The University Of Sheffield.

Cycle Psychology Experimentally Testing the Life Cycle of Phonological Change

Ranjan Sen, University of Sheffield
ranjan.sen@sheffield.ac.uk

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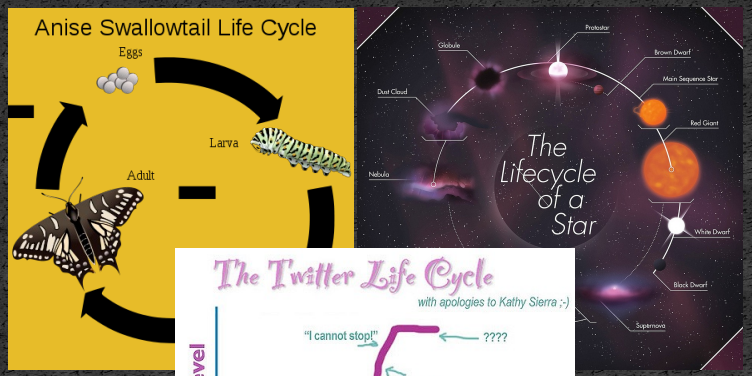
Life cycles



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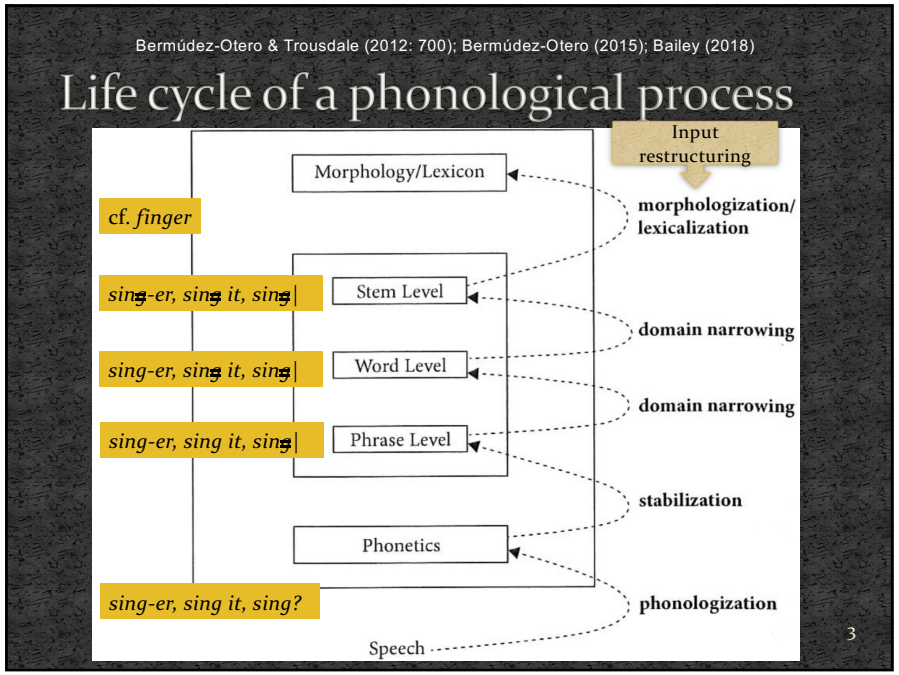
Bermúdez-Otero & Trousdale (2012: 700); Bermúdez-Otero (2015); Bailey (2018)
Life cycle of a phonological process
Input restructuring
Morphology/Lexicon
cf. finger
morphologization/ lexicalization
sing-er, sing it, sing
Stem Level
domain narrowing
sing-er, sing it, sing
Word Level
domain narrowing
sing-er, sing it, sing
Phrase Level
stabilization
Phonetics
sing-er, sing it, sing?
phonologization
Speech
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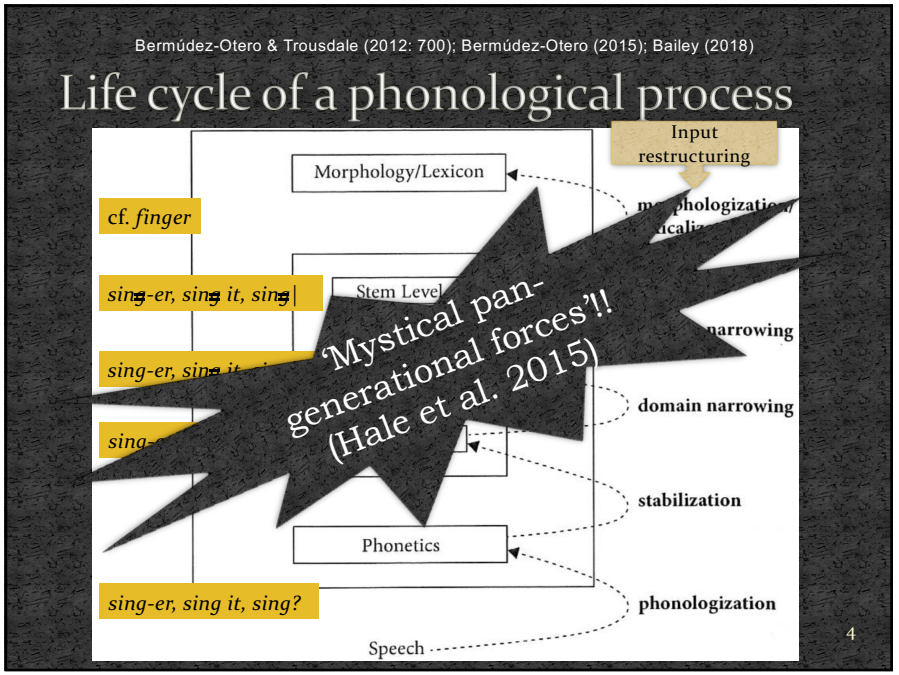
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'Mystical pan-generational forces'!! (Hale et al. 2015)
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Why? Hypothesis: Psycholinguistic roots of the Life Cycle

