

# A comparative account of intransitive verbs with conservative first person forms in Cariban

Nine Cariban languages have a group of intransitive verbs irregularly inflected for first person. The irregular first person markers are conservative, contrasting with innovative regular markers. They are a result of person marker extensions not affecting some verbs, which happened independently in six (proto-)languages. These six incomplete extensions left between one and seven conservatively inflected verbs, which show a great etymological overlap across (proto-)languages. Bybee's network model of morphology was used to generate hypotheses about factors causing the distribution of conservative and innovative markers in each language. Predictions of different possible factors were then tested against the data. Because of patterns reconstructible to Proto-Cariban, the hypothesized factors largely overlap in their predictions, though phonology (combined with frequency) shows a strong overall performance.

Keywords: Cariban, person marking, irregular, language change, network morphology

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## 1 Introduction

The Cariban language family is one of the largest of South America, with between 60'000 and 100'000 speakers unevenly distributed between 22 to 25 extant languages (Gildea 2012: 441). The family is concentrated in Venezuela, the Guianas and Northern Brazil, with three Western and four Southern outliers. Figure 1 shows the geographical distribution and genealogical affiliation of the extant Cariban languages. For overviews of and comparative work on the family, readers are referred to Gildea (1998), Derbyshire (1999), Meira (2002), Meira & Franchetto (2005), Meira (2006a), Gildea & D. Payne (2007), Meira et al. (2010), Gildea et al. (2010), Gildea (2012), Matter (2021a), and Gildea & Cáceres (in preparation).

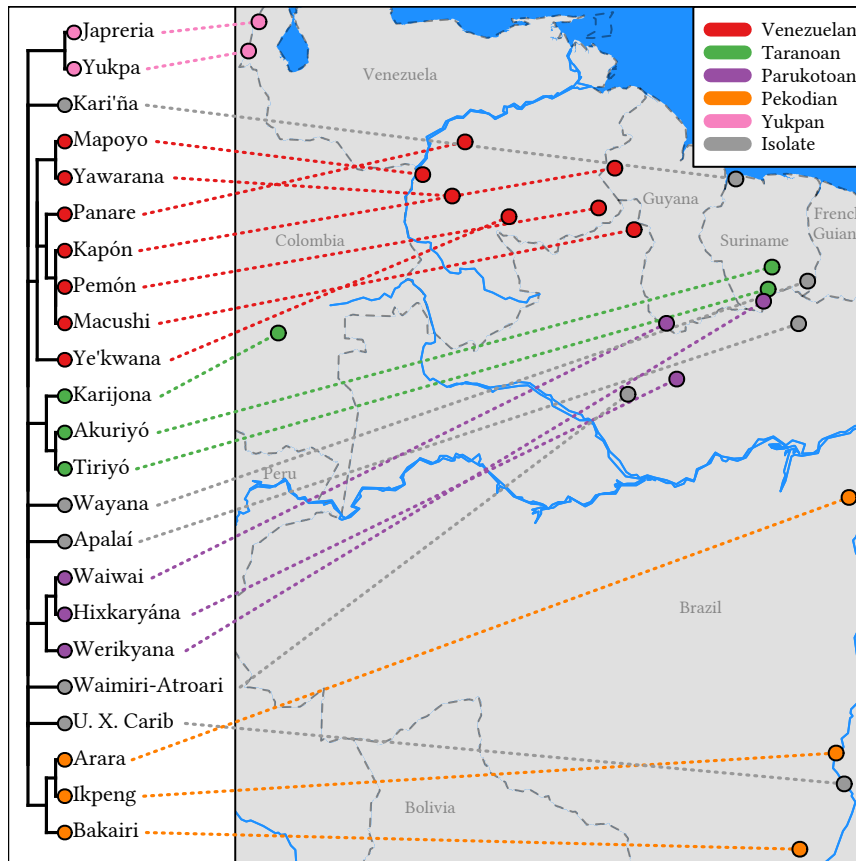


Figure 1: The Cariban language family. Classification from Matter (2021a), positions from Hammarström et al. (2020). Made with a modified version of phytools (Revell 2012)

In some Cariban languages, a small group of verbs show a divergent first person inflection pattern, a topic which has not received much attention in the literature. This is illustrated for Hixkaryána in Table 1,<sup>1</sup> with paradigms of four verbs, all members of the  $S_A$  inflectional class. In this language, the

Table 1: Some Hixkaryána verbs (Howard 2001: 150, 510-511, 513, 520; Derbyshire 1985: 197-198)

	‘to fall’	‘to be afraid’	‘to walk’	‘to cut self’	‘to be’
1	k-ehurka-	k-oser <sup>1</sup> ehi-	k-atar <sup>1</sup> eknohi-	k-atama-	w-eje-
2	m-ehurka-	m-oser <sup>1</sup> ehi-	m-atar <sup>1</sup> eknohi-	m-atama-	m-eje-
1+2	t-ehurka-	t-oser <sup>1</sup> ehi-	t-atar <sup>1</sup> eknohi-	t-atama-	t-eje-
3	ɲ-ehurka-	n-oser <sup>1</sup> ehi-	n-atar <sup>1</sup> eknohi-	n-atama-	n-eje-

<sup>1</sup>The presence of a 1+2 person value implies that of a 1+3 value. This is usually expressed with a free pronoun combined with third person morphology in Cariban languages, so it is not represented as a distinct value in Table 1 and other paradigm

Table 2: Some Tiriyó verbs (Meira 1999: 292, 294; Carlin 2004: 274)

	‘to sleep’	‘to see self’	‘to bathe (INTR)’	‘to yawn’	‘to go’
1	t-ə̀nɪki-	t-ə̀ene-	s-epi-	s-entapo-	wi-tən-
2	m-ə̀nɪki-	m-ə̀ene-	m-epi-	m-entapo-	mi-tən-
1+2	kit-ə̀nɪki-	k-ə̀ene-	ke-epi-	k-entapo-	ki-tən-
3	n-ə̀nɪki-	n-ə̀ene-	n-epi-	n-entapo-	ni-tən-

verb ‘to be’ diverges from other  $S_A$  verbs like ‘to fall’ by having a first person marker  $w-$ , rather than  $k-$ . A similar pattern exists in Tiriyó (Table 2), where the verb ‘to go’ has a first-person prefix  $wi-$  while other  $S_A$  verbs have a prefix with phonologically conditioned allomorphs  $t-$  /  $ə̀$  and  $s-$  /  $ə̀$ . In both languages, the first person prefix of the verbs on the left is representative for the vast majority of  $S_A$  verbs.

Such divergent verbs have been identified for Hixkaryána (Derbyshire 1985: 188), Waiwai (Gildea 1998: 90), the three Taranóan languages (Meira 1998: 112–115), Bakairi (Meira 2003a), and Arara (Alves 2017: 153), but have only been subject to comparative scrutiny in Meira’s (1998) reconstruction of Proto-Taranóan. In synchronic analyses, these verbs and their first person prefixes may be called *IRREGULAR*, contrasting with regular prefixes (like Hixkaryána  $ki-$  and Tiriyó  $t-/s-$ ) on regular verbs. Note that there is no widely accepted definition of irregularity (Stolz et al. 2012), and many stricter definitions (e.g., Haspelmath & Sims 2010) require the pattern to occur at a single place in the grammar. In such approaches, the verbs simply belong to a small inflectional (sub-)class, an analysis applied to the Pekodian languages Bakairi and Arara (Meira 2003a: 4; Alves 2017: 149).

Regardless of the details of synchronic analysis, the cause for the divergent inflectional patterns is found in the diachrony of the languages in question. The goal of this study is to approach these patterns from a comparative perspective and to provide a diachronic and functional account, proceeding as follows: In Section 2, relevant aspects of the Proto-Cariban verbal system are introduced, and it is shown that the mechanism of person marker extensions is responsible for patterns like in Tables 1 and 2. In Section 3, six incomplete person marker extensions and the verbs unaffected by them are described. Since languages show considerable etymological overlap in their conservative verbs, these are further discussed and reconstructed. Section 4 uses Bybee’s (1985) network model of morphology to search explanations for the verbs (un-)affected by each extension. Section 5 summarizes and discusses the results of the study.

## 2 The origins of irregular first person inflections

The irregular first person prefixes from Section 1 are relics, inherited from the ancestral Proto-Cariban system (Section 2.1). That system underwent much innovation; the mechanism responsible for the irregular forms are person marker extensions not spreading through the entire  $S_A$  lexicon (Section 2.2). A specific aspect of the system, the  $S_A$  vs  $S_P$  distinction, plays a role in incomplete extensions and is discussed in Section 2.3.

