Pathways of initial consonant loss: A Middle Paman case study

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1. Introduction

This paper investigates the historical loss of root-initial consonants, using a case study of Middle Paman languages (< Paman < Pama-Nyungan) of Cape York Peninsula, in northeastern Australia. Initial consonant loss is illustrated in (1) and (2) below, which show how reconstructed initials, also attested beyond Middle Paman, are lost in Middle Paman reflexes in Umpithamu, Yintyingka and Umpila.

(1) *tumu 'chest' (Proto-Paman, Alpher 2019, attributed to Hale); compare *dumu* 'chest' (Guugu Yimidhirr, Haviland nd)
   a. *umu* 'chest' (Yintyingka, Verstraete & Rigsby 2015)
   b. *umu* 'towards' (Umpila, Thompson 1988)

(2) *pa(:)ngkarra 'bluetongue lizard' (Alpher 2019); compare *banggarra* 'blue-tongue lizard' (Warrgamay, cited in Alpher 2019)
   a. *aangkarra* 'blue-tongue lizard' (Umpithamu, Verstraete 2020)
   b. *aangkay* 'lizard, blue-tongue' (Umpila, Thompson 1988)

So far, the literature has focused mainly on identifying phonetic causes of initial consonant loss, but this paper focuses on the actual process of initial loss. Specifically, the analysis shows that there are multiple pathways towards loss. Large-scale loss of initials in a language can be the result of a gradual phonetic process involving intermediate steps like consonant lenition, as is assumed in part of the literature, but it can also be due to more abrupt mechanisms involving borrowing and even morphosyntactic alternations.

The systematic loss of initial consonants is an unusual phenomenon, both from a typological and from a diachronic perspective. On the one hand, the phenomenon has a peculiar distribution: it is found in several parts of Australia, but is relatively rare from a world-wide perspective (Blevins 2007). In Australia, historical loss of initials, also known as 'initial dropping', is attested in areal patterns, with hotbeds in Cape York Peninsula (Hale 1976a, b, c, Alpher 1976), Northern New South Wales (Crowley 1976), and Central Australia reaching into South Australia (Koch 1997, Hercus 1979) (see Blevins 2001 for an extensive survey). Where it occurs, initial loss can have important structural consequences, like the far-reaching changes in root structure and phoneme inventory found in several Paman subgroups

in Cape York Peninsula (e.g. Hale 1976b, c; Verstraete 2018a, b). Beyond Australia, systematic loss of initials appears to be rare, with only a handful of reliably attested cases, for instance in Trans-New Guinea (Daniels 2010, 2015) and Sino-Tibetan (Handel 2003, Reinöhl forthcoming). On the other hand, initial loss is also challenging from a diachronic perspective: given the often-cited contrast between initial strengthening and final weakening (e.g. Hyman 2008), why and how would languages systematically lose initial consonants? The Australian cases in particular have produced a number of explanatory models, mainly based on factors that could initiate phonetic weakening of initials. Causal mechanisms proposed in the literature are based, for instance, on diachronic shift of stress away from the first syllable, on perceptual properties of specific consonant types in initial position, and/or or on phonetic properties of utterance-initial positions in general (e.g. Hale 1964, Hercus 1979, Blevins & Marmion 1994, Blevins 2001). The stress shift model first put forward by Hale (1964) appears to be the most relevant for the Middle Paman data discussed in this paper, but overall the question of phonetic causes remains open to some degree. Apart from the initiation of the process, however, there is a second diachronic question that remains largely implicit in the literature, viz. how exactly the process of initial consonant loss unfolds. There is little overt discussion of this question, but a common assumption appears to be that initial loss is the end point of a gradual process of weakening. This is most explicit in analyses of initial vowel loss (following initial consonant loss), most of which assume some kind of phonetic reduction as an intermediate step towards loss (see, for instance, Blevins & Garrett 1998: 527–528, Sommer 1999a: 9 and Dixon 2002: 589ff). There is less explicit discussion in the literature on initial consonant loss, but similar 'gradualist' assumptions can be found in some scenarios (see, for instance, Blevins 2001: 282-284, Fletcher & Butcher 2014: 111-112), where loss of initial consonants is preceded by an intermediate step of lenition, for instance with plosives like [p] or [c] leniting to glides like [w] and [j] before being lost altogether.

The question of pathways towards loss is the one that will be addressed in this paper, i.e. how exactly does initial consonant loss proceed? To answer this question, I will use data from three languages of the Middle Paman subgroup of Paman languages, Umpithamu, Yintyingka and Umpila. These languages are so-called 'sporadic' initial-dropping languages (as they are called Alpher 1976), which show a combination of loss and retention of initial consonants within their lexicon and therefore form an interesting 'laboratory' to investigate the process of loss in detail. On the basis of a historical-comparative analysis, I will show that these languages fall into two quite distinct types, which followed different paths towards initial consonant loss. For Umpithamu, I will argue that there is good evidence for a gradual

phonetic process, with an intermediate step of initial consonant lenition leading to loss. For the other two languages, by contrast, I will show that there is no evidence for gradual development, and that a more abrupt mechanism based on borrowing has to be invoked. Beyond the Middle Paman languages that are the focus of this paper, I will also bring in evidence from a neighbouring subgroup of Paman to show that developments affecting initial vowels – following initial consonant loss – need not be gradual either, thus contributing to a more diversified model of how languages can lose initial segments.

The argument is structured in four parts. Section 2 briefly discusses the data used in this study. Section 3 is a historical-comparative analysis of initial loss and lenition in Umpithamu, Yintyingka and Umpila, which shows that a model of gradual phonetic development can really only work for Umpithamu. Section 4 focuses on Yintyingka and Umpila, showing that initial loss in these languages can most likely be attributed to an alternative mechanism, viz. borrowing of initial-dropping or -leniting forms from neighbouring languages rather than any language-internal pathway of lenition and loss. Section 5 brings in evidence from Lamalamic, a neighbouring subgroup of Paman, which shows complete loss of initial consonants, but has a combination of retention and loss of the remaining initial vowels. The analysis shows little or no evidence for any gradual development of initial vowel loss and instead proposes a morphosyntactically driven process, which again contributes to the case for a more diversified model of initial loss. Section 6 rounds off with a conclusion.

2. Data and significance

2.1. Data

This paper uses data from six languages of Cape York Peninsula in northeastern Australia, all of which belong to the Paman subgroup (Hale 1964, 1966) of Pama-Nyungan languages (Alpher 2004a, b; Bowern & Atkinson 2012). Umpithamu, Yintyingka and Umpila, discussed in sections 3 and 4, belong to the Middle Paman subgroup of Paman (Hale 1976a), specifically the Eastern Middle Paman subgroup as defined in Verstraete & Rigsby (2015). Umbuygamu, Lamalama and Rimanggudinhma, discussed in section 5, together form the Lamalamic subgroup of Paman (Laycock 1969, Rigsby 1997, Verstraete 2018a). Figure 1 below provides a (simplified) representation of genetic relations, while Figure 2 provides rough relative locations on the map (see Rigsby 1992 for more details).

