

The history of English intrusive liquids: using the present to ascertain the past

Ricardo Bermúdez-Otero
University of Newcastle upon Tyne

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DIACHRONIC REDUCTIONISM, OPTIMALITY THEORY, AND LIQUID INTRUSION

Diachronic reductionism vs OT

§1 *Diachronic reductionism*

Explanations for phonological patterns may reside in synchronic analysis or diachronic evolution [...], but since historical accounts permit simpler grammatical models they are preferable wherever possible.

Blevins & Garrett (2004: 118)

Functionalist proponents: e.g. Bybee (2001), Blevins (2004)

Formalist proponents: e.g. Hale & Reiss (2000), Hyman (2001)

§2 *The argument against OT*

Marked structures are those which, for phonetic reasons, are more likely to become distorted in production or perception and, consequently, to be lost through change.

⇒ Ockham's Razor: markedness constraints are superfluous.

But cf. Bermúdez-Otero (2005), Bermúdez-Otero & Börjars (2006), Bermúdez-Otero & Hogg (2003), Kiparsky (2004).

Liquid intrusion: synchronically arbitrary?

§3 *The rise of intrusive r: the rule inversion account*

See e.g. Vennemann (1972), McMahon (2000a: ch. 6).

(a) Original rhotic system: /V#/ ≠ /Vɹ#/

e.g.	<i>saw</i>	<i>saw up</i>	<i>soar</i>	<i>soar up</i>
	/sɔ:/	/sɔ: ʌp/	/sɔ:ɹ/	/sɔ:ɹ ʌp/
	[sɔ:]	[sɔ: ʌp]	[sɔ:ɹ]	[sɔ:ɹ ʌp]

(b) Linking r: /V#/ ≠ /Vɹ#/

V → [-high] / ___ ɹ (by breaking and laxing before r)

ɹ → ∅ / ___ {C, ||} (r-loss)

e.g.	<i>saw</i>	<i>saw up</i>	<i>soar</i>	<i>soar up</i>
	/sɔ:/	/sɔ: ʌp/	/sɔ:ɹ/	/sɔ:ɹ ʌp/
	[sɔ:]	[sɔ: ʌp]	[sɔ:]	[sɔ:ɹ ʌp]

(c) Intrusive <i>r</i> :	No underlying /Vɹ#/ $\emptyset \rightarrow \text{ɹ} / [\text{V}, -\text{high}] ___ \# \text{V}$	(input restructuring) (<i>r</i> -insertion)
e.g.	<i>saw</i> <i>saw up</i> <i>soar</i> <i>soar up</i> /sɔ:/ /sɔ: ʌp/ /sɔ:/ /sɔ: ʌp/ [sɔ:] [sɔ:ɹ ʌp] [sɔ:] [sɔ:ɹ ʌp]	

§4 *The case for arbitrariness*

- *r*-insertion violates of the Emergence of the Unmarked: [ɹ] is highly marked.
- No synchronic connection between intrusive *r* and the preceding nonhigh vowel: the distribution of intrusive *r* reflects that of linking *r* prior to rule inversion.

See Vennemann (1972), McCarthy (1993), Blevins (1997), Halle & Idsardi (1997), Hale & Reiss (2000), McMahon (2000a,b).

§5 *Alleged implications*

- Phonological processes created by analogical change, rather than through the phonologization of a phonetic effect, can freely violate markedness laws.
- Markedness constraints cannot be cognitively real.

§6 *The counterargument*

The rule inversion account is incompatible with two pieces of synchronic evidence:

- the phonetic evidence on the position of intrusive liquids in syllable structure,
- dialects where linking *l* and intrusive *l* have different distributions.

INTRUSIVE LIQUIDS AND SYLLABLE STRUCTURE

The phonetic evidence

§7 Linking liquids and intrusive liquids are phonetically identical (e.g. Gick 1999: 31-2).