### 2.1 Proto-Cariban person marking and inflectional relics

Proto-Cariban is reconstructed by Gildea (1998) as using a person paradigm called Set I in its independent verb forms, shown in Table 3. Person indexation in transitive verbs was conditioned by a basic hierarchy

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tables. Further, TAM suffixes in the attested forms are omitted, since a) the focus lies on the prefixes and stems, and b) full paradigms with the same TAM suffix are rare in the available sources. Standard IPA symbols are used in the transcription of Cariban languages, except for coronal rhotics, which are simply represented with  $\langle r \rangle$ , rather than  $\langle \mathfrak{r} \rangle$  for Wayana or  $\langle \mathfrak{r} \rangle$  for Ye’kwana etc. In languages with strong morphophonological processes and/or non-phonemic orthography the original form is shown in an additional line when presented in interlinearized examples. Gildea (2018) is followed in using  $\langle \mathfrak{a} \rangle$  for the Proto-Cariban reconstructed by Meira & Franchetto (2005), although it was likely more back (Gildea et al. 2010).

Table 3: Proto-Cariban Set I (main clause) person markers (Meira et al. 2010: 495; Gildea &amp; Zúñiga 2016: 497)

(a) Transitive					(b) Intransitive		
A/P	1	2	1+2	3	S <sub>A</sub>	S <sub>P</sub>	
1		*k-		*t(i)-	1	*w-	*u(j)-
2	*k-			*m(i)-	2	*m-	*ə(j)-
1+2				*kit(i)-	1+2	*kit-	*k-
3	*u(j)-	*ə(j)-	*k-	*n(i)-	3	*n-	*n(i)-

$1/2 > 3$ . The locuphoric markers had two forms, an A-oriented one for direct ( $SAP > 3$ ) scenarios and a P-oriented one for inverse ( $3 > SAP$ ) scenarios. There was a single aliophoric marker \*n(i)-, which only surfaced in nonlocal ( $3 > 3$ ) scenarios, without morphologically expressed distinctions between different third person referents. Local scenarios were marked identically and non-transparently with the 1+2 prefix \*k-.

Formally identical or etymologically related markers occurred in intransitive verbs, which showed a split-s system (Table 3b). S<sub>A</sub> verbs took similar markers as the A-oriented ones in transitive verbs, with the exception of first person (1S<sub>A</sub> \*w- vs 1>3 \*t(i)-) and the absence of \*i after all S<sub>A</sub> prefixes. On the other hand, S<sub>P</sub> verbs took markers fully identical to the P-oriented ones, with 3S<sub>P</sub> \*n(i)- aligning with 3>3 scenarios.

Knowledge about the ancestral system makes clear that the divergent Hixkaryána and Tiriyo forms in Tables 1 and 2 behave irregularly because they preserve the original Proto-Cariban 1S<sub>A</sub> prefix \*w-; they are therefore CONSERVATIVE. They contrast with regular S<sub>A</sub> verbs, which are innovative in both languages. The reflexes of \*w- are RELICS, old and restricted to a few lexemes, contrasting with the innovative prefixes found elsewhere. These verbs and their prefixes are comparable with the few English nouns like *oks*, which preserve the old plural suffix -ən. It was once more widespread as the normal plural suffix of the weak inflection, compare German *oks-ən* ‘ox-en’, *na:mə-n* ‘name-s’, *ha:zə-n* ‘hare-s’, *bɛ:ɣ-ən* ‘bear-s’. Since the regular Hixkaryána and Tiriyo prefixes are innovative, the question arises how they developed.

## 2.2 Person marker extensions and lexical diffusion

In his discussion of the Proto-Cariban split-s system (Section 2.3) and reconstruction of the intransitive person prefixes, Gildea (1998: 88–96) shows that the system has undergone many different changes in daughter languages. The main mechanism of these changes are PERSON MARKER EXTENSIONS, person prefixes being extended to verbal paradigm cells previously occupied by other prefixes. There have been many person marker extensions in Cariban languages, some still ongoing. Gildea (1998) illustrates this with the three Parukotoan languages Werikyana, Hixkaryána, and Waiwai. Apart from segmental changes to individual morphemes, the following innovations happened in the Set I paradigm in Parukotoan:

- (1) Proto-Parukotoan 1S<sub>A</sub> \*w- to 1>3  
 1+2 \*k- to 1S<sub>P</sub><sup>a</sup>  
 1+2 \*kit- to 1+2S<sub>P</sub><sup>a</sup>  
 Proto-Waiwaian 1S<sub>P</sub> \*k- to 1S<sub>A</sub>  
 \*owi(ro) j- ‘1PRO LK’ for 1P  
 Waiwai 2S<sub>A</sub> m- to 2S<sub>P</sub>

<sup>a</sup> Completed in Proto-Waiwaian, ongoing in Werikyana.

All innovations are person marker extensions except 2b, which combined a pronoun with the linker \*j-. Figure 2 shows them in bold and reproduces Gildea’s (1998) tables as a tree diagram, with adapted

transcription and an additional Werikyana 1S<sub>p</sub> marker Ø/j- (Spike Gildea, p.c.). Hixkaryána has preserved

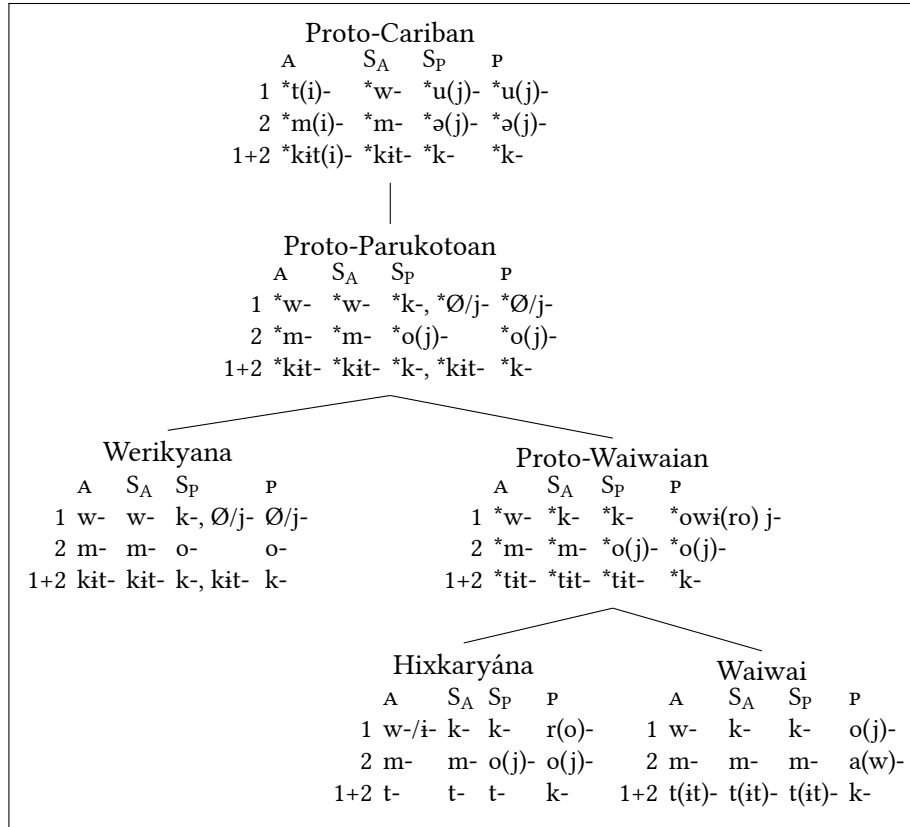


Figure 2: Person marker extensions in Parukotoan, after Gildea (1998: 94)

split-s only in the second person prefixes, while Werikyana still shows the variation reconstructible to Proto-Parukotoan in its first person and 1+2 prefixes. Waiwai has lost the system entirely, which notably happened via three diachronically distinct innovations.

For Gildea (1998), person marker extensions are relevant for the loss of split-s and the accompanying changes to indexing alignment, whereas this study focuses on a different aspect. Namely, they most likely took place via lexical diffusion, characterized as a type of extension by Harris & Campbell (1995: 106–115), a hypothesis supported by three facts. First, the variation in first person and 1+2 prefixes described above for Werikyana is not completely free. Some verbs only allow e.g. first person k-, but not j-, while others can occur with both, a pattern expected in a lexical diffusion scenario. In addition, this is speaker-dependent (Spike Gildea, p.c.), which points to an ongoing change. Second, while there is no detailed diachronic account of the switch of 1>3 \*t- and 1S<sub>A</sub> \*w- in the Tiriyoan languages (Section 3.1.3), Meira (1998: 111–112) argues that it must have happened gradually rather than instantaneously, and entailed both markers spreading simultaneously. Whether or not this gradual switch followed ordered lines, lexical diffusion must have played a role.

