Jonathan A. Geary (jonathangeary@email.arizona.edu)
Confederated Tribes of the Umatilla Indian Reservation; University of Arizona

Assessing the evidence for lateral phonemes in River Yuman: Implications for Piipaash orthography

Introduction: Careful phonological analysis must inform the development of alphabetic writing systems. We consider the evidence for phonemic contrasts among lateral consonants within the members of the River branch of Yuman: Mojave, Quechan, and Piipaash, focusing on the latter. Prior analyses have posited a contrast between at least two lateral phonemes in each River language, and as a result the practical orthographies used for these languages have included two or more lateral graphemes. However, we find no evidence to support this: Prior analyses have failed to present evidence to support the contrastive nature of lateral segments (e.g. minimal pairs), often basing their phonemic inventories on earlier work comprising phonetic sketches and tentative phonological analyses without scrutiny. We suggest that variation among lateral segments in River Yuman stems from the considerable phonetic variability inherent in the production of lateral consonants, showing that even the same Piipaash speaker recorded at two dates three months apart exhibits considerable variability in their pronunciation of laterals. We argue for a single lateral phoneme that exhibits considerable phonetic variation, similar to lateral phonemes in other languages (e.g. English). We discuss the implications of this analysis for Piipaash orthography and language revitalization.

Writing systems: An alphabetic writing system aims to represent the sound system of a language, taking as its minimal unit orthographic characters that more-or-less correspond to individual phonemes (Perfetti and Dunlap 2008). A "good" alphabet is one which represents only these phonemically distinctive contrasts, balancing the representation of phonic variation with the needs of speakers who are fluent in the phonology of the language (Smalley 1959). Minimal pairs represent the gold standard for establishing the phonemes of a language: For instance, the segments [x, m] contrast in Piipaash *xat* 'dog' and *mat* 'earth', motivating the phonemes /x, m/ and justifying the use of unique letters to represent them orthographically.

Lateral consonants: Lateral segments are phonetically variable. Ladefoged and Maddieson (1996) summarize: (1) Lateral consonants vary considerably in their production within/across individual speakers, words, and phonetic contexts; (2) they are subject to considerable assimilatory and coarticulatory variation and position effects; and (3) due to their resonant nature and vowel-like acoustic structure, variation in their pronunciation is more noticeable to listeners than is variation among other types of consonants. A language with one lateral phoneme (e.g. English; Kirkham et al. 2020) will have many lateral speech sounds, and so special care must be taken to justify any contrast between lateral phonemes within a given language.

Laterals in River Yuman: Mojave (also spelled "Mohave"), Quechan (a.k.a. Yuma), and Piipaash (also spelled "Pee Posh", a.k.a. Maricopa) are members of the River branch of Yuman, a family of languages today spoken in Arizona, California, Baja California, and Sonora (Kroeber 1943; Miller 2018). Previous analyses have identified two lateral phonemes for Mojave (Munro 1976) and Piipaash (Gordon 1986), an alveolar lateral approximate /l/ and a palatal lateral approximate /lʸ/, and four for Quechan (Halpern 1946), adding voiceless alveolar and palatal lateral fricatives /ɬ, ɬʸ/. Kroeber (1911) remarks that palatal /lʸ/ is more common than alveolar /l/ in Mojave, a claim which we find holds for Piipaash as well based on counts from Crawford (1962) and Langdon et al. (1991), while Halpern (1946) notes that /ɬ/ is rare in Quechan.

However, said analyses have failed to support these contrasts. Despite its title, Halpern's (1946) *Yuma I: Phonemics* represents a phonetic sketch of Quechan, describing speech sounds and some systematic variation in their production, enumerating attested consonant clusters, etc. but without providing minimal pairs or other evidence to support posited phonemic contrasts. For Mojave, Munro (1976) cites Kroeber (1911), a sketch of Mojave "phonetic elements" that predates the notion of phonemes in Western linguistic circles. Munro (1976) and Gordon (1986) cite Wares (1968), whose work on Yuman consonantism set the stage for subsequent phonological analysis. Yet Wares cites no minimal pairs, identifying representative example words containing each phoneme that he posits for each language. Scrutinizing the data reveals only distant pairs for laterals (e.g. for Mojave, he notes that they "contrast" in *halʸúlʸ* 'to cook' and *hilóːl* 'to boil'). In an addendum to his fieldnotes (1962), he describes the Piipaash analysis in Wares (1968) as "tentative": We are aware of no subsequent work which has motivated a contrast among lateral phonemes.