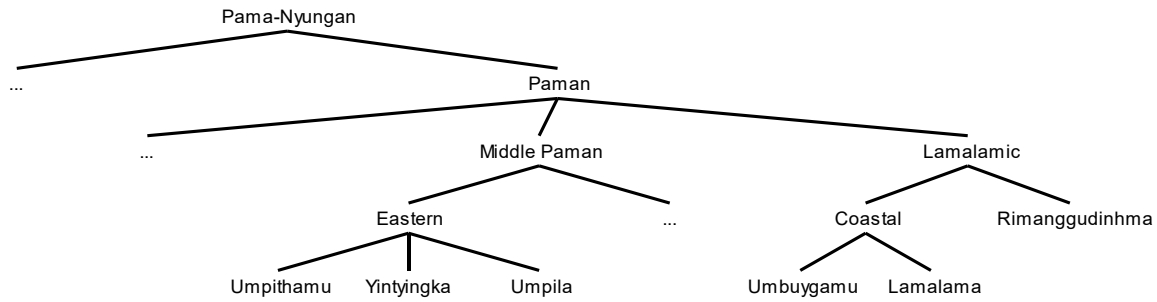


Figure 1: Genetic relations of the languages studied

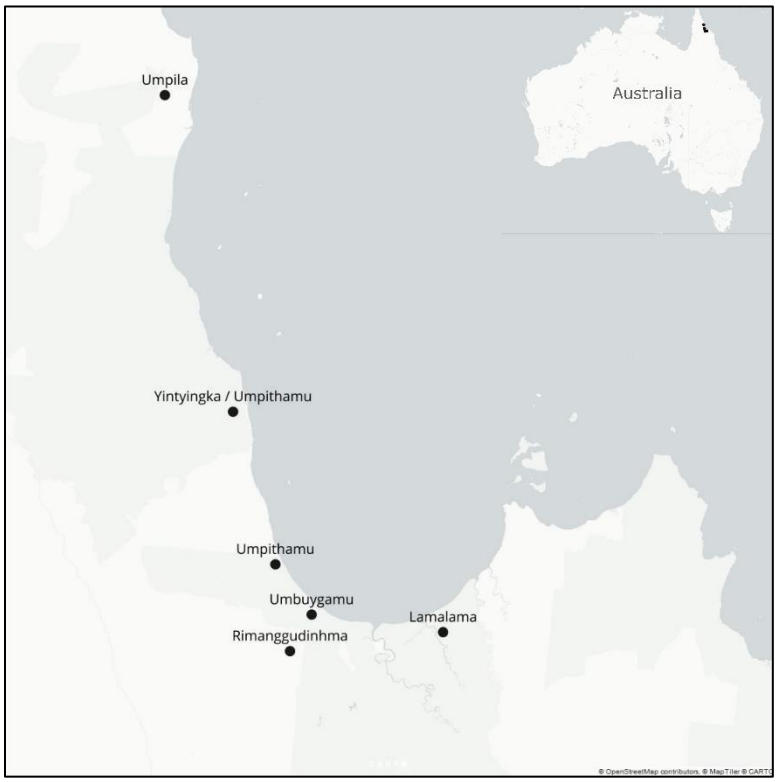


Figure 2: Locations of the languages studied

Data used in this paper come from the author's own fieldwork for Umpithamu, Umbuygamu and Lamalama, and the author's transcriptions of archival materials for Yintyingka (jointly with Bruce Rigsby) and Rimanggudinhma. Umpila material comes from the lexicon in Thomson (1988), with cross-checking from Hill (nd, 2018). Other published sources on the languages are Verstraete (2020) for Umpithamu; Verstraete & Rigsby (2015) for Yintyingka; Ogilvie (1994), Sommer (1998) and Verstraete (2019a) for Umbuygamu; Sommer (1999a) and Verstraete (2019b) for Lamalama; and Godman (1993) and Sommer (1999b) for Rimanggudinhma. Reconstructions used in this paper are from Hale (1976a, b, c) for Proto-Paman and from Alpher (2004b, 2019) for Proto-Pama-Nyungan (as well as some

reconstructions from Alpher 2019 without a specified or specifiable level of reconstruction, often but not always at a relatively local scale, for instance below Proto-Paman).

Data are provided in standard Australianist orthography, i.e. with digraphs for lamino-dentals (<th>, <dh>, <nh>), lamino-palatals (<ty>, <dy>, <ny>), velar nasals (<ng>) and trills (<rr>, versus <r> for alveolar glides), as well as <'> for glottal stops and <y> for palatal glides. Homorganic nasal-plosive clusters are orthographically simplified, e.g. <nth> instead of <nhth>. Lamalamic languages have a relatively large inventory of consonants for Australian languages: special symbols used are <f>, <θ>, <sh> and <h> for bilabial, dental, palatal and glottal fricatives, respectively, as well as <rh> for voiceless trills and <ð> for dental glides. In reconstructed forms, <c> and <ñ> represent the reconstructed laminal set (following Alpher 2004a: 107).

2.2. Significance

As already mentioned, the languages studied here represent a combination of loss and retention of initial consonants and/or initial vowels, which makes them an interesting laboratory for the study of initial loss. Table 1 below provides an overview of the languages, with their relevant properties. The three Middle Paman languages all combine retention and loss of initial consonants in their lexicon, also known as 'sporadic' initial dropping in the literature (Alpher 1976). These will be used in sections 3 and 4 to model the pathways leading to initial consonant loss. The Lamalamic languages, by contrast, are 'fully' initial dropping (see Verstraete 2018a, b), which means they are of little interest to the question how initial consononant loss proceeds. However, they do show a combination of retention and loss of the remaining initial vowels: this property will be used in section 5 to demonstrate that initial vowel loss is not necessarily a gradual process either.

		Initial C retention	Initial C loss, V retention	Initial CV loss	
Middle Paman	Umpila	+	+	-	Sporadic initial dropping ➔ modelling C loss
	Yintyingka	+	+	-	
	Umpithamu	+	+	-	
Lama-lamic	Umbuygamu	-	+	-	Full initial dropping ➔ modelling V loss
	Rimanggudinhma	-	+	+	
	Lamalama	-	-	+	

Table 1: Initial loss in Middle Paman and Lamalamic

3. Historical-comparative analysis of loss and lenition

Umpithamu, Yintyingka and Umpila are all 'sporadic' initial-dropping languages, which means they have both retention and loss of initials in their lexicon. In this section, I use historical-comparative evidence to show that they fall into two quite distinct types. In Umpithamu, instances of initial loss are pervasive, phonetically systematic, and there is language-internal evidence for lenition, all of which is compatible with the 'gradualist' model of initial loss that appears to be implicit in part of the literature. In Yintyingka and Umpila, by contrast, initial loss is less pervasive, and there is no evidence for any phonetic systematicity or language-internal processes of lenition, which is not compatible with any gradualist model, as will be discussed in more detail in section 4. In what follows, I discuss the three different criteria I use to make this distinction: the amount of lexicon affected in section 3.1, phonetic systematicity in section 3.2 and the presence of initial lenition in section 3.3.

3.1. Amount of lexicon affected

The basic criterion to calculate the amount of lexicon affected by initial consonant loss is fairly simple. Proto-Paman and Proto-Pama-Nyungan word forms are assumed to be almost uniformly consonant-initial (e.g. Hale 1964, Alpher 1976, O'Grady 1998). This is confirmed by the most extensive published lists of reconstructions. Hale's (1976a, b, c) lists of Proto-Paman reconstructions do not contain any vowel-initial forms. There are a few reconstructions where the nature of the initial consonant cannot be determined with any certainty, but the assumption is that there was one (reflected in an abstract initial *C in the reconstruction); in

some cases specific properties of reflexes (like vowel patterns) point to the identification of at least a specific phonological feature for the reconstructed *C. The same applies to Alpher's (2004b) list of Proto-Pama-Nyungan reconstructions, which does not contain any reconstruction with an initial vowel.[1]

Given that proto-forms are uniformly consonant-initial (and that there is no evidence for vowel prothesis), any vowel-initial form in the lexicon of the languages studied here is almost certainly the result of historical loss of initial consonants. This results in the figures listed in Table 2 below, based on counts of roots (obviously excluding any derived and compound forms) in Verstraete (2020) for Umpithamu, Verstraete & Rigsby (2015) for Yintyingka, and Thompson (1988) for Umpila.

	Percentage of lexicon affected
Umpithamu	40 %
Yintyingka	13 %
Umpila	12 %

Table 2: Amount of lexicon affected

There is a clear difference between Umpithamu on the one hand, where about 40 percent of the roots are vowel-initial, and Yintyingka and Umpila on the other, where a bit over 10 percent are vowel-initial. In other words, initial loss is pervasive in Umpithamu, but much less so in Yintyingka and Umpila. And even if 12 or 13 percent still looks like a significant portion of the lexicon, the underlying difference between the two sets of languages is further revealed by the historical-comparative evidence discussed in the next two subsections.

3.2. Systematicity of initial consonant loss

This section investigates in how far initial consonant loss is predictable or systematic on phonetic grounds. This question is operationalised in two ways: (i) by investigating attested retention or loss in a historical-comparative analysis, and (ii) by looking at the distribution of initials in the synchronic lexicon.

[1] Alpher (2019), an unpublished document containing the largest number of proposed reconstructions in the domain, has a total of three vowel-initial reconstructions. In at least two cases, however, the relevant form appears to be an intermediate-level reconstruction reflecting a deeper-level consonant-initial form.