The third argument in favor of the lexical diffusion scenario goes back to conservative forms like in Hixkaryána and Tiriyo. Both innovative 1S<sub>A</sub> prefixes were introduced by a person marker extension spreading via lexical diffusion. The continued presence of the old 1S<sub>A</sub> prefix in a few verbs is the result of the extension stopping short of these verbs, rather than spreading through the entire S<sub>A</sub> lexicon. In a family-wide search, 18 distinct extensions affecting intransitive verbs were identified, 6 of them incomplete. The latter have left between 1 and 7 conservatively inflected verbs in 9 Cariban languages (Section 3).

Interestingly, all six featured innovative first person markers on S<sub>A</sub> verbs. All other (complete) extensions<sup>2</sup> either occurred with other person values and/or targeted S<sub>P</sub> verbs. Illustrative examples for

<sup>2</sup>As an honorable mention, when Ikpeng replaced third person Set I with Set II prefixes, a ‘to be’ and ke ‘to say’ retained n-

Table 4: Some examples for completed extensions (Gildea 1998: 90–92)

(a) Apalaí			(b) Panare			(c) Waimiri-Atroari		
	S <sub>A</sub>	S <sub>P</sub>		S <sub>A</sub>	S <sub>P</sub>		s	
1	i-/∅	i-/j-	1	w(i)-	∅/j-	1	w(i)-/i-	
2	m(i)-	o-	2	m(i)-		2	m(i)-	
1+2	s(i)-		1+2	n(i)- <sup>a</sup>		1+2	h(i)-	
3	n(i)-		3	n(i)-		3	n-/∅	

<sup>a</sup> 1+2 was lost as a person value.

complete extensions are shown in Table 4: the extension of 1+2S<sub>A</sub> s(i)- (< \*kit-) to S<sub>P</sub> verbs in Apalaí (Table 4a), of 2S<sub>A</sub> m(i)- in to S<sub>P</sub> verbs in Panare (Table 4b), and the extension of the entire S<sub>A</sub> set to S<sub>P</sub> verbs in Waimiri-Atroari (Table 4c). The starkly different behavior of S<sub>A</sub> and S<sub>P</sub> verbs regarding extensions points to the split-s system playing a role, so its main properties will be discussed in Section 2.3. This will also clarify how the S<sub>A</sub>/S<sub>P</sub> distinction can be lost for a single person, or how S<sub>P</sub> verbs can take on S<sub>A</sub> markers with apparent semantic impunity.

### 2.3 The Cariban split-s system

As seen in Section 2.1, the split between S<sub>A</sub> and S<sub>P</sub> verbs was instantiated by inflection classes within the Proto-Cariban Set I person paradigm, but this was not the only difference: In deverbalized forms, S<sub>A</sub> verbs took a class marker \*w-, while S<sub>P</sub> verbs lacked that prefix (Gildea 1998: 89, 141–142; Meira 2000: 208). Also, S<sub>P</sub> verbs took the 2S<sub>P</sub> prefix \*ə(j)- in imperatives, while S<sub>A</sub> verbs were unprefixes (Gildea 1998: 89; Meira 2000: 208).

In modern instantiations of Cariban split-s, mismatches between the semantics of verbs and their S<sub>A</sub> or S<sub>P</sub> status are common, exemplified with Kari’ña data in (2).

#### (2) Kari’ña

- a. sipi tinka-ri m-ekema-non hen  
 net pull-NMLZ 2S<sub>A</sub>-be.afraid-PRS.UNCERT eh?  
 ‘You’re afraid to pull up the net, aren’t you?’ (Courtz 2008: 253)
- b. aya:woiya  
 aj-awomi-ja  
 2S<sub>P</sub>-get.up-PRS  
 ‘You are getting up.’ (Hoff 1968: 167)

The S<sub>A</sub> verb ekema ‘to be afraid’ takes an A-oriented marker (2a), while the S<sub>P</sub> verb awomi ‘to get up’ takes a P-oriented marker (2b). In both cases, the prefix does not appear to contribute to the semantics of the predicate, since there are clear mismatches: ‘to be afraid’ with an “agentive” marker can hardly be considered a volitional act, while ‘to get up’ with a “patientive” marker is clearly volitional. Meira (2000) investigates a corpus of intransitive verbs from Tiriyó, Kari’ña, Apalaí, and Wayana, and categorizes them by applying different criteria commonly encountered in split-s systems. He shows that neither (non)activities, (non-)agency, (in-)animacy, nor Aktionsart satisfactorily predict the class membership of intransitive verbs in any of the languages.

Rather, the reason for a verb to take A- or P-oriented prefixes is (at least diachronically) a morphological one. Meira (2000: 217–221) demonstrates that those intransitive verbs which (etymologically) have a derivational detransitivizing prefix are treated as S<sub>A</sub> verbs, while essentially all others are S<sub>P</sub> verbs:

(Matter 2021b: 12). However, innovative markers were not spreading within a paradigm, but rather from former subordinate to main clauses.



Almost all verbs in the S<sub>A</sub> class are detransitivized forms of transitive verbs, either synchronically (with still existing transitive sources) or diachronically (with reconstructible but no longer existing transitive sources) (Meira 2000: 201)

126 He notes that this leads to an inflectional split not based in meaning, but rather morphology:

Apparently, the morphological behavior of the S<sub>A</sub> verb class is an accidental consequence of the fact that detransitivization, as far back as we can reconstruct, entails all the morphology described [...] as typical of S<sub>A</sub> verbs. The alignment of person-marking prefixes appears not to be driven by any semantic forces in the language; it is as though they were being dragged by the evolution of the reflexive marker. (Meira 2000: 226)

127 Regarding the form of this marker, Meira et al. (2010: 505–512) reconstruct two distinct prefixes for  
128 Proto-Cariban: reciprocal \**əte*- and reflexive \**e*-, although their reflexes on verbs have been merged into  
129 a single morpheme in modern languages.<sup>3</sup> Reflexes of \**əte*/*e*-show a range of meanings summarizable  
130 as “detransitive”, illustrated with Tiriyó S<sub>A</sub> verbs in (3).

131 (3) Tiriyó (Meira 2000: 218–219, 1999: 128, 256)

nonta 'abandon'	→	e-nonta, əi-nonta	'abandon each other' (reciprocal)
suka 'wash'	→	e-suka, əi-suka	'wash self' (reflexive)
pahka 'break (TR)'	→	e-pahka	'break (INTR)' (anticausative)
puunəpi 'think about'	→	əh-puunəpi, əi-puunəpi	'think, meditate' (antipassive)

133 The morphological variation in 'abandon each other' and 'wash self' is due to the collapse of the two  
134 Proto-Cariban prefixes: *e*- comes from the reflexive prefix \**e*-, while the form *əi*- originates in reciprocal  
135 \**əte*-. However, both can occur with either meaning – at least for these two verbs. In the next section, it  
136 will be seen that many of the verbs not affected by person marker extensions belong to the small group  
137 of S<sub>A</sub> verbs without a reflex of \**əte*/*e*-.

### 138 3 Prefixes and verbs: innovation and resistance

139 As shown in Section 2.2, irregularly inflected first person forms are leftovers of incomplete person marker  
140 extensions. Section 3.1 presents the six identified incomplete extensions, the prefixes they introduced  
141 and the verbs they spared. Since languages show considerable etymological overlap in their conservative  
142 verbs, those are compared and reconstructed in Section 3.2. Further, their reflexes which did get affected  
143 by an incomplete extension are identified. Section 3.3 summarizes the results.

#### 144 3.1 Incomplete extensions: the innovative 1S<sub>A</sub> markers

145 As stated in Section 2.2, the six person marker extensions which left a group of verbs untouched all in-  
146 troduced innovative first person markers on S<sub>A</sub> verbs. Of these extensions, half can be reconstructed to  
147 intermediate proto-languages, and half happened in pre-modern stages of single languages. The sources

<sup>3</sup>In the Proto-Cariban transitive verb template, derivational prefixes were in a paradigmatic relationship with the earlier third person marker \**i*-. \**m-i*-V 'you V it', \**m-e*-V 'you V yourself', \**m-əte*-V 'you V each other'. This analysis is applied to Tiriyó by Carlin (2004: 268–269), who interprets *i*- as marking transitive diathesis.

