LENITION, FORTITION, AND WORD-RECOGNITION IN MAWNG AND IWAIDJA

Background. Most models of continuous parsing, like Shortlist B (Norris & McQueen, 2008), argue that speech recognition begins with the first incoming phoneme. This first segment and the following segments activate possible lexical competitors in the listeners vocabulary (Marslen-Wilson & Welsh, 1978; a top-down process), and progressively eliminate competitors that do not match the presented material (a bottom-up process). Most models assume that the incoming material will be delivered in '*a form suitable for accessing stored lexical entities'* (Cutler, 2008: 1602), and (unpredictable) variability in the initial segments of words thus poses a challenge to consider. Here, we tested speaker tolerance for word-initial phonological mutations in Iwaidja (Pym & Larrimore, 1979) and Mawng (Capell & Hinch, 1970). Both languages have grammatically conditioned initial mutations in verb and noun roots, resulting from lenition and fortition (Evans, 2000); see (1) and (2). These alternations are historical and lexicalised. Mawng also has synchronic external sandhi processes affecting initial segments at word boundaries: /g/ is lenited to [ɣ ~ ɯ ~ w] following vowels, liquids, and glides (Capell & Hinch, 1970: 44), as in (3a, c), whereas only /g/ is found following nasals and stops (3b, d). Iwaidja is not described with synchronic lenition of this kind.

Method. In a 2AFC experiment, we asked 11 speakers each of Mawng and Iwaidja (all bilingual in the other language) to indicate preference for one of two sequentially presented utterances, differing only in the first segment of the target noun (15 nouns; 60 trials). Stop-initial nouns were presented in canonical form versus a lenited continuant-initial form e.g. *baŋga* 'forked stick' vs. **waŋga*, while continuant-initial nouns were presented in canonical form and in an unattested stop-initial ('hardened') form, e.g. *wamba* 'shark' vs **bamba*. We also included two control items, consisting of minimal pair nouns differing in the initial segment (/b/ vs /w/), where both nouns were licit. Stimuli were presented in two frames ('*I see one X*' and '*I can see X*'): in one frame, the target followed vowel /a/; in the other, it followed /b/ (in Mawng) or /d/ (in Iwaidja). We presented the experiment in two counterbalanced versions: a 'natural' and a 'slow speech' version, generated by inserting of 500 ms of silence before the target noun.

Results. The results are presented in Figure 1. We fitted a series of GLMMs (binomial link) to the data, and the best fit model indicates that both groups prefer canonical forms over unattested 'hardened' forms (e.g. *wamba* 'shark' vs **bamba; p* < .001) and over lenited forms (e.g. *baŋga* 'forked stick' vs. **waŋga*; *p* = .001) though Mawng speakers have a lower preference for canonical forms in the lenited trials (*p* = .007) than in the hardening trials (*p* = .359). There was no effect of 'conditioning frame' or 'speech rate'. We fitted an additional GLMM for a confirmatory analysis of a Place of Articulation effect on the acceptability of lenited forms (Figure 2). This confirmed that Mawng speakers are particularly tolerant of lenition of the velar stop (significant intercept *p* < .001; significant interaction between Mawng and /g/, *p* = .013).

Discussion. The results are consistent with earlier reports that speakers of Mawng are tolerant of lenition of word initial /g/ (Capell & Hinch, 1970), but—in contrast to previous reports—also suggest that lenition in Mawng is not phonetically conditioned ('conditioning frame' and 'speech rate' *ns*). The results also demonstrate that speakers reject word-forms with initial lenition and fortition if the mutated forms result in collapse of phonological contrasts (/b/ → /w/, /j/ → /ɟ/, or vice versa), and that lenition from [g] → [ɣ ~ ɯ ~ w] in Mawng likely constitutes an exception from this pattern in being a case of free variation, with [g] as the typical realisation. Together, these findings demonstrate that word recognition in Mawng and Iwaidja does require input in '*a form suitable',* and that speakers' reluctance to accept deviant forms reflects both language-specific phonological and phonetic constraints, as well as the shape of the lexicon (including historical and lexicalized mutations). Finally, the results highlight that models of continuous parsing and word-recognition must include considerations of language specific phonetic distributions as well as phonological status, phonotactic distributions and frequencies, and the shape and characteristics of the lexicon.

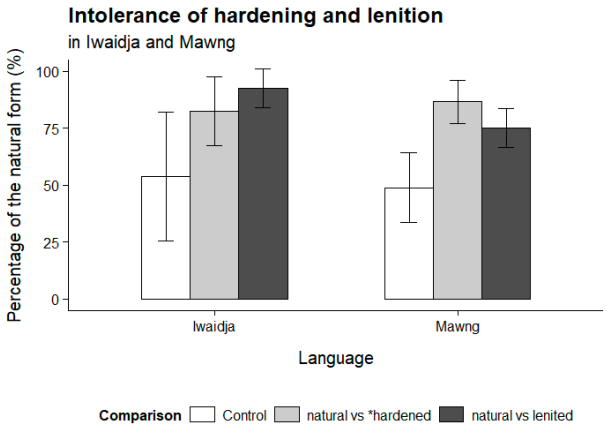

Figure 1. Mean preference results.

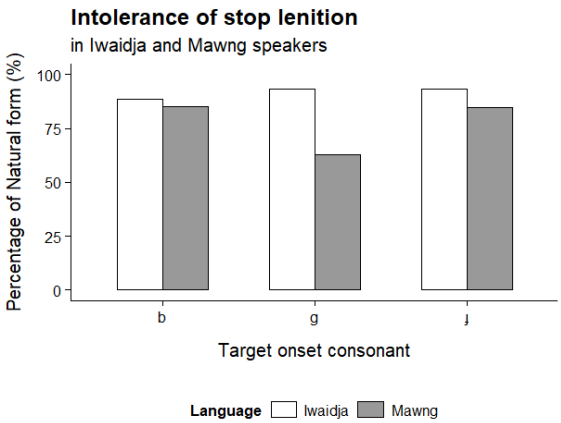

Figure 2. POA effects.

Initial mutation in Iwaidja (Mailhammer & Harvey, 2018:334), adapted transcription

(1)	a. ŋa-**w**ani-ŋan 1SG-sit-PST 'I was sitting'	b. Ø-**b**ani-ŋan 3SG-sit-PST 'He/She/It was sitting'.
(2)	a. a-**j**ama-ŋ 3PL-work-PRES 'They are working'	b. Ø-**ɟ**ama-ŋ 3SG-work-PRES 'He/she is working'

Word-initial velar stop lenition (Capell & Hinch, 1970), adapted transcription

(3)	a. ge it.goes	[g ~ ɰ]apala boat	c. mada VEG.the	[g ~ w]ubuŋ canoe
	b. gaɾgbin big	[g]apala /*ɰabala boat	d. marig NEG	[g]ubuŋ/*wubuŋ canoe

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