To begin with Umpithamu, there is a clear pattern in retention and loss of initials on both of the criteria. First, attested instances of retention versus loss or lenition of initials show clear phonetic systematicity: sonorants are largely retained, whereas obstruents are largely lenited or lost. Velar plosives are more or less evenly divided between loss and retention, which may suggest they are the last obstruent to have undergone initial loss. Table 3 below provides a breakdown for reconstructed initials, with one example each. The patterns in this table are based on an examination of all roots for which reconstructions or cognates are available that allow one to determine retention versus loss or lenition of initials, as documented in the historical-comparative information available in Verstraete (2020).

	Process	Example	
		Reconstruction	Umpithamu
*m	retained	*manta ‘small’ (Alpher 2019)	*manta* ‘child’
*ng	retained	PPN *nguku ~ nguki 'water' (Alpher 2004a)	*ngoki* ‘water’
*ñ	retained	*ñuñu ~ ñuña '3SgAcc' (Alpher 2019)	*nhunha* ‘other’
*n	(insufficient data)	-	
*w	retained	PP *wari- 'to dig' (Hale 1976a)	*wa’in* ‘dig’
*y	retained	PP *yica- 'put' (Alpher 2019, attributed to Hale)	*yithan* ‘leave’
*p	lost or lenited	PP *pukan 'grass' (Alpher 2019, attributed to Hale) PP *pungku 'knee' (Hale 1976a)	*ukan* ‘bulguru’ *wungku* ‘knee’
*k	lost or retained	PPN *kacin 'digging stick' (Alpher 2004a) PP *kalu- ~ kali- 'carry' (Alpher 2019)	*athin* ‘digging stick’ *kalin* ‘take, bring’
*c	lost or lenited	PP *cunu 'one' (Alpher 2019) PP *cuma 'fire' (Hale 1976a)	*onongkol* ‘one *yuma* ‘fire’
*t	lost	PPN *taaku 'ground' (Alpher 2004a)	*aakurru* ‘ground, place’

Table 3: Patterns of attested retention or loss in Umpithamu, by reconstructed initial

All of these patterns have a handful of exceptions, some of which can be attributed to a principle of paradigmatic pressure. There are two word classes that have lost initial consonants throughout, regardless of the nature of the initial. All kinterms have lost initials (or lenited *c in two cases): this includes obstruent initials that are regularly lost, like *p in

(2a), but also sonorant initials that are normally retained, as shown in (2b-d) below. The second class are pronouns, all of which are vowel-initial, again regardless of the original initial involved. As shown in (3) below, this includes sonorant initials that are normally retained.

(2) Generalised initial loss in Umpithamu kinterms

a.	*apitha* ‘cross grandparent’	PP *papi ‘father’s mother’ (Hale 1976a)
b.	*athithunu* ‘grandchild type’	PPN *ngaci 'mother's father' (Alpher 2004b)
c.	*iilatha* ‘younger sister’	PP *wiila ‘younger sister’ (Verstraete 2020)
d.	*apatha* ‘older sister’	PPN *yapa 'sister (older)' (Alpher 2004b)

(3) Generalised initial loss in Umpithamu pronouns

a.	*aliya* ‘1 dual inclusive nominative’	PPN *ngali 'we INDU' (Alpher 2004b)
b.	*inuwa* ‘2 singular nominative’	PPN *ñinu '2nd sg oblique' (Alpher 2004b)
c.	*ula* ‘3 dual nominative’	PPN *pula ‘they DU’ (Alpher 2004b)
d.	*ayuwa* ‘1 singular nominative’	PPN *ngayu ‘I’ (Alpher 2004b)

These two sets of words do not exhaustively explain the list of exceptions, but the residue is small enough to look like the typical set of exceptions found with sound change.[2] The predominant pattern is that of sonorants being retained and obstruents being lost or lenited, with velar plosives halfway between the two.

The same pattern is also reflected in the distribution of initials in the synchronic lexicon. Examining all roots listed in Verstraete (2020), again excluding compounds and derived terms, results in the distribution listed in Figure 3 below.

[2] The residue is about 8.5 percent, i.e. 27 out of a total of 316 roots for which reconstructions or cognates allow one to determine retention, lenition or loss of initial consonants.

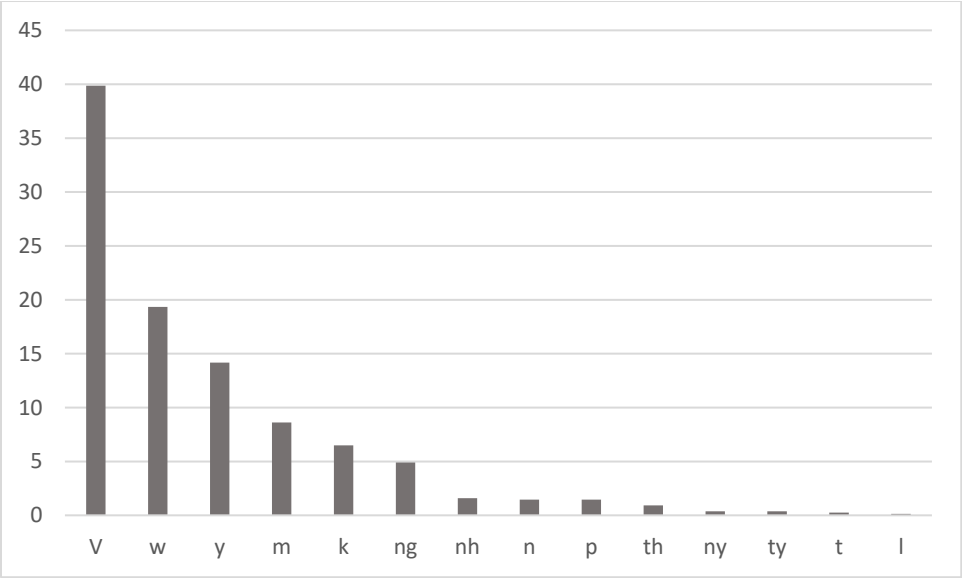


Figure 3: Distribution of initials in the Umpithamu lexicon (percentages)

The predominance of initial vowels reflects the pervasiveness of initial consonant loss, and the elevated numbers of the two glides within the sonorants are the result of initial lenition (see below in section 3.3). The rest of the numbers can be looked at in several ways. First, in terms of ordering, all of the obstruents are at the lower end of the scale, with the exception of the velar plosive, which was shown above to allow both retention and loss. This corresponds nicely with the historical-comparative evidence that obstruents tend to be lost as initials; the very low numbers involved again confirm the status of retained initial obstruents as exceptions to sound change. By way of comparison, Figure 4 lists the distribution of initials in Hale's (1976a) Proto-Paman reconstructions, where obstruents are the most frequent type of initial.

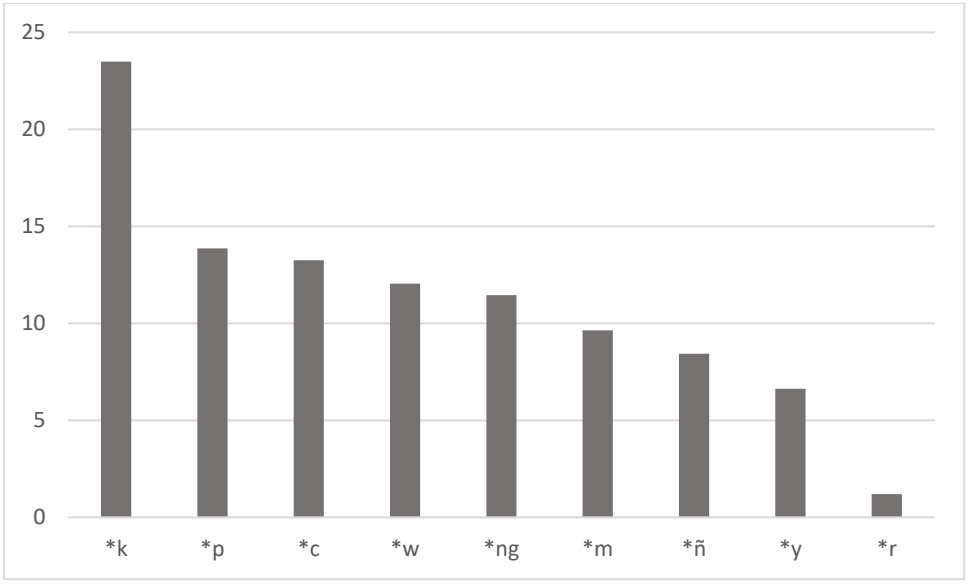


Figure 4: Distribution of initials in Hale's (1976a) Proto-Paman reconstructions (percentages)