Table 5: Regular Pekodian S<sub>A</sub> verbs (Meira 2003a: 4; Alves 2017: 150; Pachêco 2001: 52)

	Bakairi ‘to go up’	Arara ‘to dance’	Ikpeng ‘to run’
1	k-əku-	k-origu-	k-aranme-
2	m-əku-	m-origu-	m-aranme-
1+2	kɪd-əku-	kud-origu-	kw-aranme-
3	n-əku-	Ø-origu	Ø-aranme-

of innovative markers vary, but not much: the innovative 1S<sub>A</sub> prefix is formally identical to the 1+2P/S<sub>P</sub> marker (Proto-Cariban \*k-) in three cases, to the 1P/S<sub>P</sub> marker (Proto-Cariban \*u(j)-) in two cases, and to the 1>3 marker (Proto-Cariban \*t-) in one case. For each extension, regular (innovative) verbs are contrasted with irregular (conservative) ones, and verb forms are reconstructed where necessary. Section 3.1.1 demonstrates the extension of \*k- in Proto-Pekodian, reflected in the three daughter languages Arara, Ikpeng, and Bakairi. Section 3.1.2 details the extension of \*k- in Proto-Waiwaian, briefly shown in Section 2.2. Section 3.1.3 focuses on innovative \*t- in Proto-Tiriyóan, reflected in modern Tiriyó and Akuriyó. The topic of Sections 3.1.4 to 3.1.6 are innovative 1S<sub>A</sub> markers found in single languages: k- in Akuriyó, and j- in Carijona and Yukpa.

### 3.1.1 Proto-Pekodian \*k-

The Pekodian branch consists of closely related Arara and Ikpeng, with Bakairi as a more distant member. The contribution establishing the branch (Meira & Franchetto 2005) focused on phonology and lexicon, so no reconstructions of Proto-Pekodian morphosyntax are found in the literature. However, all three Pekodian languages have a regular 1S<sub>A</sub> marker k- (Table 5), allowing the reconstruction of a Proto-Pekodian 1S<sub>A</sub> marker \*k-.

The most detailed description of a Pekodian language (Alves 2017) names six<sup>4</sup> Arara S<sub>A</sub> verbs forming a subclass defined by a first person marker w(i)- rather than k-, shown in (4). There is also a reflex of the copula \*a[p] (Section 3.2.3), serving syntactically as a postposition introducing adverbial clauses meaning ‘if’ or ‘when’ (Alves 2017: 199–201). However, it inflects with verbal Set I prefixes, including first person w- (5).

#### (4) Arara (Alves 2017: 153)

wi-geni	‘I said’
w-ɪŋjini	‘I was, lied down’
w-ebini	‘I came’
w-ibini	‘I bathed’
w-iptɔŋri	‘I went down’
w-idoli	‘I went’

#### (5) Arara (Alves 2017: 200)

1	w-aptam	‘when/if I was’
2	m-od-aptam	
1+2	kud-aptam	
3	Ø-aptam	

In his brief but precise discussion of Bakairi verbal person marking, Meira (2003a) reports the existence of two S<sub>A</sub> subclasses, defined by 1S<sub>A</sub> w- and k-, respectively.<sup>5</sup> The first group is illustrated with i ‘to bathe’ (6).

<sup>4</sup>Seven in her analysis, treating the two meanings of ɪŋji ‘to be, to lie down’ as different verbs.

<sup>5</sup>Meira (2003a) indicates that the same verbs which take first person w- in Bakairi also take a 1+2 marker k-. However, this marker is only illustrated for ‘to bathe’, both by Meira (2003a) and von den Steinen (1892). Given the lack of data for other verbs, this potential additional pattern will not be further discussed. If the characterization by Meira is accurate, then verbs with innovative first person prefixes have conservative 1+2 prefixes, and vice versa.

- 175 (6) Bakairi (Meira 2003a: 4)  
 176 w-i-də  
 1S<sub>A</sub>-bathe-IMM  
 ‘I bathed’

177 While Meira (2003a: 4) lists some Bakairi cognates of the Arara verbs in (4) as S<sub>A</sub> verbs, he does not  
 178 indicate whether they belong to the S<sub>A</sub>-1 class with k-, or the S<sub>A</sub>-2 class with w-. However, inflected forms  
 179 can be found in von den Steinen (1892), represented in (7) based on the analyses of Bakairi phonology  
 180 and verbal morphology by Wheatley (1969), Meira (2003a, 2005), and Franchetto & Meira (2016).

- 181 (7) Bakairi (von den Steinen 1892: 131, 397, 76, 137, 374, 130)

- |  |                                  |  |
|--|----------------------------------|--|
| <p>182 a. ⟨u-yépa⟩<br/>         u-ge-pa<br/>         1S<sub>A</sub>-say-NEG<br/>         ‘I don’t say.’</p> <p>183 b. ⟨wi-táki⟩ / ⟨wi-tági⟩<br/>         w-i-taki<br/>         1S<sub>A</sub>-be-INT<br/>         ‘I was.’</p> <p>184 c. ⟨kχaewí-le⟩<br/>         k-æwi-li<br/>         1S<sub>A</sub>-come-IMM<br/>         ‘I came.’</p> | <p>185</p> <p>186</p> <p>187</p> | <p>d. ⟨kχ-itaké-he⟩<br/>         k-itági-se<br/>         1S<sub>A</sub>-go.down-NPST?<br/>         ‘I go down.’</p> <p>e. ⟨úta⟩ / ⟨uúta⟩<br/>         u-tə<br/>         1S<sub>A</sub>-go<br/>         ‘I go.’</p> <p>f. ⟨töre-w-akine⟩<br/>         tərə w-a-kine<br/>         there 1S<sub>A</sub>-be-PST.CONT<br/>         ‘I was there.’</p> |
|--|----------------------------------|--|

188 All descriptions of Ikpeng list k- as the only 1S<sub>A</sub> marker (Pachêco 1997: 55; Campetela 1997: 105;  
 189 Pachêco 2001: 64; Alves Chagas 2013: 205). However, most Ikpeng cognates of the verbs in question do  
 190 not take k-, but rather i- or Ø (8), with the exception of k-prefixed ‘to go’ (9). There is a formally identical  
 191 Ikpeng cognate of Arara iptonj ‘to go down’, but no first person forms are attested (Angela Chagas, p.c.).  
 192 While reflexes of \*a[p] ‘be-1’ do exist in Ikpeng, apparently only reflexes of \*eti ‘be-2’ occur with first  
 193 person prefixes (Gildea 2018: 401).

- 194 (8) Ikpeng

- 195 a. i-ge-li  
 1-say-REC  
 ‘I said.’ (Pachêco 2001: 209)
- 196 b. Ø-efji-li  
 1-be-REC  
 ‘I was.’ (Pachêco 2001: 139)
- 197 c. afjagotpop Ø-ip-fji ik-gwa-kfji  
 always 1-bathe-NPST river-LOC.aquatic-ALL  
 ‘I always bathe in this river.’ (Pachêco 1997: 68)

- 198 (9) Ikpeng (Pachêco 2001: 80)

- 199 k-aran-fji  
 1-go-NPST  
 ‘I’m going.’

Table 6: Verbs preserving 1S<sub>A</sub> \*w- in Proto-Pekodian (Alves 2017: 153, 200; Pachêco 2001: 42, 80, 139, 209; von den Steinen 1892: 76, 130-131, 374, 397; Pachêco 1997: 68; Meira 2003a: 4)

	Proto-Pekodian	Arara	Ikpeng	Bakairi
‘say’	*wi-ge-	wi-ge-	i-ge-	u-ge-
‘go’	*w-itən-	w-ido-	k-aran-	u-tə-
‘be-1’	*w-ap-	w-ap-	–	w-a-
‘be-2’	*w-eŋi-	w-iŋi-	Ø-eŋi-	w-i-
‘come’	*w-epi-	w-ebi-	k-arep-	k-æewi-
‘go down’	*w-iptə-	w-ipton-	?-ipton-	k-itəgi-
‘bathe’	*w-ipi-	w-ibi-	Ø-ip-	w-i-

Table 7: Loss of \*w in Ikpeng (de Souza 1993: 44, 70; Alves Chagas 2013: 118; Alves 2017: 143; Pachêco 2001: 21, 164; de Souza 2010: 9; Campetela 1997: 40)

Meaning	Arara	Ikpeng
‘to defecate’	watke	atke
‘DAT’	wina	ina
‘dog’	wokori	akari
‘capuchin monkey’	tawe	tae
‘to sleep’	winki	inki

Reconstructed Proto-Pekodian forms of conservatively inflected verbs are given in Table 6. Newly identified Ikpeng i-/Ø is demonstrably a reflex of Proto-Xinguan \*w(i)-, based on other (albeit irregular) cases of loss of \*w (Table 7). Similarly, the change of \*wi to Bakairi u is found in correspondences like udo (Meira & Franchetto 2005) from Proto-Cariban \*witoto ‘person’ (Gildea & D. Payne 2007: 4). Thus, a 1S<sub>A</sub> prefix \*w(i)- can securely be reconstructed to Proto-Pekodian, identical to its Arara reflex in form and distribution. In later, individual developments, Bakairi extended k- to ‘to go down’, and Ikpeng to ‘to go’.