- Bias in acquisition to reduce morpheme alternation
  - g → Ø / ŋ __ C, # creates g ~ Ø alternation
  - Over-applying to smaller domains reduces alternation
- Learner generalises pattern if frequency of post-change alternant sufficiently high vs. unchanged
- Result: unidirectional mis-generalizations
- Result: domain narrowing only
- Sen (2016, 2017) on the range of predictions of the model

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How to test?

Adult Artificial Language Learning (e.g. White 2013)

- Can inaccurate learning of a fabricated language in the laboratory replicate the roots of domain narrowing?
- Test the acquisition of a Phrase-Level (PL) rule
  - Exposure to the more frequent alternant in training
- Do participants generalise to a Word-Level (WL) rule
  - Reducing morpheme alternation, over-applying rule
- Replicating historically real:

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How to test? Hypothetical rule

- Rule: syllable-final lenition
  - b → v / __]σ
- Occurs when final or before C in a domain
  - /pa**b**te**b**/## → [pa**v**.te**v**]##
- Fails when before V in a domain
  → resyllabified as onset
  - /pa**b**i**b** ama/ → [pa.**b**i.**b** a.ma] at PL

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Training stimuli: 9 morphemes

- Three /b/-final nouns
  - /pab/ 'horse'
  - /mib/ 'dog'
  - /fub/ 'cat
- Three /b/-final suffixes
  - /ib/ plural
  - /deb/ feminine
  - /gub/ masculine

  } Ratio initial C:V = 2:1
- Three intransitive verbs
  - /ama/ 'run'
  - /dumi/ 'eat'
  - /gimi/ 'sleep'

  } As above

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Training phase

- SEE picture depicting animal(s) performing the action of an intransitive verb
- HEAR corresponding artificial-language sentence
  - Each sentence has the structure:
  - NOUN-SUFFIX VERB
- 27 sentences, each played twice = 54 training items

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Stimulus sentences

	UR	Surface form	Gloss	Translation	PL b → v? (2 instances)
(a)	/pab-ib ama/	[pab-ib ama]	horse.plural run	'The horses run'	NO – NO
(b)	/pab-ib dumi/	[pab-iv dumi]	horse.plural eat	'The horses eat'	NO – YES
(c)	/pab-deb ama/	[pav-deb ama]	horse.fem run	'The mare runs'	YES – NO
(d)	/pab-deb dumi/	[pav-dev dumi]	horse.fem eat	'The mare eats'	YES – YES