Second, in terms of numbers there seems to be a break between velar nasals and the rest in Figure 3, which are at very low numbers between 0.1 and 1.5 percent of the total number of roots. These low numbers include the four remaining obstruents, which is in line with expectations, but they also include some sonorants, which requires some discussion. The presence of *n* and *l* at the lower end of the scale is unsurprising from a phonotactic perspective: apico-alveolars are generally rare in initial (as opposed to medial) position in Pama-Nyungan languages (see Dixon 1980, Hamilton 1996, Baker 2014). The small difference between *n* and *t* in the synchronic lexicon could relate to retention versus loss, but as mentioned in Table 3 above, the number of roots with reconstructions and cognates is too small to say anything definite about *n*. The low numbers for laminal nasals are somewhat more surprising.The reconstructed laminal set is typically reflected as a lamino-dental, so lamino-palatal *ny* is expected to be rare (most likely originating in borrowing), but the low number for lamino-dental *nh* is not clearly motivated, especially since initial laminal nasals do not appear to be exceptionally rare as compared to other initials in the set of reconstructions in Hale (1976a; see also Figure 4 above). One factor that could play a role here is a set of apparently irregular instances of initial apicalisation of laminals like the ones listed in (4) below.

(4) Initial apicalisation in Umpithamu

a.	*niinan* 'sit'	PPN *ñiina- 'sit' (Alpher 2004b)
b.	*nuumun* 'smell'	PPN *ñuuma 'smell' (Alpher 2004b)

Overall, however, the synchronic distribution of initial consonants in the lexicon is largely in line with the historical-comparative pattern that suggests retention for sonorants and loss or lenition for obstruents, with velar plosives in between.

Turning to instances of initial loss in Umpila and Yintyingka, we do not see the same type of phonetic regularity as in Umpithamu, again on both criteria. To begin with the historical-comparative criterion, all consonant classes are typically retained; there is no more than a handful of instances of attested loss, with no obvious phonetic pattern, as shown in (5) and (6) below (*T represents a non-nasal apico-alveolar). In Umpila, 21 out of 114 vowel-initial roots allow reconstruction of an initial either with some degree of certainty (13 instances) or with some probability (8 instances). In Yintyingka, 13 out of 58 vowel-initial roots allow reconstruction of an initial either with some degree of certainty (9 instances) or with some probability (4 instances). The numbers in (5) and (6) are too small to draw any firm conclusions, but there does not seem to be any obvious phonetic pattern. In other words, from a historical-comparative perspective there does not appear to be any phonetic motivation behind initial loss in these languages.

(5) Attested initial loss in Umpila[3]

a. Probable cases: *m 1, *n 1, *y 1, *w 2, *r 2, *p 1, *k 1, *t 3, *T 1

b. Possible cases: *m 1, *ng 1, *p 1, *k 4, *t 1

(6) Attested initial loss in Yintyingka[4]

[3] The probable cases for Umpila are (Umpila forms from Thompson 1988): *il'a* 'light'~ *milta 'spark' (Alpher 2019); *achu* 'if' ~ PP *naca 'apprehensive' (Verstraete 2020); *aachinya* 'light/heat (v)' ~ PP yaaci- 'burn' (Alpher 2019); *atapa* 'river' ~ PP *watapa 'river' (Alpher 2019, attributed to Hale); *uungka* 'song type' ~ Wik Ngathan *wuungk* 'female mourning style' (Sutton 1995); *aampayi* 'father-in-law' ~ PPN *ra(:)mparra 'father in law' (Alpher 2019); *ungkaana* 'cry/sob/weep' ~ PPN *rungka 'cry' (Alpher 2004); *aangkay* 'lizard, blue-tongue' ~ *pa(:)ngkarra 'blue-tongue lizard' (Alpher 2019); *acha* 'shallow' ~ *kaca+ 'coral' (Alpher 2019); *uutu* 'tree type' ~ *tuutu 'beefwood (*Grevillea* sp)' (Alpher 2019); *umu* 'towards' ~ PP *tumu 'chest' (Alpher 2019, attributed to Hale); *anchi* 'hole in ground' ~ *tañci 'hole' (Alpher 2019); *awu* 'spirit, bad/evil' ~ *Tawa/*Tawu 'totemic site' (Alpher 2019).

[4] The probable cases for Yintyingka are (Yintyingka forms from Verstraete & Rigsby 2015): *angku* 'here' ~ PP *ngungku 'there' (Hale 1976a); *errke-* 'talk, speak' ~ PP *yirrka- 'speak' (Hale 1976a); *atapa* 'river' ~ PP *watapa 'river' (Alpher 2019, attributed to Hale); *aampayi* 'father-in-law' ~ PPN *ra(:)mparra 'father in law' (Alpher 2019); *olpo* 'bone barb of a long spear or a harpoon head' ~ *kulpu 'message stick' (Alpher 2019); *umu* 'chest' ~ PP *tumu 'chest' (Alpher 2019, attributed to Hale); *ilpa* 'scar, cicatrice' ~ PP *tilpa 'cicatrices' (Alpher

a. Probable cases: *ng 1, *y 1, *w 1, *r 1, *k 1, *t 3, *T 1
b. Possible cases: *k 3, *c 1

A broadly similar view emerges when examining the distribution of initials in the synchronic lexicon. Distributions are listed in Figure 5 and 6 below, based on counts of all roots in Thompson (1988) for Umpila and Verstraete & Rigsby (2015) for Yintyingka, again of course excluding compounds and other complex forms.

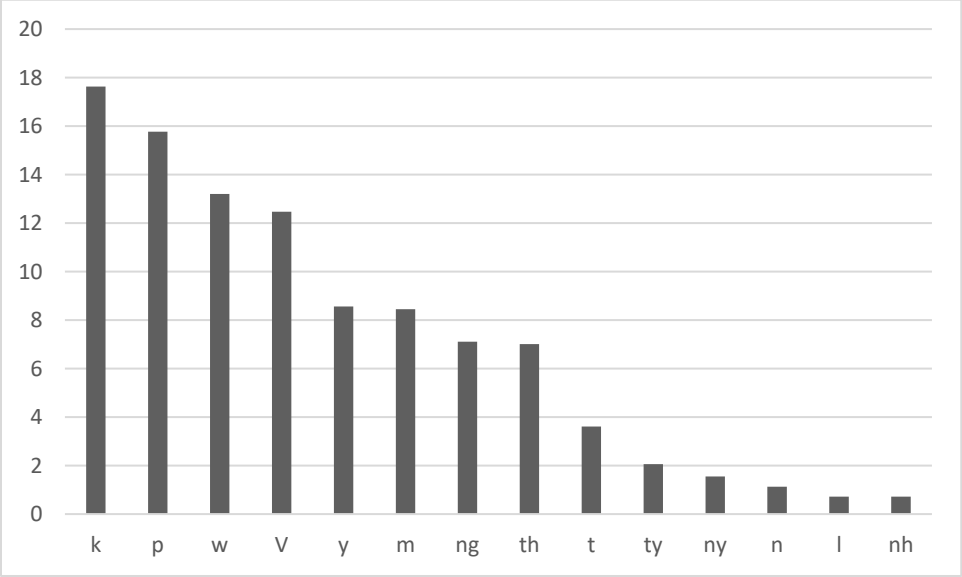
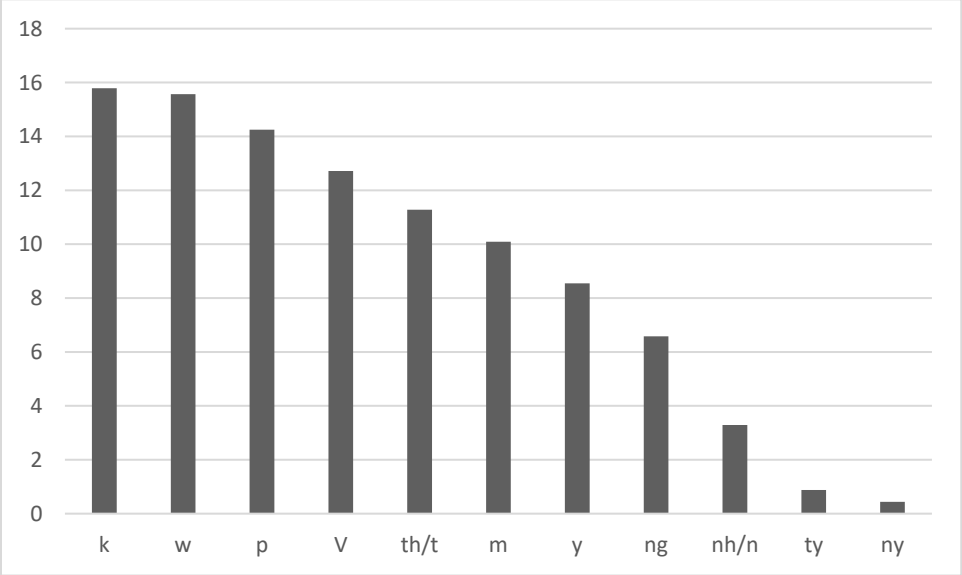