Reconstructions of verb stems are deferred to Section 3.2, but a comment on ‘to come’ is in order: The stems are not fully cognate, as Ikpeng and Bakairi both show a reflex of the Proto-Pekodian detransitivizer \*əd- in combination with a root reconstructible as \*epi (Section 3.2.4). In contrast, the Arara first person form has a bare reflex of \*epi. While reflexes of \*əd-epi can be found elsewhere in the Arara paradigm (10), Ikpeng and Bakairi uniformly reflect \*əd-ebi.

- (10) Arara (Alves 2017: 150)  
 m-odebi-ni  
 2S<sub>A</sub>-come-REC  
 ‘You came.’

Following Meira’s (1998: 114) line of reasoning for a similar pattern in Taranoan (see also Section 3.1.3), the idiosyncratic pattern in Arara can be reconstructed to Proto-Pekodian, with Bakairi and Ikpeng independently leveling the paradigm in favor of \*əd-epi.

### 3.1.2 Proto-Waiwaian \*k-

This extension, one of the Parukotoan innovations shown in Section 2.2, resulted in the Hixkaryána patterns from Section 1. Proto-Waiwaian further extended the 1S<sub>p</sub> prefix \*k- (innovated in Proto-Parukotoan) to 1S<sub>A</sub>. For regularly inflected verbs, this created a unified 1s category (Table 8).

Table 8: Regular ‘to fall’ (S<sub>A</sub>) and ‘to sleep’ (S<sub>P</sub>) in Proto-Waiwaian (Derbyshire 1985: 189-190, 196; W. N. Hawkins & R. E. Hawkins 1953: 209, 211; Howard 2001: 150; R. E. Hawkins 1998: 30)

	‘to fall’			‘to sleep’		
	Proto-Waiwaian	Hixkaryána	Waiwai	Proto-Waiwaian	Hixkaryána	Waiwai
1	k-eφurka-	k-ehurka-	k-eφirka-	ki-winiki-	ki-niki-	ki-winiki-
2	m-eφurka-	m-ehurka-	m-eφirka-	o-winiki-	o-wniki-	mi-winiki-
1+2	t-eφurka-	t-ehurka-	tj-eφirka-	tit-winiki-	ti-niki-	tit-winiki-
3	ɲ-eφurka-	ɲ-ehurka-	ɲ-eφirka-	ni-winiki-	ni-niki-	ni-winiki-

Not all S<sub>A</sub> verbs were affected: Waiwai ka ‘to say’ does not take ki-, but rather conservative wi- (11a). Its Hixkaryána counterpart has a prefix i- (11b), which also occurs in 1>3 scenarios in Hixkaryána (11c), corresponding to Waiwai wi- (11d).

(11) a. Waiwai (R. E. Hawkins 1998: 71)

wiikekpe  
wi-ka-jakpe  
1-say-PST  
‘I said.’

b. Hixkaryána (Derbyshire 1985: 124)

roxehra nay hami Kaywerye ikekoni  
ro-je-hira n-a-je hami kajwer<sup>je</sup> i-ka-jakoni  
1-DES-NEG 3-be-NPST.UNCERT EVID K. 1S<sub>A</sub>-say-REM.CONT  
‘I said (to myself), “Kaywerye evidently doesn’t like me”’

c. Hixkaryána (Derbyshire 1985: 191)

i-koroka-no  
1>3-wash-IMM  
‘I washed him.’

d. Waiwai (R. E. Hawkins 1998: 192)

wiyesî  
wi-jo-jasi  
1>3-boil-NPST  
‘I will boil it.’

The regular correspondence in transitive verbs points to Hixkaryána i- on intransitive verbs as another reflex of \*wi-, with a similar phonological reduction as in Ikpeng (Section 3.1.1). Notably, Derbyshire (1985) analyzes this i- as the regular 1>3 prefix, because he considers Hixkaryána ka ‘to say’ to be transitive (Section 3.2.1).

There are three more verbs which did not take innovative \*k- in Proto-Waiwaian (Table 9). The two forms for ‘to be’ are unproblematic, whereas ‘to go’ is a special case. While Hixkaryána has the expected i-, Waiwai seems to have combined innovative k- with old \*w-, an analysis also considered by Gildea (1998: 90). Alternatively, this form may have been influenced by deverbalized forms of ‘to go’ showing a fossilized of the S<sub>A</sub> class marker \*w- (e.g., o-wto-topo-nho ‘my trip’ [R. E. Hawkins 1998: 92]). Either way, the first person form Hixkaryána ‘to go’ clearly points to Proto-Waiwaian \*wi-tom-.

### 3.1.3 Proto-Tiriyoan \*t-

The moniker Tiriyoan (Hammarström et al. 2020) subsumes Tiriyo and Akuriyo, the more closely related of the three Taranoan languages identified by Girard (1971), with Carijona as a sister. Meira (1998) provides an extensive phonological, morphological, and lexical reconstruction of Proto-Taranoan, facing

Table 9: Verbs preserving 1S<sub>A</sub> \*w- in Proto-Waiwaian (Derbyshire 1979: 4; R. E. Hawkins 1998: 71, 85; Derbyshire 1985: 70, 197-198; p.c., Spike Gildea)

	Proto-Waiwaian	Hixkaryána	Waiwai
‘say’	*wi-ka-	i-ka-	wi-ka-
‘go’	*wi-tom-	i-to-	kiw-tom-
‘be-1’	*w-ah-	w-ah-	w-a-
‘be-2’	*w-eʃi-	w-eʃe-	w-eʃi-

Table 10: Regular Proto-Tiriyóan S<sub>A</sub> verbs (Gildea 1994: 87; Meira 1999: 292, 294)

	‘to bathe (INTR)’ Proto-Tiriyóan	Tiriyó	Akuriyó	‘to sleep’ Proto-Tiriyóan	Tiriyó	Akuriyó
1	*ʃ-epi-	s-epi-	ʃ-epi-	*t-əəniki-	t-əəniki-	k-əəniki-
2	*m-epi-	m-epi-	m-epi-	*m-əəniki-	m-əəniki-	m-əəniki-
1+2	*ke-epi-	ke-epi-	ke-epi-	*kit-əəniki-	kit-əəniki-	kəʔ-əəniki-
3	*n-epi-	n-epi-	n-epi-	*n-əəniki-	n-əəniki-	n-əəniki-

an interesting puzzle in the Set I paradigms of Tiriyó and Akuriyó: Proto-Cariban 1>3 \*t- and 1S<sub>A</sub> \*w- seem to have switched places, creating a regular 1S<sub>A</sub> marker of the form \*ʃ- / \_e, \*t- / \_ə (Table 10).<sup>6</sup> The question of how this switch happened in detail (Meira 1998: 107–112) is still open, although a scenario seems necessary in which both \*t- and \*w- for a time occurred on both transitive and intransitive verbs (Meira 1998: 112).<sup>7</sup>

As for verbs unaffected by the spread of \*t-, Meira (1998) reconstructs four of the items in Table 11 as taking \*w- in Proto-Taranoan, for which reconstructed Proto-Tiriyóan forms are substituted here.<sup>8</sup> As a fifth verb \*eʔi ‘be-1’ can be added, whose Tiriyó reflex retains w-. The idiosyncratic Akuriyó first person prefix ə- on ‘to go’ is identified as a reflex of \*wi- by Meira (1998: 113), which is supported the fact that both components of the idiosyncratic change \*wi- > ə- (\*w → ∅ and \*i → ə) are found in other person prefixes (12a–b).

(12) Akuriyó

Table 11: Verbs preserving 1S<sub>A</sub> \*w- in Proto-Tiriyóan (Meira 1999: 292, 294, 339, 1998: 112-115, 165)

	Proto-Tiriyóan	Tiriyó	Akuriyó
‘say’	*wi-ka-	wi-ka-	wi-ka-
‘go’	*w-itəmi-	wi-tən-	ə-təmi-
‘be-1’	*w-a-	w-a-	∅-a-
‘be-2’	*w-eʔi-	w-ei-	?-eʔi-
‘come’	*w-əʔepi-	w-əepi-	∅-eepi-

<sup>6</sup>The latter allomorph was subsequently replaced by k- in Akuriyó (Section 3.1.4).

<sup>7</sup>In fact, even the issue of when this happened is open. It could have happened at the Proto-Taranoan stage, but the subsequent introduction of j- in Carijona (Section 3.1.5) would have erased any traces of such an innovation. Accordingly, Meira (1998) hesitates to assign this extension to a specific proto-language. The decision taken here to assign the innovation to Proto-Tiriyóan does not affect the results of this study.