§8 */l/ in Gick (2003)*

- Subject: MR, male, Southern California, mid 20s
- Method: EMMA (electromagnetic midsagittal articulometer)
- Targets: V#IV e.g. *see Lynn* (my examples)
 VI#V e.g. *seal in*
 VI#C e.g. *seal him*
- Results:

(a) Magnitude of the dorsal gesture:	no difference
(b) Timing of the coronal and dorsal gestures:	V#IV coronal lead ('light <i>l</i> ') VI#V } VI#C } coronal lag ('dark <i>l</i> ')
(c) Magnitude of the coronal gesture:	V#IV > VI#V > VI#C

§9 */l/ in Scobbie & Wrench (2003)*

- Subjects: 8 speakers of “(near-) standard English” (5 English, 1 Scottish, 2 American)
- Method: electropalatographic records in MOCHA database
- Targets: $l||$
 $l\# C_{[labial]}$
 $l\# V$
- Results: 7 out of 8 subjects show the following alternation categorically
 $l\# C \Rightarrow$ no linguoalveolar contact (= ‘vocalized *l*’)
 $l\# V \Rightarrow$ linguoalveolar contact (= ‘consonantal *l*’)

§10 *A three-way phonetic contrast between V#IV, VI#V, and VI#C*

Most clearly manifest in American English accents with the following pattern:

Position	Example	Linguoalveolar contact?	Coronal lead?	Percept
V#IV	<i>see Lynn</i>	YES	YES	clear, consonantal
VI#V	<i>seal in</i>	YES	NO	dark, consonantal
VI#C	<i>seal him</i>	NO	NO	dark, vocalic

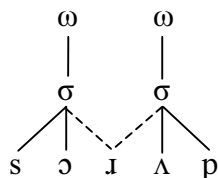
§11 *Similar evidence for /ɹ/*

- In nonrhotic accents, word-final prevocalic [ɹ], whether linking or intrusive, is more ‘vocalic’ (has greater energy at all frequencies) than word-initial [ɹ] (McCarthy 1993: 179).
- Magnitude of coronal gesture in rhotic accents (Gick 1999: 47-9):
 $V\# \mathbf{r}V > V\mathbf{r}\# V > V\mathbf{r}\# C$

This refutes Jensen (2000: 220), who postulates a two-way distinction ($V\mathbf{r}\# V = V\mathbf{r}\# C$).

Syllabification§12 How do we account for the unique properties of word-final prevocalic liquids?§13 *Analysis I: parallel ambisyllabification (e.g. McCarthy 1993)*

/sɔ: ʌp/
saw[ɹ] *up*

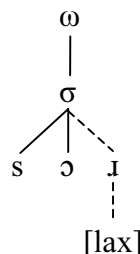


- Intrusive *r* inserted in the coda to satisfy FINALC (‘A prosodic word must end with a consonant’).
- Intrusive *r* adjoined to following onset to satisfy ONSET.
- Adjunction to the following onset allows satisfaction of CODACOND[ɹ] (‘[ɹ] must be licensed by an onset’).

§14 *Analysis II: cyclic resyllabification (e.g. Kiparsky 1979, McCarthy 1991)*

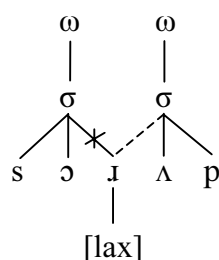
/sɔ: ʌp/
saw[ɹ] up

Word level



- CODACOND[ɹ] ranked low, FINALC ranked high.
- Intrusive *r* inserted ω-finally to satisfy FINALC.
- In the coda, *r* acquires the feature [lax], to be realized as reduction (and delay) of the C-gesture.

Phrase level



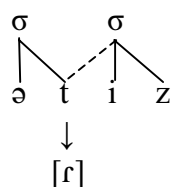
- CODACOND[ɹ] ranked high, FINALC ranked low.
- Intrusive *r* resyllabifies to satisfy ONSET, thereby also fulfilling CODACOND[ɹ], but remains lax.

§15 *Predictions of the ambisyllabic analysis*

On the evidence of /t/-flapping, classic ambisyllabic analyses (Kahn 1976, Gussenhoven 1986) postulate ambisyllabicity in two environments:

(a) word-final prevocalic

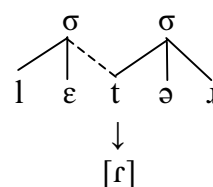
e.g. *at ease*
[əɾ i:z]



‘Onset Capture’

(b) foot-medial intervocalic

e.g. *letter*
[lɛɾəɪ]



‘Coda Capture’

Prediction: liquids will have the same allophonic realization in word-final prevocalic position (e.g. *seal in*) and foot-medial intervocalic position (e.g. *Sealey*)

§16 *A counterexample to the ambisyllabic analysis (data from Sproat & Fujimura 1993)*

- Subjects: 4 speakers (2 male, 2 female), Midwestern American, early 20s
- Method: X-ray microbeam cinematography
- Targets: nonce words *Beelik* (morpheme-internal foot-medial)
Beel equates (word-final prevocalic)
- Results: *Beelik* ⇒ coronal lead (‘light l’)
Beel equates ⇒ coronal lag (‘dark l’)
- Conclusion: In this accent, ambisyllabic analyses cannot deal with the allophony of plosives and liquids simultaneously.