Figure 5: Distribution of initials in the Umpila lexicon (percentages)



2019); *awu* ‘devil’ ~ *Tawa/*Tawu 'totemic site' (Alpher 2019); *epa* ‘antbed’ ~ PPN *tipa ‘termite mound’ (Alpher 2004b).

Figure 6: Distribution of initials in the Yintyingka lexicon (percentages)

Vowel-initial roots are not particularly pervasive, as already mentioned, and unlike in Umpithamu the scale is not topped by sonorants: the most common initials are in fact the peripheral plosives (as in Proto-Paman reconstructions, see Figure 4 above) and the labial glide, in both languages. At the other end of the scale, at least for Umpila, apico-alveolars[5] are among the least common initials, which is expected phonotactically for a Pama-Nyungan language (see above). Laminal nasals are again unexpectedly low on the scale, which may suggest this is an (as yet unexplained) Middle Paman characteristic. Neither of these features can be determined with any certainty for Yintyingka because most of the data come from archival sources that do not allow us to distinguish between apico-alveolar or lamino-dental plosives and nasals (see Verstraete & Rigsby 2015: 47-48, 97-101), hence the composite numbers for *th*/*t* and *nh*/*n* in Figure 6. In spite of these minor uncertainties, however, the overal pattern is clear, and evidently different from Umpithamu: initials in Umpila and Yintyingka are predominantly retained, and there is no obvious phonetic pattern in the attested cases of loss.

3.3. Lenition

The final point of difference between the three languages concerns lenition: there is good evidence for a structural presence of initial lenition in Umpithamu, while there is not for the other two languages. Again, the evidence comes both from historical-comparative analysis and from the distribution of initials in the synchronic lexicon.

In Umpithamu, there is solid historical-comparative evidence for lenition of initial *c and *p to *y* and *w*, respectively.[6] In the set of forms for which initials can be identified through reconstructions and cognates, *c and *p can either be lenited or lost. There is no obvious pattern as to which cases are lenited or lost, but in both cases instances of attested

[5] The relatively high number of apico-alveolar plosives may reflect a transcription issue in the source, as quite a few of the actual forms would be expected to have a laminal initial from a historical-comparative perspective.

[6] There is no evidence for lenition of the other plosives *t and *k. It is not clear why this is the case: the absence of an equivalent glide in the system may be a factor for *k (as suggested by a reviewer), though lenition of *k to *w* is attested elsewhere in Australia (e.g. Blevins & Marmion 1994).

lenition are about twice the number of instances of attested loss. Examples of lenition are listed in (7) and (8) below.

(7) Lenition of *c to *y* in Umpithamu

a.	*ya'u* 'foot'	PP *caru 'foot' (Hale 1976a)
b.	*yinthu* 'down'	PP *ciñcu 'near' (Hale 1976a)

(8) Lenition of *p to *w* in Umpithamu

a.	*warrpurru* 'maggot'	PP *parrpu 'maggot' (Verstraete 2020)
b.	*wilu* 'hip'	PPN *pilu 'hip' (Alpher 2004b)

Lenition is also nicely reflected in the distribution of initials in the synchronic lexicon. As shown in Figure 3 above, there is a clear over-representation of lenition targets *y* and *w*: they are, in fact, the two most frequent initial consonants in Umpithamu, about twice as frequent as the next type of initial. This is due to the fact that the figures for initial *w* and initial y in the synchronic lexicon cover both roots that continue initial *w and *y and roots where initial *p and *c have been lenited to *w* and *y*.

The picture is entirely different for Umpila and Yintyingka. Unlike with Umpithamu, there is no historical-comparative analysis for the entire lexicon, but I have examined all *y*- and *w*-initial forms in both languages to detect historical lenition. In Yintyingka, among the 54 *y*- and *w*-initial roots for which reconstructions or cognates are available, there is only one single correspondence suggesting *c-lenition in Yintyingka, listed in (9) below, and none suggesting *p-lenition. The same applies to Umpila, though with somewhat higher numbers: among the 59 *y*- and *w*-initial forms for which reconstructions and cognates are available, there are five correspondences suggesting *c-lenition, two of which are listed in (10) below, and none suggesting *p-lenition. The few correspondences suggesting *c-lenition can actually be attributed to borrowing rather than any language-internal process, as discussed in section 4.2 below.

(9) Lenition in Yintyingka

yampa- 'lift up, raise'	PP *campa 'give, throw' (Hale 1976b)

(10) Lenition in Umpila

a.	*yaami* 'mother-in-law'	PPN *caami 'mother-in-law' (Alpher 2004b)
b.	*yuli* 'woomera'	PP *culi 'spearthrower' (Hale 1976a)

Again, the absence of lenition as a systematic process is also reflected in the synchronic distribution of initials. Unlike in Umpithamu, lenition targets *y* and *w* are not over-represented in any way, as shown in Figures 5 and 6 above.

To conclude, then, Umpithamu has good indications for a systematic process of lenition, whereas Yintyingka and Umpila do not. Together with the characteristics discussed in the previous sections, this further confirms that initial loss in Umpithamu is of a different kind than in Yintyingka in Umpila, as will be discussed in the following section.

4. Alternative models for initial consonant loss

4.1. Internal systematicity and the gradualist model

The properties that set apart Umpithamu from the other two languages suggest two things. One is that initial loss is a systematic, phonetically driven process in Umpithamu, such that initial sonorants are mostly retained, and initial obstruents are mostly lost or lenited, resulting in a largely sonorant-initial lexicon. The precise nature of the phonetic causes are beyond the scope of this paper, except perhaps to note that a link with stress shift could be entertained, given that Umpithamu mostly has a distinct stress pattern for vowel-initial roots.[7] The other point is that differentiation between sound classes probably reflects some degree of graduality, in two ways. On the one hand, the presence of lenition in addition to loss for *c and *p suggests that it is plausible to assume that lenition is an intermediate step towards loss for at least some classes of sounds. On the other hand, the simultaneous presence of two outcomes for *c, *p and *k (loss and lenition or loss and retention) suggests that the process of initial loss is 'caught in the middle', and that loss may be in its initial stages relative to lenition or retention (as reflected in a proportion of about 1 to 2 in all cases, see section 3.1 above).[8] Both of these features fit the basic assumptions about gradual phonetic development in the literature. Studying more languages in this way will not only help to test the relevance

[7] This is examined in more detail in Verstraete (ms), which demonstrates that the situation is more complex than assumed the classic models of stress shift (e.g. Hale 1964), with stress shift just as much a consequence as a cause of initial consonant loss.

[8] The process does not appear to be 'active' at the moment of recording, as reflected in the fact that English loans are not affected and that there is no significant inter-speaker variation (except for one instance with initial *k*, viz. *ka'anta* versus *a'anta* for 'hiccups'). This could reflect a genuinely stalled process of change, or it could be attributed to the moribund nature of the language.

of the gradualist model, but it will probably also bring out further diversity, with more than one path towards initial loss even within gradualist models of loss (as suggested in Blevins & Marmion 1994 and Blevins 2001).