<sup>8</sup>The present reconstruction of ‘to come’ diverges from Meira’s (1998: 114–115), who reconstructs Proto-Taranoan \*əepi for first, but \*eepi for other persons, based on the paradigmatic pattern in Tiriyó and the vowel length in Akuriyó. Akuriyó and Carijona would then have levelled that pattern, similar to what was suggested for the Pekodian languages (Section 3.1.1). Here, both Tiriyó əepi and Akuriyó eepi are identified as reflecting \*ətepi (Section 3.2.4), via Proto-Taranoan \*(əʃ-)epi and Proto-Tiriyóan \*(əʔ)epi.

Table 12: Regular Akuriyó 1S<sub>A</sub> markers (Gildea 1994: 77, 79, 82, 84-87)

first person k-	first person tʃ-
æmpa- ‘to learn’	epi- ‘to bathe (INTR)’
əʃʃena- ‘to cry’	ekirika- ‘to stay back’
əiwa- ‘to tremble’	entapo- ‘to yawn’
əmami- ‘to enter’	etonema- ‘to lie down’
ətajɪŋka- ‘to run’	ewai- ‘to sit down’
əturu- ‘to talk’	ehpa- ‘to bathe (INTR)’
əniki- ‘to sleep’	

258 a. wi-toka  
1>3-hit  
‘I hit him/her.’ (Gildea 1994: 86)

259 b. kəʔ-eepi  
1+2-come  
‘We came.’ (Meira 1998: 114)

#### 260 3.1.4 Akuriyó k-

261 After the split of Proto-Tiriyóan, when \*t-/tʃ- had largely replaced \*w-, Akuriyó innovated a third 1S<sub>A</sub>  
262 marker k-. k- and tʃ- show a clear phonologically conditioned distribution in Gildea’s (1994) Akuriyó  
263 data (Table 12). Meira (1998: 107) largely confirms that distribution, but mentions “several cases of  
264 first person t- in Akuriyó” (on ə-initial verbs), albeit without any examples. He also suggests that k-  
265 may be more recent, which is plausible: since the distribution \*t- / \_\_ə / \*tʃ- / \_\_e is reconstructible to  
266 Proto-Tiriyóan, the most straightforward scenario is k- replacing \*t- but not \*tʃ- in Akuriyó. The few  
267 t- mentioned by Meira (1998) were then perhaps reintroduced under Tiriyó influence. However, since  
268 there are no examples of – or more information about – ə-initial verbs with t-, these cases cannot be  
269 discussed further.

270 The verbs listed for Proto-Tiriyóan in Table 11 in Section 3.1.3 of course also resisted the extension  
271 of k- in Akuriyó, although the first-person form of the copular verb eʔi is unknown. In addition, there is  
272 an S<sub>A</sub> verb i(h)tə ‘to go down’, which has an irregular first person marker p-, apparently reconstructible  
273 to Proto-Tiriyóan (13). It was not affected by the extension of Akuriyó k-, but whether it was an S<sub>A</sub> verb  
274 when Proto-Tiriyóan \*t- was introduced is unclear (see Section 3.2.5).

- 275 (13) First person forms of ‘to go down’  
276 Tiriyó p-ih̥tə- (Meira 1999: 294)  
Akuriyó p-itə- (Gildea 1994: 84)

#### 277 3.1.5 Carijona j-

278 Carijona, the third Taranoan language, extended the 1S<sub>P</sub> marker j(i)-<sup>9</sup> to S<sub>A</sub> verbs (Meira 1998: 105–107).  
279 Combined with the extension of 2S<sub>A</sub> m- and 1+2S<sub>A</sub> kit-/kis- to S<sub>P</sub> verbs, this created a single unified s  
280 category for regular verbs (Table 13). Although the split-s system was lost entirely, former S<sub>A</sub> verbs can  
281 be identified by the presence of a detransitivizer, like eh̥nəhi ‘to fight’ (14), derived from hin̥əhi ‘to kill’  
282 (Robayo Moreno 2000: 179).

- 283 (14) Carijona (Koch-Grünberg 1908: 79)  
284 h̥eɲe(x)tónoko-máɾɛ y-e-h̥eɲe(x)yai  
hin̥əh̥tono-ko=marə j-e-hin̥əhi-jai  
enemy-PL=with 1-DETRZ-kill-NPST.CERT  
‘I fight with the enemies.’

<sup>9</sup>Since all affected S<sub>A</sub> verbs are V-initial, only the / \_\_V allomorph j- occurs in that context.

Table 13: Regular Carijona verbs (Robayo Moreno 2000: 173; Meira 1998: 106)

	‘to dance’	‘to arrive’
1	j-eharaga-	ji-tuda-
2	m-eharaga-	mi-tuda-
1+2	kis-eharaga-	kisi-tuda-
3	n-eharaga-	ni-tuda-

Table 14: Regular Yukpa verbs (Largo 2011: 72, 76; Meira 2006b: 139)

	‘to wash self’	‘to sleep’	‘to fall’
1	j-otum-	ji-ni-	j-ata-
2	m-otum-	mi-ni-	m-ata-
3	n-otum-	ni-ni-	n-ata-

As noted in Section 3.1.3, this extension also erased any traces of putative Proto-Taranoan 1S<sub>A</sub> \*t-. However, it did not fully eclipse the old 1S<sub>A</sub> marker \*w-, which is attested as being preserved in the verbs tə ‘to go’ (15a) and a ‘to be’ (15b). In addition, the verb ka ‘to say’ has a zero-marked first-person form (15c).

(15) Carijona (Guerrero-Beltrán 2016: 5, 42, personal communication)

- a. wi-tə-e=rehe  
1-go-NPST=FRUST  
‘I almost go (but I am not going to go).’
- b. əji-marə-ne w-a-e  
2-COM-PL 1-be-NPST  
‘I am with you all.’
- c. dēmēmara kae ewi iya  
n-təmə=mara Ø-ka-e əwi i-ja  
3-go=DUB 1-say-NPST.CERT 1PRO 3-OBL  
“‘Did s/he leave?’”, I say to him.’

Based on other C-initial verbs like tə ‘to go’ or tuda ‘to arrive’, ka ‘to say’ should either have conservative wi- or innovative ji-, so the zero is unexpected. It is analysed here as a reflex of \*wi-, primarily due to the loss of \*w in Ikpeng and Hixkaryána. While those developments were more regular, an already irregular marker undergoing idiosyncratic phonological erosion is not that surprising, see Akuriyó \*wi- > ə- in the preceding section. Alternatively, the divergent development of \*w- on ka ‘to say’ and tə ‘to go’ may be due to the latter’s originally V-initial nature (Section 3.2.2).

### 3.1.6 Yukpa j-

The divergent nature of Yukpa<sup>10</sup> is inter alia visible in the loss of many Set I forms and the formation of non-cognate innovative constructions (Meira 2006b). However, it does preserve the Set I prefixes in the immediate past, which shows a unified intransitive paradigm (Table 14). The wholesale loss of 1+2 as an inflectional value was combined with the extension of 2S<sub>A</sub> m(i)- to (now former) S<sub>P</sub> verbs like ni ‘to sleep’. These verbs share their first person marker j(i)- with former S<sub>A</sub> verbs like otum ‘to wash self’, identifiable by their semantics and the reflex of \*əte/e-. Since j(i)- is the reflex of the Proto-Cariban 1S<sub>(P)</sub>

<sup>10</sup>Very little is known about its sister Japreria, whose status as a dialect of Yukpa is contested by Oquendo (2004).



marker \*u(j)- (Gildea 1998: 92), it also occurs on transitive verbs in 3>1 scenarios (16a). In contrast, 1>3 scenarios are zero-marked (16b).

(16) Yukpa (Meira 2006b: 139)

- a. aw j-esare  
1PRO 3>1-see  
'S/he saw me.'
- b. aw Ø-esare  
1PRO 1>3-see  
'I saw it.'

Since Proto-Cariban 1S<sub>A</sub> \*w(i)- was extended to 1>3 scenarios in most languages (Gildea 1998: 81–82), and given its inclination for phonological erosion (Sections 3.1.1 and 3.1.2), the zero marking in 1>3 scenarios can be identified as the Yukpa reflex of 1S<sub>A</sub> \*w-.

In intransitive verbs, this first-person zero marking is attested with a single verb, to 'to go' (17). It diverges from regular C-initial verbs with ji-, like 'to sleep' (Table 14). It can thus be identified as having resisted the extension of j- in Yukpa.

