

Cycle Psychology: Experimentally Testing the Life Cycle of Phonological Change

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The **Life-Cycle** model (e.g. Bermúdez-Otero 2015) claims that each sound change follows a defined pathway from start to finish, mimicking a biological life cycle; but whereas it might be clear why algae and butterflies show life cycles, why do sound changes behave this way without ‘mystical, pan-generational forces’ (Hale et al. 2015)? I present a methodology for testing the model’s purported psycholinguistic foundations.

A sound change begins with variation in speaking and listening, but then becomes increasingly entwined with grammatical structure in a process known as **domain narrowing**. Thus the /g/ originally at the end of English *sing* was deleted as a **Phrase-Level** rule (even across word boundaries) before consonants and phrase-finally, as it was barely perceptible there (e.g. *sing tunes*). During the eighteenth century, speakers ‘narrowed’ the rule to delete /g/ *word*-finally, extending its application to before words which began with vowels (e.g. *sing it*), rendering it a **Word-Level** rule. In Present-Day RP English, /g/ is further deleted *stem*-finally before a suffix beginning with a vowel (e.g. *sing-er*), known as a **Stem-Level** rule. The rule has now reached the end of its life cycle, as every instance of the stem *sing* has no final /g/, so infant learners can simply memorise this as its lexical representation.

The Life Cycle is hypothesised to be driven by a bias in language acquisition to reduce morpheme alternation. Generalisation unidirectionally narrows the domain of application of the process from phrase to word to stem, as learners over-apply the change to contexts where its original phonetic motivations are absent, e.g. final /g/ is more easily perceived before vowels than before consonants, but comes to be deleted before both. We can use the Artificial Language-Learning Paradigm (e.g. White 2013) to test whether inaccurate learning of a fabricated language in the laboratory can lead to domain narrowing. Participants are tested on their acquisition of a Phrase-Level (PL) rule where /b/ becomes [v] syllable-finally, and trained on 9 different morphemes: three /b/-final nouns, three /b/-final suffixes (female, male, plural), and three intransitive verbs. The suffixes and verbs consist of two consonant-initial and one vowel-initial item each, producing a ratio of 2:1 in favour of the rule operating on /b/. Each morpheme is combined with each other, yielding twenty-seven suffixed noun + verb sentences in the following combinations, with each short sentence containing two instances of underlying /b/:

	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 tumi/	[pab-iv tumi]	horse.plural eat	‘The horses eat’	NO – YES
(c)	/pab-teb ama/	[pav-teb ama]	horse.fem run	‘The mare runs’	YES – NO
(d)	/pab-teb tumi/	[pav-tev tumi]	horse.fem eat	‘The mare eats’	YES – YES

In the test phase, an additional verb beginning with a vowel provides an equal number of sentences with (‘control items’) and without (‘test items’) word-final b → v (18 each = 36). The participant is played two alternative sentences aloud, and asked to select which matches an image by pressing a button. One will be correct and, in the test items (vowel-initial verb), the other will present a version where the rule has occurred at Word Level, e.g. *[pav-tev ama] in (c). If learners accurately acquire the rule at Phrase Level, the error rates between test and control items are not significantly different. However, if participants make significantly more errors in test items than in control items, we might conclude that domain narrowing is occurring, with learners over-applying the rule at Word Level due to exposure to twice as many Phrase-Level changes as retentions in the training phase.

Further predictions can be tested by manipulating the frequencies in the training phase, and the type and environment of the sound change. By tackling the understudied role of inaccurate learning in language change using experimental techniques, the methodology provides a fundamental bridge between four subfields: theoretical phonology, historical linguistics, language processing, and language acquisition.

References

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