4.2. External systematicity and a more abrupt model

The properties outlined for Yintyingka and Umpila do not really fit gradualist models of loss. As mentioned above, they have a much smaller proportion of the lexicon affected by initial loss, there is no phonetic systematicity in which initials are lost, and there is no evidence for any systematic process of lenition. So the lack of systematicity suggests that initial loss has not come about through any language-internal phonetically driven process. However, there is an alternative model that can make sense of initial loss in these languages, and that is external rather than internal. While vowel-initial forms in Yintyingka and Umpila do not show any coherence among themselves, they are systematic in an external sense, in their relation to (apparent) cognates in initial-dropping neighbours: vowel-initial forms in Yintyingka and Umpila invariably have vowel-initial matches in neighbouring languages. This is the expected pattern for fully initial-dropping neighbours where vowel-initial forms are the default, but it is not for sporadic initial-dropping ones like Umpithamu, where the lexicon is a mix between vowel- and consonant-initial forms. Crucially, matches with Umpithamu forms even include exceptions to the sonorant-obstruent divide discussed in the previous section, as well as instances of lenition. All of this strongly suggests a scenario of borrowing as the origin of vowel-initial forms in Umpila and Yintyingka. This also makes sense in geographic terms, because Yintyingka and Umpila are almost completely surrounded by initial-dropping languages: not just 'sporadic' initial-dropping ones like Umpithamu (Middle Paman), but also 'full' initial-dropping ones like Rimanggudinhma (Lamalamic) and Olkola (Southwest Paman, Hamilton 1997) in the southwest, and Yinwum and Mbiywum (Northern Paman, Hale 1976b) in the northeast.

In this section I discuss some of the details of the relevant matching items, to flesh out the borrowing scenario. 'Match' is used here as a cover term for sets of apparently related forms, regardless of whether similarity originates in shared descent or contact. The focus is on correspondences with Umpithamu, not just because it offers the largest number of matches for both languages, but more importantly because it is the only sporadically initial-dropping neighbour for Umpila and Yintyingka. Because of its mix of vowel- and consonant-initial roots, systematicity in matching initials can be used as a diagnostic of borrowing. By way of

comparison, consonant-initial forms in Yintyingka and Umpila do not show any systematicity in matches with Umpithamu: consonant-initial forms can have consonant-initial, lenited or vowel-initial matches in Umpithamu, as shown in (11) and (12) below. This is simply a reflection of the basically retaining nature of initial consonants in Yintyingka and Umpila: initials that are retained, lost or lenited in Umpithamu will normally be retained in Yintyingka and Umpila.

(11) Yintyingka: matches for consonant-initial forms (illustrative)

	Yintyingka (Verstraete & Rigsby 2015)	Umpithamu (Verstraete 2020)
a.	*kuuthi* 'two'	*uuthirri* 'two'
b.	*patha-* 'eat'	*athan* 'eat'
c.	*purrka* 'dust'	*wurrkan* 'dust'
d.	*thaami* 'mother-in-law'	*yaami* 'mother-in-law'
e.	*ma'u* 'cloud'	*ma'u* 'cloud'
f.	*kuntu* 'three'	*kuntu* 'three'

(12) Umpila: matches for consonant-initial forms (illustrative)

	Umpila (Thompson 1988)	Umpithamu (Verstraete 2020)
a.	*kuuku* 'language'	*uuku* 'language'
b.	*pathana* 'bite'	*athan* 'eat'
c.	*pilu* 'hip'	*wilu* 'hip'
d.	*thi'a* 'liver'	*yipa* 'liver'
e.	*matha* 'seaweed on reef'	*matha* 'seagrass'
g.	*kangkul* 'elbow'	*kangkul* 'elbow'

In contrast with the consonant-initial forms, vowel-initial forms in Yintyingka and Umpila do show clear systematicity in the way they match with Umpithamu: they invariably have vowel-initial matches in Umpithamu, as shown in the exhaustive lists of correspondences (13) and (14) below.

(13) Matches for vowel-initial forms in Yintyingka (exhaustive)

	Yintyingka (Verstraete & Rigsby 2015)	Umpithamu (Verstraete 2020)
a.	*atyampa* 'emu'	*atyampa* 'emu'
b.	*epo* 'grub'	*epo* 'grub'

c.	*errke-* ‘talk’	*errken* ‘talk’
d.	*imantharra* ‘sandpiper’	*imantharra* ‘type of sandpiper’
e.	*ingka* ‘freshwater turtle’	*ingkal* ‘long-necked freshwater turtle’
f.	*inuku* ‘type of tree’	*enuku* ‘*Hakea* (no local English name)’
g.	*itharra* ‘big salmon’	*itharra* ‘king salmon’
h.	*ompirili* ‘sooty oyster catcher’	*omperel* ‘pied oystercatcher’
i.	*untangala* ‘type of tree’	*untangala* ‘spearhandle tree’
j.	*utya* ‘dugong’	*utyarra* ‘dugong’

(14) Matches for vowel-initial forms in Umpila (exhaustive)

	Umpila (Thompson 1988)	Umpithamu (Verstraete 2020)
a.	*aangkay* ‘lizard, blue-tongue’	*aangkarra* ‘blue-tongue lizard’
b.	*atyu* ‘if’	*atya* ‘apprehensive’
c.	*alkun* ‘ray, spotted eagle’	*aykun* ‘whitespotted eagle-ray’
d.	*amparra* ‘deaf’	*ampatyi* ‘butterfish type’
e.	*ampul* ‘ground, dirt, earth’	*ampula* ‘fine sand’
f.	*ampuyu* ‘cuscus, female’	*ampuyu* ‘cuscus’
g.	*anchi* ‘hole in ground’	*anthi* ‘hole’
h.	*apina* ‘take, gather up, get’	*apan* ‘gather, collect, pick up’
i.	*iichi* ‘scrub’	*iitha* ‘scrub’
j.	*iikula* ‘snail, land’	*eekulu* ‘small shell sp.’
k.	*iiwirri* ‘mosquito’	*iwirrmun* ‘type of sugarbag’
l.	*imuyu* ‘crab, mud’	*iimuthi* ‘rock lobster’
m.	*iyitpi* ‘rock wallaby’	*(i)yirrpiri* ‘eastern grey kangaroo’
n.	*uutu* ‘tree type’	*uutu* ‘beefwood’

As already mentioned, Umpithamu has both vowel- and consonant-initial roots, so the systematicity in vowel-initial matches is significant. Given the lack of phonetic systematicity for vowel-initial forms in Umpila and Yintyingka, this external systematicity strongly suggests a scenario of borrowing, in which vowel-initial forms entered the lexicon through borrowing from Umpithamu.

There is, in fact, further evidence for this scenario, in two ways. First, the list of vowel-initial correspondences in (13) and (14) includes not just ‘regular’ patterns of initial loss, but also some of the exceptions mentioned above. Thus, for instance, *errken* in (13c) reflects PP

*yirrka ‘speak’ (Hale 1976a) and *ampatyi* in (14d) possibly reflects *yampa ‘leaf, ear, place’ (Alpher 2019), in both cases as an exception to the general retention of sonorant-initial forms in Umpithamu. The fact that the same exceptions are found in Umpila and Yintyingka again suggests a scenario of borrowing, which is expected to be ‘blind’ to the regularity of a sound change in the source language. Second, the correspondences with Umpithamu are not limited to initial consonant loss, but they also extend to initial consonant lenition. As mentioned above in section 3.3 above, Yintyingka and Umpila only have a handful of cases of initial lenition, with no obvious phonetic pattern. From the perspective of this section, however, there is a clear external pattern: while the forms in (15) below are not coherent among themselves, they are linked in that they all have lenited matches in Umpithamu, which again very clearly suggests a pattern of borrowing. Even more tellingly, there is some evidence from variation, as shown in (15f): a southern Umpila dialect adjoining Umpithamu uses *yipa* rather than *thi’a* for ‘liver’. *Thi’a* is the expected reflex of PP *cipa ‘liver’ (Hale 1976a) in Umpila, while *yipa* is clearly borrowed from Umpithamu: the retention of intervocalic *p in *yipa* is an independent indicator of borrowing (see also O’Grady 1976).