(17) Yukpa (Meira 2006b: 139)

- aw Ø-to  
1PRO 1S<sub>A</sub>-go  
'I went.'

## 3.2 Conservative verbs in comparison

In Section 3.1, six incomplete extensions of personal prefixes into 1S<sub>A</sub> territory and the verbs unaffected by them were identified. This set is rather small in most cases, and many of the verbs remain conservative in different (proto-)languages. Here, these verbs are investigated from a comparative perspective: \*ka[ti] 'to say' (Section 3.2.1), \*itə[mə] 'to go' (Section 3.2.2), both roots of the copula \*eti and \*a[p] (Section 3.2.3), \*(ət)jəpi 'to come' (Section 3.2.4), \*ipitə 'to go down' (Section 3.2.5), and \*e-pi 'to bathe' (Section 3.2.6). The large and phonologically coherent group of e-initial verbs not affected by the extension of Akuriyó k- (Section 3.1.4) will not be discussed.

### 3.2.1 \*ka[ti] 'to say'

This verb was not affected by any of the extensions in Proto-Pekodian, Proto-Waiwaian, Proto-Tiriyoan, Akuriyó, or Carijona (Sections 3.1.1 to 3.1.5), while no first person form of its Yukpa reflex ka is attested. Most reflexes are simply ka, but a fleeting syllable \*ti is reconstructed by Gildea & D. Payne (2007), visible in the imperative forms of some languages. Table 15 shows a comparison of the longest attested forms for each language.<sup>11</sup>

As mentioned in Section 3.1.2, Derbyshire (1985) analyzes Hixkaryána ka[s] as transitive, a choice not only motivated by a desire to avoid an idiosyncratic intransitive first person prefix i- instead of regular ki-. The verb also shows the complementary distribution of third person n- and preceding objects typical of transitive verbs in Cariban (Gildea 1998: 60–81). Due to its semantics, these objects are either ideophones or direct speech (18).

<sup>11</sup>Cognate segments in Tables 15 to 21 were aligned automatically with LingPy (List et al. 2021), for improved exposition of correspondences. Brackets indicate segments not present in all forms.

Table 15: Reflexes of \*ka[ti] ‘to say’ (Meira 2005: 267, 2003a: 4; Franchetto 2008: 48; Pachêco 2001: 209, 279; Alves 2017: 80, 153; Derbyshire 1985: 182; Meira 1998: 113; E. Koehn & S. Koehn 1986: 107; R. E. Hawkins 1998: 26; Camargo & Tapinkili 2010: 66; Abbott 1991: 59; Swiggers 2010: 123; Courtz 2008: 430; Caesar-Fox 2003: 125; M.-C. Mattéi-Müller 1994: 102; Largo 2011: 63; p.c., Spike Gildea)

Language	Form			
Werikyana	ka[s]	k	a	s
Proto-Waiwaian	*ka[s]	k	a	s
Hixkaryána	ka[s]	k	a	s
Waiwai	ka[s]	k	a	s
Proto-Pekodian	*ge	g	e	
Proto-Pekodian	*ke	k	e	
Arara	ge	g	e	
Arara	ke	k	e	
Ikpeng	ge	g	e	
Ikpeng	k[e]	k	e	
Bakairi	ge	g	e	
Bakairi	ke	k	e	
Proto-Tiriyoan	*ka	k	a	
Tiriyó	ka	k	a	
Akuriyó	ka	k	a	
Carijona	ka	k	a	
Wayana	ka[i]	k	a	i
Apalaí	ka[ʃi]	k	a	ʃ i
Kari’ña	ka	k	a	
Kapón	ka	k	a	
Pemón	ka	k	a	
Macushi	ka	k	a	
Panare	ka[h]	k	a	h
Upper Xingu Carib	ki	k	i	
Yukpa	ka	k	a	

## 338 (18) Hixkaryána

- 339 a. oní wyaro nkekoni biryekomo, tiyoni wya  
 oní wjaro n-ka-jakoni bir'ekomo ti-joni wja  
 this like 3-say-REM.CONT boy COR-mother OBL  
 'This is what the boy said to his mother.' (Derbyshire 1985: 36)
- 340 b. moro ha, ketxkoná hatá.  
 moro ha ka-jatʃkoni hati  
 MED.DEM.INAN INTS say-REM.CONT.PL HSY  
 '“That one there” they said.' (Derbyshire 1965: 14)

341 In (18a), the prefix *n-* occurs because there is no preceding object ('he said it like this'), while does not  
 342 occur in (18b) where the verb is preceded by direct speech. Outside of Hixkaryána, at least the Tiriyó  
 343 reflex shows the same pattern, albeit inconsistently so (Carlin 2004: 267).

344 Reflexes of \*ka[ti] 'to say' also show transitive patterns in their derivational suffixes: In Tiriyó, it is  
 345 the only intransitive verb (inconsistently) taking transitive *-po* (CAUS) and *-ne* (AGT.NMLZ) (Meira 1999:  
 346 263, 169). It also exceptionally takes the former suffix in Kari'ña (Courtz 2008: 82) and Wayana (Tavares  
 347 2005: 258). The agent nominalizer *\*-ne* became the Panare inflectional suffix *-ne* on transitive verbs  
 348 (Gildea 1998: 184–185). The combination of *ka* and *-ne* likely led T. E. Payne & D. L. Payne (2013: 214)  
 349 to categorize it as transitive, disagreeing with M.-C. Mattéi-Müller (1994: 102). Finally, reflexes of the  
 350 transitive causativizer *\*-metipo* (Gildea 2015) are found with *ka* in Apalaí (E. Koehn & S. Koehn 1986:  
 351 51) and Waiwai (R. E. Hawkins 1998: 52).

352 Arguments in favor of intransitive 'to say' primarily come from its inflectional prefixes. Kari'ña has a  
 353 minimal pair between transitive *ka* 'to remove' and intransitive *ka* 'to say', *sikai* 'I took it away' vs *wikai*  
 354 'I said' (Courtz 2008: 288, 45). Similarly, Proto-Pekodian *\*ke* 'to say' had 1S<sub>A</sub> *\*w-* (Section 3.1.1), rather  
 355 than 1>3 *s-* (Bakairi) or *\*ini-* (Proto-Xinguan). Additionally, languages differentiating transitive from S<sub>A</sub>  
 356 prefixes by the presence of *i* (Meira et al. 2010: 495) have *i*-final prefixes, see Akuriyó in (19a), as well  
 357 as Meira (1999: 294), Tavares (2005: 195), Pachêco (2001: 288), Alves (2017: 150), and Hoff (1968: 168)  
 358 for cognate forms in other such languages. Finally, the S<sub>A</sub> class marker *w-* occurs on nominalizations  
 359 in Kari'ña (19b), and is probably reflected as vowel length in the Tiriyó (Meira 1999: 333) and Wayana  
 360 (Tavares 2005: 196) participles.

## 361 (19) a. Akuriyó (Meira 1998: 113)

- 362 mi-ka  
 2-say  
 'You said.'

## 363 b. Kari'ña (Courtz 2008: 202)

- 364 Òmakon 'wa oti ywykàpo kaiko.  
 o-ʔma-kon ʔwa oti i-wi-ka-ʔpo kai-ko  
 2-child-PL OBL greeting 1-S<sub>A</sub>-say-PST.NMLZ say-IMP  
 'Pass my greetings to your children.'

365 In summary, this verb can be reconstructed as intransitive based on its (inflectional) prefixes, but  
 366 transitive based on some (derivational) suffixes. Hixkaryána has lost the main intransitive criteria, mak-  
 367 ing its reflex look more like a transitive verb.