§17 *Summary of synchronic results*

- Intrusive liquids have both onset-like and coda-like properties.
- This is the result of a cyclic resyllabification effect:
 - (a) Intrusive *r* is inserted in ω -final position after nonhigh vowels at the word level to satisfy FINALC. Being in the coda, it picks up the feature [lax].
 - (b) At the phrase level, ω -final lax *r* resyllabifies into the onset before vowel-initial words; otherwise, it deletes under pressure from CODACOND[ɹ].

Diachronic implications

- §18 There is evidence that
- *r*-intrusion after /ə/ precedes *r*-intrusion after /ɑ, ɔ/
 - word-final *r*-intrusion precedes stem-final *r*-intrusion
- See
- early orthoepic treatises (e.g. Sheridan 1762, Elphinston 1787)
 - relative frequencies in conservative RP (Jones 1928, Gimson 1989: 303-4)

§19 *The rise of intrusive r after word-final /ə/*

- Initial stage: linking *r*

(a) <i>Anna</i>	[ænə]	(b) <i>Peter</i>	[pi:tə]
<i>Anna is</i>	[ænəɪz]	<i>Peter is</i>	[pi:təɹɪz]

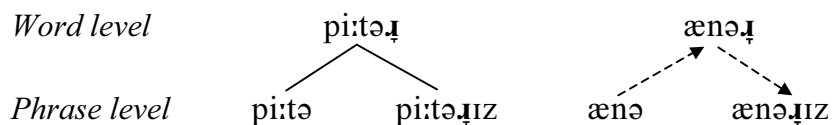
Because of final schwa loss in Middle English, pattern (a) had very low type-frequency (mainly loanwords) ⇒ Learners tend to reanalyse /ə/-final citation forms as predictably following pattern (b). See Harris (1994: 253).

- But the linking *r* is lax, contrasting with nonlax word-initial *r*:

(b) <i>Peter is</i>	[pi:təɹɪz]	(c) <i>to reserve</i>	[təɹɪzɜ:v]
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Therefore, if UG does not allow ambisyllabicity as an option, learners must interpret linking *r* as a word-level coda resyllabified into the onset.

- Therefore,



⇒ Rise of a word-level phonotactic constraint against [ə]-final ω , satisfied by *r*-insertion (hence the automatic character of intrusive *r*; cf. McMahon 2000a).

§20 *Comparison with the rule inversion story*

- Rule inversion story: underlying /pi:təɹ/ > underlying /pi:tə/
- Actual development: word-level [ænə] > word-level [ænəɹɪz]

The rule inversion account depends on an imperfect understanding of the syllabic behaviour of intrusive *r*:

- either it ignores syllable structure altogether (Vennemann 1972, McMahon 2000a)
- or it erroneously assumes ambisyllabicity (McCarthy 1993).

INTRUSIVE LIQUIDS AND V-PLACE FEATURES

§21 But the fact remains that liquids are highly marked, and therefore not expected as epenthetic segments, whether at the word level or the phrase level!

The classic response:

Liquid intrusion is licensed by the sharing of V-place features with the preceding vowel.

See Broadbent (1991), Donegan (1993), Harris (1994), McMahon, Foulkes & Tollfree (1994), Baković (1999), Gick (1999), Giegerich (1999), Gick (2002a), Gick, Kang & Whalen (2002).

§22 *The clinching piece of synchronic evidence*

See Bermúdez-Otero & Hogg (2003), Bermúdez-Otero (2005), Bermúdez-Otero & Börjars (2006).

Certain English dialects spoken in the Northeast of the United States exhibit the following distribution (Gick 1999, 2002b):

- Linking *l* after all vowels

e.g.	/ɔ:/	<i>drawl</i>	[dɹɔ:]	<i>drawling</i>	[dɹɔ:lɪŋ]
	/ə/	<i>cruel</i>	[kɹu:wə]	<i>cruel act</i>	[kɹu:wəl ækt]
	/ɑ:/	<i>Dahl</i>	[dɑ:]	<i>Dahl is</i>	[dɑ:l ɪz]
		etc.			