(15) Lenition in Yintyingka and Umpila

	Yintyingka (Verstraete & Rigsby 2015)	Umpithamu (Verstraete 2020)
a.	*yampa*- ‘lift up, raise’	*yampanin* ‘go up’ PP *campa ‘give, throw’ (Hale 1976b)
	Umpila (Thompson 1988)	Umpithamu (Verstraete 2020)
b.	*yaami* ‘mother-in-law’	*yaami* ‘mother-in-law’ PPN *caami ‘mother-in-law’ (Alpher 2004b)
c.	*yintyu* ‘close to’	*yinthu* ‘down’ PP *ciñcu 'near' (Hale 1976a)
d.	*yuli* ‘woomera’	*yuli* ‘woomera’ PP *culi ‘spearthrower’ (Hale 1976a)
e.	*yuma* ‘fire’	*yuma* ‘fire’ PP *cuma ‘fire’ (Hale 1976a)
f.	*thi’a* ‘liver’ (north) *yipa* ‘liver’ (south, Hill nd)	*yipa* ‘liver’ PP *cipa ‘liver’ (Hale 1976a)

The precise details of the borrowing scenario are difficult to work out with any certainty because there are not that many sound changes that set apart Umpila and Yintyingka from Umpithamu (apart from initial loss and lenition, of course) – see O'Grady (1976) and Verstraete & Rigsby (2015) for overviews. However, there are indications that borrowing was extended over time, with sporadic borrowings accruing in Umpila and Yintyingka. For instance, Umpila *alkun* in (14c) suggests that borrowing happened prior to the lenition of laterals in clusters in Umpithamu, while the contrast between Yintyingka *utya* in (13j) and *imantharra* and *itharra* in (13d)-(13g) suggests that *utya* was borrowed prior to the addition of -rrV# in Umpithamu, and *imantharra* and *itharra* following it. The change affecting laterals is itself presumably earlier than the addition of -rrV#, given that the former is shared with Yintyingka (Verstraete & Rigsby 2015)[9] and the latter is specific to Umpithamu (Verstraete 2020). The reflection of proto-laminal *c as lamino-dental or lamino-palatal could presumably be used in a similar way (compare 14b, g, i), but unlike in Western Middle Paman (Hale 1976a), the regularity of this pattern remains poorly understood for Eastern Middle Paman.

To conclude, then, while a gradualist, phonetically driven model does not work for Yintyingka and Umpila, a more abrupt scenario of borrowing can help to discern a pattern in the seemingly random sets of vowel-initial roots in these languages. Borrowings most likely came from various neighbouring initial-dropping languages, but a borrowing scenario can only be demonstrated in a systematic way for a sporadic initial-dropping language like Umpithamu, hence the focus on Umpithamu in this section. There are some indications of historical layering, which suggests that the figures of a bit over 10 percent of vowel-initial forms in Yintyingka and Umpila most likely represent an accretion of borrowed forms over an extended period of time.

5. Alternative models for initial vowel loss

The need for a more diversified model of initial loss is further supported by what happens after the loss of initial consonants. Several other subgroups of Paman do not just show loss of initial consonants, but also subsequent loss of the remaining initial vowel. This is the case in the Lamalamic languages, a neighbouring subgroup of Paman, which as mentioned above

[9] Lenition of laterals in clusters is also found in Western Middle Paman (Hale 1976a), though it is most likely an independent process there.

have uniformly lost initial consonants, and show a combination of retention and loss of initial vowels (Verstraete 2018a, b): Lamalama systematically loses initial vowels, Umbuygamu systematically retains them, and Rimanggudinhma shows both retention and loss, as illustrated in (16) below.

(16)	Reconstruction/cognate	Lamalama	Umbuygamu	Rimanggudinhma
	a. *kungul ‘mosquito’ (Alpher 2019)	*nggul*	*ongal*	*gol*
	b. PP *pangkarr 'flesh' (Alpher 2019)	*karr*	*agarr*	*nggarr*
	c. Umpt *wuyarra* ‘green ant’	*yuarr*	*uyarr*	*udyarr*

In this sense, Lamalamic languages form an interesting laboratory to test the gradualist model on the further step of initial vowel loss. Earlier work on these languages (Verstraete 2018a, b) has shown that there is little evidence for weakening as a precursor to loss, and that there is an alternative model that may work better. In this section, I briefly summarise the central arguments, and link them to the argument developed in the body of this paper.

5.1. No evidence for initial vowel weakening

The first relevant point about Lamalamic languages is that there is no evidence for weakening of initial vowels in those languages that retain them, which would be a crucial point in a gradualist model of initial vowel loss (as predicted, for instance, in Sommer 1976 and Blevins & Garret 1998). If a gradualist model applied, we would expect to see ‘seeds’ of vowel weakening in those languages that retain initial vowels, just like we observed lenition to glides for some classes of initial consonants in Umpithamu. Both Umbuygamu and Rimanggudinhma retain initial vowels, but in neither language is there any indication that the initial vowel position shows signs of weakening. The relevant observations relate to phonetic realisation, phonotactics, and morphophonology.

Phonetically, the most obvious reflection of weakening would be reduction, for instance in terms of quality (to schwa), or in terms of length (to extra-short realisations). There is no evidence for either of these properties in Umbuygamu, which has retained all initial vowels, or in Rimanggudinhma, which has lost some and retained others (with no obvious pattern). In fact, schwa realisations have a very specific distribution in both languages, which crucially excludes retained initials. In Umbuygamu, schwa realisation is rare, and restricted to post-tonic contexts (Verstraete 2019a), as shown in (17) below: initial vowels are always pre-tonic,

and are therefore never realised as schwa. In Rimanggudinhma, schwa alternations can be found initially, but only in ‘new’ initials. Retained initial vowels are never realised as schwa, but there is a set of ‘new’ prefix-like elements consisting of a low vowel followed by a liquid (see further in Verstraete 2018b), in which the lowel vowel can alternate with schwa, as illustrated in (18).

(17) Umbuygamu

orhanham ‘grindstone’	/ɔˈr̥aɲam/	→	[ɔˈr̥aɲam], [ɔˈr̥aɲəm]

(18) Rimanggudinhma

alnggol ‘hole’	/alˈŋgɔl/	→	[alˈŋgɔl], [əlˈŋgɔl]

< *Cunggul, compare *ogal* ‘hole’ (Umbuygamu)

Similarly, there is no evidence for reduction in length: in fact, lengthening or other types of strengthening are avaible for initial vowels in both languages. In Umbuygamu, lengthening is found before trills, and is available regardless of position, as shown in (19) below. In Rimanggudinhma, initial high vowels allow optional strengthened realisations consisting of the vowel followed by a glide, as shown in (20) below. Crucially, this type of strengthening is limited to initial vowels and not available beyond the initial position.

(19) Umbuygamu

a. *orraw* ‘kookaburra’	/ɔˈraw/	→	[ɔːˈraw]
b. *arhirr* ‘file stingray’	/aˈr̥ir/	→	[aˈr̥iːr]

(20) Rimanggudinhma

a. *itharr* ‘daughter’s child’	/iˈð̥ar/	→	[ijˈð̥aːr]
b. *urhïð* ‘emu’	/uˈr̥ɨð̥/	→	[uwˈr̥ɨð̥]

In other words, phonetic realisation does not provide any indications of initial vowel weakening in Umbuygamu or in Rimanggudinhma.

The same pattern is reflected in the structural availability of vowel contrasts for different positions in the root. Umbuygamu has a five-vowel system and Rimanggudinhma a six-vowel one: historically, both languages have added two mid vowels to the Proto-Paman three-vowel system, and Rimanggudinhma has added a high central vowel as well. In Umbuygamu, the initial vowel position has the largest functional load for vowel contrasts, in contrast to the second syllable which shows some historical levelling (see Verstraete 2018a).

Accordingly, it is far easier to find minimal pair sets for initial vowels than for second-syllable ones, as shown in (21) below. The situation in Rimanggudinhma is slightly different in that only the conservative vowels are represented initially: the other ones are found in second syllables. Even so, the conservative contrasts are robustly represented initially, as shown in (22), and the availability of phonetic strengthening discussed above does show that the absence of the new vowel contrasts does not necessarily reflect weakening.