Revisiting laterals in River Yuman: We surveyed the ~6,700-entry Mojave dictionary (Munro et al. 1992), a comparable Piipaash dictionary prepared by Langdon et al. (1991), the Yuman cognate sets in Wares (1968), and Piipaash archival fieldnotes (Crawford 1962, Wares 1962) for words containing lateral segments: We failed to find a single minimal pair contrasting /l, lʸ/ within a River language. Rather, across sources lateral segments vary considerably in their transcription as [l] or [lʸ]. Notably, Crawford (1962) and Wares (1962) interviewed the same Piipaash speaker three months apart:[1] Crawford and Wares disagree in their transcription of the lateral segment in 43% of words that contain a lateral and are shared across the two lists (13/30; i.e. Crawford records [lʸ] where Wares records [l] or vice versa; see Table 1 for examples). Crawford also records several Spanish loanwords with [lʸ] (e.g. *la mesa* > ***l***ʸ*amés* 'table'), suggesting a phonological adaptation not expected in a two-phoneme system, while Wares records one instance of the locative suffix, elsewhere [-lʸ], as [l]. These facts are consistent with Piipaash having one lateral phoneme /lʸ/ that exhibits great variation in its pronunciation. Indeed, some words are transcribed across sources more consistently with either [l] or [lʸ]: This simply indicates that considerable word-specific phonetic detail is represented lexically (Pierrehumbert 2002); it is not itself evidence for a phonemic contrast.

Table 1. Comparison of lateral transcriptions

Segments (*N*)	Crawford	Wares	Gloss
l ~ l (1)	xatə**l**əwíṣ	ʔxʌtʌ**l**ʌwé	'coyote'
l ~ lʸ (3)	ṣ**l**ɪʔáy	šʌ**l**ʸʔáy	'sand'
lʸ ~ lʸ (16)	čiməðú**l**ʸ	čʌmʌðú**l**ʸ	'ant'
lʸ ~ l (10)	xa**l**ʸtót	xʌ**l**tót	'spider'

Implications for Piipaash orthography and beyond: Informed by previous linguistic analyses (e.g. Gordon 1986), practical orthographies for Piipaash include two graphemes representing two different lateral consonants: *l* /l/, *ly* /lʸ/. This distinction has proven tricky for recent documentation and revitalization purposes (author observations; O'odham Piipaash Language Program Staff p.c.), and a phonetics workshop was held in 2019 to equip tribal staff and educators with the analytic skills to better handle this contrast (and others). The present study has argued that this distinction is superfluous: Piipaash has one lateral phoneme, not two, and so need only be written using one lateral consonant grapheme (tolerating, of course, variation in pronunciation). Maintaining a superfluous orthographic contrast serves only to weaken users' confidence in the written language, and so impede language revitalization efforts. Further, our research highlights issues in ascribing phonological significance to phonetic variation among speech sounds that tend to be phonetically variable within/across dialects, speakers, etc. (e.g. laterals, vowels; cf. Miller 2018).

References

Crawford, J. M. 1962. *Maricopa word lists* (unpublished). Mss.Ms.Coll.66, American Philosophical Society.

Gordon, L. 1986. *Maricopa morphology and syntax*. Berkeley, CA: University of California Press.

Halpern, A. M. 1946. Yuma I: Phonemics. *IJAL* 12: 25-33.

Kirkham, S., et al. 2020. A typology of laterals in twelve English dialects. *JASA* 148.

Kroeber, A. L. 1911. Phonetic elements of the Mohave language. *UCPAAE* 10: 45-96.

Kroeber, A. L. 1943. Classification of the Yuman languages. *UCPL* 1: 21-40.

Ladefoged, P., and I. Maddieson. 1996. Laterals. In *The sounds of the world's languages*, p.182-214.

Langdon, M., et al. 1991. *Maricopa – English dictionary*. SRPMIC Department of Education.

Miller, A. 2018. Phonological developments in Delta-California Yuman. *IJAL* 84: 383-433.

Munro, P. 1976. *Mojave syntax*. New York: Garland Publishing.

Munro, P., et al. 1992. A Mojave dictionary. *UCLA Occasional Papers in Linguistics* 10.

Perfetti, C. A., and S. Dunlap. 2008. Learning to read: General principles and writing system variations. In *Learning to read across languages*, p.13-38. New York: Routledge.

Pierrehumbert, J. B. 2002. Word-specific phonetics. In *Lab Phonology VII*, p.101-139. Berlin: De Gruyter.

Smalley, W. A. 1959. How shall I write this language? *The Bible Translator* 10: 49-69.

Wares, A. C. 1962. *Field notes on the Maricopa language* (unpublished). Introduction by Alan C. Wares added April 1978. MS 7292, National Anthropological Archives, Smithsonian Institution.

Wares, A. C. 1968. *A comparative study of Yuman consonantism*. The Hague: Mouton.

[1] In respect of traditional Yuman customs prohibiting naming the deceased, we do not use their name here.