- Intrusive *l* after /ɔ:/ only

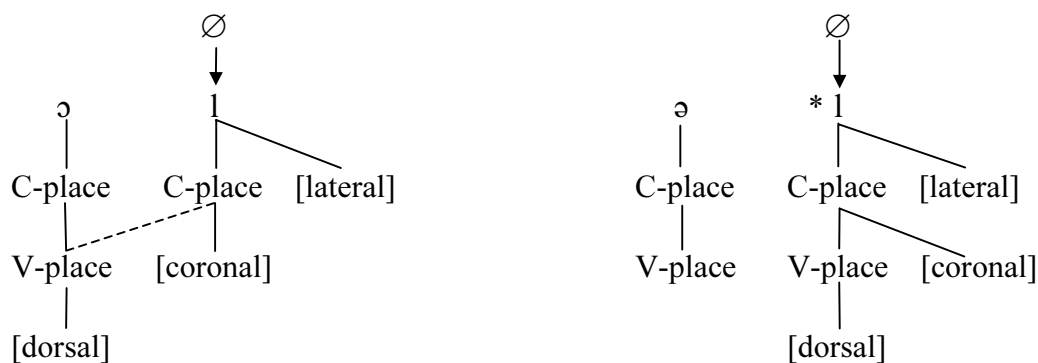
e.g.	/ɔ:/	<i>the law</i> [l] <i>is...</i>
but	/ə/	<i>the idea</i> [∅] <i>is...</i>
	/ɑ:/	<i>the bra</i> [∅] <i>is...</i>

This is totally unexpected under the rule inversion analysis: cf. §4.

§23 *Synchronic constraints*

In these dialects, /l/ is pronounced with the same V-gesture as /ɔ:/ (Gick *et al.* 2002)

l-intrusion is tolerated when the epenthetic *l* gets its V-gesture by spreading from the preceding vowel:



CONCLUSION

- §24
- The rule inversion account on the rise of intrusive liquids in English is untenable.
 - The evidence of liquid intrusion fails to support the reductionist critique of OT: liquid intrusion is not synchronically arbitrary.
 - To reconstruct the history of a linguistic phenomenon, the first thing we need is an adequate synchronic analysis.

REFERENCES

- Baković, Eric. (1999). Deletion, insertion, and symmetrical identity. *Harvard Working Papers in Linguistics* 7.
- Bermúdez-Otero, Ricardo (2005). Phonological change in Optimality Theory. In Keith Brown (ed). *Encyclopedia of language and linguistics*. 2nd edition. Oxford: Elsevier.
www.bermudez-otero.com/encyclopedia.pdf
- Bermúdez-Otero, Ricardo & Kersti Börjars (2006). Markedness in phonology and in syntax: the problem of grounding. In Patrick Honeybone & Ricardo Bermúdez-Otero (eds). *Linguistic knowledge: perspectives from phonology and from syntax*. Special Issue, *Lingua* 116(2).
<http://www.sciencedirect.com/science/journal/00243841>
- Bermúdez-Otero, Ricardo & Richard M. Hogg (2003). The actuation problem in Optimality Theory: phonologization, rule inversion, and rule loss. In D. Eric Holt (ed), *Optimality Theory and language change*. Dordrecht: Kluwer. 91-119.
- Blevins, Juliette (1997). Rules in Optimality Theory: two case studies. In Iggy Roca (ed). *Derivations and constraints in phonology*. Oxford: Clarendon Press. 227-260.
- Blevins, Juliette (2004). *Evolutionary phonology: the emergence of sound patterns*. Cambridge: Cambridge University Press.
- Blevins, Juliette & Andrew Garrett (2004). The evolution of metathesis. In Bruce Hayes, Robert Kirchner & Donca Steriade (eds). *Phonetically-based phonology*. Cambridge: Cambridge University Press. 117-156.
- Broadbent, Judith (1991). Linking and intrusive *r* in English. *University College London Working Papers in Linguistics* 3: 281-302.
- Browman, Catherine P. & Louis Goldstein (1995). Gestural syllable position effects in American English. In Fredericka Bell-Berti & Lawrence J. Raphael (eds). *Producing speech: contemporary issues. For Katherine Safford Harris*. New York: American Institute of Physics. 19-33.
- Bybee, Joan (2001). *Phonology and language use*. Cambridge: Cambridge University Press.
- Donegan, Patricia (1993). On the phonetic basis of phonological change. In Charles Jones (ed.) *Historical linguistics: problems and perspectives*. London: Longman 98-130.
- Elphinston, James (1786-7). *Propriety ascertained in her picture, or English speech and spelling rendered mutual guides, secure alike from distant, and from domestic, error*. 2 vols. London: John Water.
- Gick, Bryan (1999). A gesture-based account of intrusive consonants in English. *Phonology* 16: 29-54.
- Gick, Bryan (2002a). An X-ray investigation of pharyngeal constriction in American English schwa. *Phonetica* 59: 38-48.
- Gick, Bryan (2002b). The american intrusive *l*. *American Speech* 77.2: 167-183.
- Gick, Bryan (2003). Articulatory correlates of ambisyllabicity in English glides and liquids. In John Local, Richard Ogden & Rosalind Temple (eds), *Phonetic interpretation: papers in laboratory phonology VI*. Cambridge: Cambridge University Press.
- Gick, Bryan, A. Min Kang & D. H. Whalen (2002). MRI evidence for commonality in the post-oral articulations of English vowels and liquids. *Journal of Phonetics* 30: 357-372.
- Giegerich, Heinz J. (1999). *Lexical strata in English: morphological causes, phonological effects*. Cambridge: Cambridge University Press.