(21) Umbuygamu
arha 'wife', *irha* 'other', *erhanh* 'shell', *orha* 'upper arm', *urhal* 'big mullet'

(22) Rimanggudinhma
arho 'arm', *irhar* 'other', *urhïrr* 'fat'

In terms of hiatus rules, finally, there is again no evidence that initial vowels are weak; in fact, the opposite is the case. Both languages have a system of sandhi in which one vowel is elided in situations of hiatus across words. In such contexts, it is always the initial vowel of the second word that 'wins out', as shown by the behaviour of the compound structures in (23) and (24) below (see further in Verstraete 2018b on these structures, and section 5.2 below on the deletion of the initial vowel of *aθa* in (23)).

(23) Umbuygamu

aθa	*edyerr*		
/aˈθa/	/ɛˈɟɛr/	→	/θɛˈɟɛr/
fire	ashes		'ashes'

(24) Rimanggudinhma

thamba	*igorr*		
/ˈʈamba/	/iˈgɔr/	→	/ˌʈambiˈgɔr/
woman	no.good		'old woman'

Looking at these properties from the perspective of a 'gradualist' weakening-based model, there is no real case for gradual initial vowel loss through intermediate steps of weakening. If this model applied, we would expect to find indications of initial weakening in languages that retain initial vowels, just like we found evidence for systematic lenition in Umpithamu. This would be expected even more strongly for a language like Rimanggudinhma, which retains or loses initial vowels. As we have just seen, however, there

is no evidence for weakening in initial vowels, and in fact there are indications of strengthening, including in Rimanggudinhma. One might argue that instances of initial strengthening are precisely those that would have blocked initial loss in specific roots in Rimanggudinhma, but overall the observations listed in this section do suggest quite strongly that a gradual development is less likely for initial vowel loss in Lamalamic.

5.2. Morphosyntactically driven alternations

As with the Middle Paman case, there are alternative models to explain how initial vowel loss could have proceeded. To begin with, borrowing is not a suitable model for Lamalamic. In Rimanggudinhma, for instance, there is no indication that forms without initial vowels are borrowed from neighbouring languages with full initial vowel loss (for which Lamalama, Kuku Thaypan and Aghu Tharrnggala would be the best candidates; see Rigsby 1976 and Jolly 1989 for the last two languages). To give just one example, forms that have lost initial vowels in Rimanggudinhma are consistently conservative relative to sound changes that characterise Lamalama and Umbuygamu, like nasal-plosive clusters being simplified to voiceless and voiced plosives (see Verstraete 2018a), as shown in (25) below. If borrowing was involved, we would expect to see at least some instances of initial plosives reflecting clusters in consonant-initial forms.

(25) PP *pangkarr ‘flesh’ (Alpher 2019)

a. *nggarr* Rimanggudinhma
b. *karr* Lamalama
c. *agarr* Umbuygamu

However, there is another mechanism within the Lamalamic languages that could drive initial vowel loss in a more ‘abrupt’ way, viz. a specific morphosyntactic construction that involves initial loss. All of the Lamalamic languages have ‘compounding’ structures to combine two nominal roots, with the resulting structure characterised by (i) a shift of stress to the stressable syllable of the second root, and (ii) systematic loss of the initial vowel for the first root (as well as final vowel loss in the case of vowel hiatus, as mentioned above). These structures cover compounds in the classical sense, but also other ‘close’ nominal structures like generic-specific structures and the like. They are illustrated below, for Umbuygamu in (26) and for Rimanggudinhma in (27).

(26) Umbuygamu

a. *alam* *erhanh*

/aˈlam/ /ɛˈɻan/ → /ˌlamɛˈɻan/

finger shell ‘fingernail’

b. *awar* *etha*

/aˈwaɹ/ /ɛˈʈa/ → /ˌwaɹɛˈʈa/

head flower ‘brain’

(27) Rimanggudinhma

a. *aðan* *almbar*

/aˈð̪an/ /alˈmbaɹ/ → /ˌð̪analˈmbaɹ/

sand head ‘sand hill’

b. *iwurr* *iðam*

/iˈwur/ /iˈð̪am/ → /ˌwuriˈð̪am/

ground wet ‘dew’

These structures are relevant because they form a specific morphosyntactic context that creates alternations between root forms with and without initial vowels. For instance, the existence of compound structures like (26a) and (26b) ensures that roots like *awar* and *alam* in Umbuygamu are available both with and without initial vowels, as shown in (28). The same applies to *aðan* and *iwurr* in Rimanggudinhma, as shown in (29).

(28) Umbuygamu

awar ‘head’ [aˈwaɹ / waɹ]

alam ‘hand’ [aˈlam / lam]

(29) Rimanggudinhma

aðan ‘sand’ [aˈð̪an / ð̪an]

iwurr ‘ground’ [iˈwur / wur]

If these alternations are frequent enough, they could be extended through the lexicon by analogy. Unlike with gradualist models, this type of ‘engine’ driving initial loss does not require any intermediate step of weakening, for which there is no evidence in Lamalamic as mentioned above. The association of initial loss with compounding may ultimately still be based on weakening, since compounding involves rightward stress shift, which is widely

regarded as a typical cause of initial loss in the region (Hale 1964). But the crucial point is that the mechanism itself does not require intermediate weakening, and directly creates alternate root shapes without initial vowels. Obviously, this remains a hypothesis, which leaves some questions unanswered, like the actual frequency of compounding in the language, or the reason why initial vowel loss remains partial in Rimanggudinhma. But the important point is that it is more easily compatible with what we can observe about initial vowels in Lamalamic. And like the Middle Paman data, it suggests that it may be necessary to look beyond the common 'gradualist' assumptions in the literature, towards a more diversified view of mechanisms driving initial loss, including borrowing and morphosyntactic alternations.

6. Conclusion

This paper has investigated the typologically rare phenomenon of initial consonant loss, in one of its hotspots within Australia. The analysis has shifted the focus away from the phonetic initiation of initial loss, the topic that has received most attention so far in the literature, to the actual diachronic pathways of loss. The results show that these pathways are more diverse than seems to be assumed in the literature. A language like Umpithamu substantiates the common assumption that initial loss is a gradual phonetically driven process, with intermediate stages of lenition or weakening. But the other Middle Paman languages, as well as the Lamalamic cases studied in section 5, show that processes are more diverse than this: initial loss can also be driven by external mechanisms like borrowing, or it can operate at the interface with other parts of the language system like morphosyntactic alternations. Investigating the processes underlying loss may be less spectacular than the question of its ultimate causes, but it is an important part of the puzzle nonetheless. One reason is that a good view of the relevant pathways and processes may help to develop a more comprehensive model of the entire phenomenon. Studies like Hercus (1979), Blevins & Marmion (1994) and Blevins (2001) have shown that the phonetic causes of initial loss can be more diverse than the model of stress shift put forward in the pioneering analyses of the phenomenon (Hale 1964, 1966). Along the same lines, I hope that analyses like this one can show that the same diversity applies to the processes that drive the development of initial loss in the lexicon; I expect that detailed studies of other sporadic initial dropping languages will reveal further diversity in these processes.

The second reason why it is important to study pathways of initial loss relates to its structural consequences. In the region studied here, initial loss is often regarded as the first step of a whole suite of changes, like innovations in phoneme inventories and far-reaching changes in phonotactics and root structure (e.g. Hale 1976a, b). Initial weakening and loss is thought to go hand in hand with medial strengthening, leading to innovations like voicing contrasts for plosives, prestopped nasals and fricative series, mainly associated with the old medial position after initial loss (see Hale 1966, 1976b, c). And of course initial loss leads to changes in root structure, not just directly in terms of initial segments, but also indirectly through processes of root augmentation triggered in response to word minimality requirements (see Verstraete 2018b). Understanding the actual processes underlying initial loss may help to understand when exactly initial loss will have such further structural consequences. Consequences for phoneme inventories seem most likely in languages where initial loss is a language-internal phonetically driven process, with initiating factors like stress shift inducing not just initial loss but also strengthening of medial consonants (often regarded as the engine behind the emergence of new contrasts, see Hale 1964, 1976b; Dixon 2002: 597). By contrast, effects on root structure are probably more widespread, as in Lamalamic where initial vowel loss is not a gradual phonetic process, but the changes in root structure it has precipitated are profound (Verstraete 2018b). I expect that more detailed study of further languages with partial initial loss will help to develop a better understanding of where exactly different types of initial loss fit into such structural chains.

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