I won'   (unlenited form: *buaigh*)
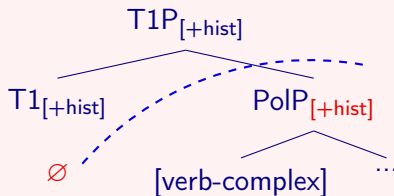
- **Example:** *d'**fh**reagair mé* 'I answered'   (unlenited form: *freagair*)
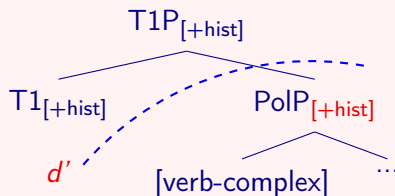
My proposal: Two distinct exponents of historic tense

- Two distinct exponents of historic tense:
  - Historic tense prefix {**L**}- triggers lenition
  - Historic tense particle *d'* inserted separately

- Spell-out timing paradox is resolved

- Retains all advantages of autosegmental account

- **Further advantage:** naturally extends to copular clauses

Extending the analysis: copular clauses

(7) a. *is   cosúil le   taibhse é*
         COP like   with ghost he
         'He is like a ghost.'

     b. *ba   **sh**aighdiúirí iad*
         COP.HIST **L**.soldiers   they
         'They were soldiers.'

- Structure: Copular particle – Predicate – Subject

- Only distinguish historic vs. non-historic tense

- Historic tense $\longrightarrow$ lenition on predicate

Extending the analysis: copular clauses

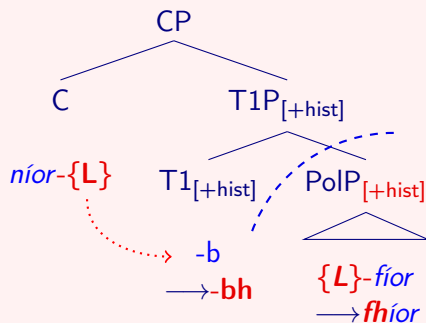Historic copular particle *-b*: similar pattern to *d'* (in some contexts)

(8) a. *níor*   **-bh**   *ealaíontóir í*
         NEG.HIST **L**.COP.HIST artist   she
         'She was not an artist.'

     b. *níor*   **-bh**   **fh**eirmeoir *í*
         NEG.HIST **L**.COP.HIST **L**.farmer   she
         'She was not a farmer.'

     c. *níor*   **(*-bh)**   **sh**aighdiúir *í*
         NEG.HIST (**L**.COP.HIST) **L**.soldier   she
         'She was not a soldier.'

(**Note:** Type 1 lenition on *-b* following mutation trigger *níor*-**{L}**)

- **Example:** *níor-**bh** fhíor é* 'it was not true'   (*fíor*)

CP
- C
- T1P[+hist]
  - T1[+hist]
    - -b
    - ⟶**-bh**
  - PolP[+hist]
    - {**L**}-*fíor*
    - ⟶**fh**íor

níor-{**L**}

Summary and conclusions

Exponents of historic tense in Irish

- Historic tense prefix {**L**}- triggers lenition
- Historic tense particles *d'* and *-b* inserted separately

- Resolves spell-out timing paradox for *d'* and *-b*

- Unified treatment of historic tense lenition

- Retains all advantages of autosegmental model

Go raibh míle maith agaibh! – Thank you!

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Appendix A: Phonology of mutations

Phonological alternations: (adapted from Green 2006)

Radical	p	t	k	b	d	g	f	s	m	n	l	r
Lenited	f	h	x	v	ɣ	ɣ	∅	h	v	–	–	–
Eclipsed	b	d	g	m	n	ŋ	v	–	–	–	–	–

Appendix B: Objections to trigger word analysis of ICM

Objections: (Green 2006)

- Linear non-adjacency:
    - *ár*[trigger] *dhá **gc**apall* 'our two **E**.horses'

- No overt trigger:
    - ***dh**úisigh mé* 'I **L**.awoke'

- Mutation linked to morphosyntactic features on target:
    - *muintir **Sh**eáin* '**L**.Seán's family'

⇒ Not necessarily homogeneous   (Duffield 1995; Iosad 2014; Laoide-Kemp 2023)

Evidence for empty consonantal slot in vowel-initial words:

(9)   a.   *ithir*   /ihir^j/ 'soil'
       b.   *an ithir*   /ən^j ihir/   'the soil'   (Ní Chiosáin 1991:80)

(10)   a.   *aois*   /iːs^j/ 'age'
       b.   *an aois*   /ən iːs/ 'the age'   (Ní Chiosáin 1991:81)

Evidence for empty consonantal slot following lenition of *f*:

(11)   a.   *feoil*   /f^{j}oːl^j/ 'meat'
       b.   *an **fh**eoil*   /ən^j oːl^j/ 'the meat'   (Gussmann 1986:894)

(12)   a.   *fáinne*   /fan^{j}ə/ 'ring'
       b.   *an **fh**áinne*   /ən an^{j}ə/ 'the ring'   (Gussmann 1986:894)

Appendix D: Vocabulary items

Two distinct effects of [+historic] feature:

- Historic tense **prefix** on verbal complex
- Historic tense **particle** in T1-head

(13)   **Historic tense prefix:**
       [Pol,+hist] ↔ {**L**}-

(14)   **Historic tense particle:**
       a.   [T1,+hist,+indep] ↔ /d/ / ___ {empty consonantal slot}
       b.   [T1,+hist,+indep] ↔ ∅ (elsewhere)

Appendix D: Vocabulary items

Two distinct effects of [+historic] feature (copular clauses):

- Historic tense **prefix** on predicate
- Historic tense **copular particle** in T1-head

(15) **Historic tense prefix:**
[Pol,+hist] $\leftrightarrow$ {***L***}-

(16) **Historic tense copular particle:**
a. [T1,+hist,+dep,+cop] $\leftrightarrow$ /b/ / ___ {empty consonantal slot}
b. [T1,+hist,+dep,+cop] $\leftrightarrow$ $\varnothing$ (elsewhere)