- Gimson, A. C. (1989). *An introduction to the pronunciation of English*. 4th edn. London: Edward Arnold.
- Gussenhoven, Carlos (1986). English plosive allophones and ambisyllabicity. *Gramma* **10**: 119-141.
- Hale, Mark & Charles Reiss (2000). Phonology as cognition. In Noel Burton-Roberts, Philip Carr & Gerard Docherty (eds). *Phonological knowledge: conceptual and empirical issues*. Oxford: Oxford University Press. 161-184.
- Halle, Morris & William J. Idsardi (1997). *r*, hypercorrection, and the Elsewhere Condition. In Iggy Roca (ed). *Derivations and constraints in phonology*. Oxford: Clarendon Press. 331-348.
- Harris, John (1994). *English sound structure*. Oxford: Blackwell.
- Hyman, Larry M. (2001). The limits of phonetic determinism in phonology: *NC revisited. In Elizabeth Hume & Keith Johnson (eds). *The role of speech perception in phonology*. San Diego: Academic Press. 141-185.
- Jensen, John T. (2000). Against ambisyllabicity. *Phonology* **17**: 187-235.
- Jones, Daniel (1928). *An English pronouncing dictionary*. Revised edn (1st published 1917). London: Dent.
- Kahn, Daniel (1976). *Syllable-based generalizations in English phonology*. PhD dissertation, MIT.
- Kiparsky, Paul (1979). Metrical structure assignment is cyclic. *Linguistic Inquiry* **10**: 421-441.
- Kiparsky, Paul (2004). Universals constrain change; change results in typological generalizations. Ms, Stanford University.
<http://www.stanford.edu/~kiparsky/Papers/cornell.pdf>
- McCarthy, John J. (1991). Synchronic rule inversion. *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* **17**: 192-207.
- McCarthy, John J. (1993). A case of surface constraint violation. *Canadian Journal of Linguistics* **38**: 169-195.
- McMahon, April M. S. (2000a). *Lexical phonology and the history of English*. Cambridge: Cambridge University Press.
- McMahon, April M. S. (2000b). *Change, chance, and optimality*. Oxford: Oxford University Press.
- McMahon, April M. S., Paul Foulkes & Laura Tollfree (1994). Gestural representation and Lexical Phonology. *Phonology* **11**: 277-316.
- Scobbie, James M. & Alan A. Wrench (2003). An articulatory investigation of word final /l/ and /l/-sandhi in three dialects of English. *Proceedings of the International Congress of Phonetic Sciences* **15**: 1871-1874.
- Sheridan, Thomas (1762), *A course of lectures on elocution: together with two dissertations on language and some other tracts relative to those subjects*. London: Strahan.
- Sproat, Richard & Osamu Fujimura (1993). Allophonic variation of English /l/ and its implications for phonetic implementation. *Journal of Phonetics* **21**: 291-311.
- Vennemann, Theo (1972). Rule inversion. *Lingua* **29**: 209-242.

CONTACT DETAILS

Ricardo Bermúdez-Otero
 School of English Literature, Language, and Linguistics
 University of Newcastle upon Tyne
 Newcastle upon Tyne NE1 7RU
 United Kingdom

R.Bermudez-Otero@ncl.ac.uk
 www.bermudez-otero.com