- 3 nouns, 3 suffixes, and 3 verbs in every combination = 27 sentences (x2)
- Each sentence has 2 word-/stem-final /b/ = 56 instances
- Due to 2:1 ratio of C:V initial sound of suffix and verb in stimuli:
- Each suffix/verb morpheme has 6 tokens of [v] alternant = TOTAL 36 [v]
- And 3 tokens of [b] alternant = TOTAL 18 [b] tokens,
- I.e. Training data exposure is 2:1 in favour of lenition

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Example: No change

[pab-ib ama] 'The horses run'

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Example: b → v at the Phrase Level

[pab-iv dumi] 'The horses eat'

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Test phase

- Same stimuli, but with one additional V-initial verb
  - /imu/ 'fly'
- → Equal number of sentences with ('control' items) and without ('test' items) word-final b → v at PL
  - 18 sentences with verbs /ama/ and /imu/
  - 18 sentence with verbs /dumi/ and /gimi/
  - [pab-ib imu] 'the horses fly' vs. [pab-iv dumi]
- Therefore, word-final b → v should occur at the Phrase Level 50% of the time in test items…
- …But if overapplied to the Word Level, it would occur 100% of the time (in an all-or-nothing grammar)
  - WL [pab-iv imu] (final in the domain)

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Test procedure

- SEE picture (as before)
- HEAR two alternative sentences A and B
- Asked to select which sentence matches the picture by pressing a button A or B
- In the test items (V-initial verbs), the choice will be:
  - A: Correct at PL [pab-ib ama]
  - B: Correct at WL [pab-iv ama] – overapplied
- In the control items (C-initial verbs):
  - A: Correct at PL [pab-iv dumi]
  - B: Rule not applied [pab-ib dumi]

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Example: Test item

A: [pab-ib ama]
'The horses run' @ PL

B: [pab-iv ama]
'The horses run' @ WL

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Prediction

- If learners accurately acquire the rule @ PL:
- Error rates between test (V-initial verbs) and control (C-initial verbs) items not significant

- If learners over-apply the rule, domain narrowing to WL:
- Significantly more errors in test items than control
  - Presumably not 100% of the time, but higher rates if at WL than at PL in a probabilistic stratal grammar with cumulative effects (e.g. Turton 2012)
- Aside: restructuring of UR as /pav/ due to exposure, and rule inversion: v → b / V__V? Not acquired as unnatural? Need VvV in training data?

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Other potential outcomes

- Significantly more errors in control items than test
- Indicates 'rule death' – failure to apply b → v
- Not predicted due to 2:1 exposure in favour of the rule in the training phase

- If one answer option in half the test items over-applied at the Stem Level, and this option was selected significantly more often than the correct @ PL option, then we might have evidence for 'extreme' domain narrowing to SL
  - A: Correct at PL [pab-ib ama]
  - B: Correct at SL [pav-iv ama] – extreme overapp
- UR lexicalised as post-change /pav/?

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Further avenues

- Modify exposure ratio
  - E.g. if 2:1 does not give result, what about 3:1 (like historical sɪŋ ~ sɪŋg per Bermúdez-Otero 2015)?
  - Does ratio weighted towards the non-change alternant (e.g. sɪŋg) result in no domain narrowing or even rule death (predicted)?
- Test on Word Level rule
  - Can we elicit results in line with domain narrowing to SL? Predicted
  - Can we elicit results in line with domain broadening to PL? Not predicted: no evidence for suffix *[-ib] at WL

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Further avenues: Different rule?

Intervocalic (not coda) lenition: b → v / V __ V

- Morphosyntax creates 2 lenition environments @ PL
  - Pre V-initial suffix
  - Pre V-initial word
- But only one @ WL
  - Pre V-initial suffix only (word-final /b/ not resyllabified)
- And none at all @ SL
  - /pab/ → [pab] regardless of following suffix/word
- Here, domain narrowing reduces environments of application, gradually resulting in rule death
  - Probably with residue of forms showing rule, and notably morpheme-internally

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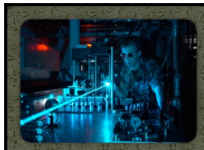
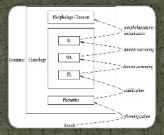


Experimental methods can help in historical research



The Life Cycle needn't rely on 'mystical pan-generational forces'

We can test the validity of the psycholinguistic underpinnings in the lab

Historical Linguistics at a complex cross-roads:
philology, theoretical linguistics, phonetics, psycholinguistics, sociolinguistics, language acquisition

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