## 368 3.2.2 \*itə[mə] 'to go'

369 This verb was not affected by the any of the extensions in Section 3.1. Gildea & D. Payne (2007) recon-  
 370 struct it as C-initial \*tə[mə], like \*ka[ti] 'to say' with a fleeting second syllable. While many reflexes are  
 371 unambiguously t-initial (e.g. Hixkaryána *ntoje* 'he went' [Derbyshire 1985: 27], Tiriyó *təkə* 'go!' [Meira  
 372 1999: 246], or Wayana *kuptəm* 'we went' [Tavares 2005: 195]), the contrast with C-initial \*ka[ti] becomes

Table 16: Reflexes of \*itə[mə] ‘to go’ (Cruz 2005: 291; Meira 1999: 292; Tavares 2005: 195; Gildea 1994: 87; Alves 2017: 80, 153; Derbyshire 1985: 27, 248; R. E. Hawkins 1998: 45, 62; Pachêco 2001: 54, 80; von den Steinen 1892: 112, 374; Cáceres 2011: 181, 216; Meira 1998: 112; Hoff 1968: 168; Meira 2006b: 139; Cáceres & Gildea 2018: 4; M. C. Mattéi-Müller 1975: 74; M.-C. Mattéi-Müller 1994: 198; Abbott 1991: 48, 50; García Ferrer 2006: 172; Franchetto 2002: 6; Camargo 2002: 99; Lacerda 1991: 14; p.c., Spike Gildea)

Language	Form
Werikyana	to[mə]      t   o   m   o
Proto-Waiwaian	*[i]to[m]    i   t   o   m
Hixkaryána	[i]to        i   t   o
Waiwai	[e]to[m]    e   t   o   m
Proto-Pekodian	*itə[n]     i   t   ə   n
Arara	to            t   o
Arara	ido          i   d   o
Ikpeng	aran        a   r   a   n
Ikpeng	ero         e   r   o
Bakairi	[i]tə        i   t   ə
Proto-Tiriyóan	*[ə]tə[mɪ]   ə   t   ə   m   i
Tiriyó	tə[n]        t   ə   n
Akuriyó	[ə]tə[mɪ]   ə   t   ə   m   i
Carijona	tə[mə]      t   ə   m   ə
Wayana	[i]tə[m]     i   t   ə   m
Apalaí	ito          i   t   o
Kari’ña	[i]ʔ         i   ʔ
Kari’ña	to            t   o
Ye’kwana	itə[mə]    i   t   ə   m   ə
Ingarikó	ətə         ə   t   ə
Pemón	[e]tə        e   t   ə
Macushi	[a]ti        a   t   i
Panare	tə[n]        t   ə   n
Yawarana	tə            t   ə
Mapoyo	tə            t   ə
Upper Xingu Carib	[e]te        e   t   e
Yukpa	to            t   o
Waimiri-Atroari	iʔ           i   ʔ

clear once all forms are considered (Table 16). *i* is predominant and can tentatively be reconstructed, although languages throughout the family reflect \**ə*. Since many languages only show *i* in certain contexts, even forms like Tiriyó witənnə ‘I went’ (Meira 1999: 43) are ambiguous, since epenthetic *i* breaks up CC clusters on prefix-verb boundaries.

### 3.2.3 \*eti and \*a[p] ‘to be’

\*a[p] is the older copula and already had various irregularities in Proto-Cariban (Gildea 2018). \*eti is reconstructed by Meira & Gildea (2009) and Gildea (2018) as originally meaning ‘to dwell, live’, but serving as a copula already in Proto-Cariban.<sup>12</sup> Reflexes of these roots are used suppletively, conditioned by person and/or TAM. Both roots preserved 1S<sub>A</sub> \*w- in Proto-Pekodian, Proto-Waiwaian, and Proto-Tiriyóan (Sections 3.1.1 to 3.1.3). Akuriyó a was not targeted by the extension of k- (Section 3.1.4), while no first person form of eʔi is attested. Carijona innovated j-, but only in the reflex of \*eti (20); the a

<sup>12</sup>Such a stative, locative source is also suggested by the existence of ifʃi ‘to lie down’ in Arara (Alves 2017: 196).

384 root preserves w- (Section 3.1.5). Yukpa introduced j- to the reflexes of both \*a[p] and \*eti, which are  
 385 preserved as encliticized auxiliaries (21).

- 386 (20) Carijona (Robayo Moreno 1989: 177)  
 387 iretibə eʃʃinəme gərə j-eʃʃi  
 ireti-bə eʃʃi-nə=me gərə j-eʃʃi-i  
 then-from be-INF=ATTRZ still 1-be-PFV  
 ‘Then I was already grown up.’

- 388 (21) Yukpa (Meira 2006b: 143–144)

	NPST	PST
1	=j-a(-s)	=j-e
2	=mak(o)	=m-e
3	=mak(o)	=n-e

390 A comprehensive comparative overview of both roots is given by Gildea (2018: 375–382); they will not  
 391 be discussed in detail here.

#### 392 3.2.4 \*(ət-)epi ‘to come’

393 Innovative \*k- was introduced on the Ikpeng and Bakairi reflexes of \*ət-epi, but not on the Arara reflex  
 394 of \*epi (Section 3.1.1). The reflex of \*ət-epi resisted the introduction of Proto-Tiriyoan \*t- (Section 3.1.3).  
 395 Carijona ehi shows innovative j-, rather than conservative w- (22). No Yukpa reflex of this verb is attested,  
 396 and it was replaced in Proto-Waiwaian by \*omoki ‘to come’.

- 397 (22) Carijona (Guerrero Beltrán 2019: 102)  
 398 əji-wa-e j-eh-i  
 2-search-SUP 1-come-PFV  
 ‘I came looking for you.’

399 Gildea & D. Payne’s (2007) reconstruction \*ətepi can be segmented into an optional prefix \*ət- and a root  
 400 \*epi, since reflexes can be grouped into those with a reflex of \*ət- and those without (Table 17). As seen  
 401 in Table 18, this division can exist within a single paradigm.

402 Long \*ət-epi lost \*t in Tiriyo, Apalaí, and Bakairi, but only the first development is due to regular  
 403 sound changes (Meira 1998: 31–32). Akuriyó reflects \*əte as ee, where eepi cannot be a reflex of \*epi  
 404 due the otherwise unexpected vowel length (Meira 1998: 114–115). Other languages coalesced \*əte to  
 405 \*əə, with \*əəpi being reflected in Upper Xingu Carib (Gildea 2012: 452), Kari’ña, Werikyana, Panare,  
 406 and Yawarana. \*e-initial transitive verbs detransitivized with \*ət- underwent the same development in  
 407 Kari’ña, creating minimal pairs for length (Meira et al. 2010: 509–510), while \*ət-e > \*əə is irregular at  
 408 least in Werikyana and Panare.

409 The Pemongan languages and Werikyana point to \*jəpi rather than \*epi, although Werikyana johi is  
 410 very rare in contrast to more frequent o(o)hi. It only occurs in the third person form of the Progressive,  
 411 meaning that the j may be a reflex of third person \*i-. However, regular o-initial Werikyana verbs have  
 412 no third person prefix (Table 19), while i- occurs with C-initial to[mo] ‘to go’, suggesting that j is indeed  
 413 part of the root. Putative Proto-Cariban \*jəpi could yield \*epi via the two widespread sound changes \*ə  
 414 → \*e / \*j\_ and \*j → ∅ / #\_ (Meira et al. 2010). The argument against this reconstruction is that \*ə →  
 415 \*e / \*j\_ did not happen in Proto-Parukotoan, and only inconsistently in Proto-Panare-Pemongan and  
 416 Mapoyo-Yawarana (Meira et al. 2010: 501–502; Gildea et al. 2010). Thus, it does not explain Werikyana  
 417 ehi, nor the total absence of the sequence \*jə in Panare and Mapoyo-Yawarana.

418 The clear segmentability of \*ət- in combination with its form suggest that it is a detransitivizing pre-  
 419 fix. Although the combination of a detransitivizer and an intransitive verb makes no sense semantically,  
 420 some historical Sp verbs are attested as adding the detransitivizer to become SA verbs. For example,

Table 17: Reflexes of *\*(ət-)epi* ‘to come’ (Abbott 1991: 32; Álvarez 2000: 102; Caesar-Fox 2003: 125; Cruz 2005: 299, 415; Cáceres 2011: 438; Robayo Moreno 2000: 178; Meira 1998: 168; M. C. Mattéi-Müller 1975: 74; Meira 1999: 294; Alves 2017: 113, 150; E. Koehn & S. Koehn 1986: 37; Pachêco 2001: 265; Stegeman & Hunter 2014: 160; Meira 2003a: 4; T. E. Payne & D. L. Payne 2013: 65, 451; Méndez-Arocha 1959: 68; Cáceres Arandia et al. 2017; Hoff 1968: 420, 437; Meira & Franchetto 2005: 182; Franchetto 1986: 42; p.c., Spike Gildea)

Language	Form					
Werikyana	ehi			e	h	i
Werikyana	johi			j	o	i
Werikyana	o[o]hi	oo	-		h	i
Proto-Pekodian	*epi			e	p	i
Proto-Pekodian	*ədepi	ə	d	-	e	p
Arara	ebi			e	b	i
Arara	odebi	o	d	-	e	b
Ikpeng	arep	a	r	-	e	p
Bakairi	əewi	ə		-	e	w
Proto-Tiriyoan	*epi			e	p	i
Proto-Tiriyoan	*əʔepi	ə	ʔ	-	e	p
Tiriyó	epi			e	p	i
Tiriyó	əe[pɪ]	ə		-	e	p
Akuriyó	eeɪ	ee		-		p
Carijona	eh[i]			e	h	i
Apalaí	oeɪ	o		-	e	p
Kari’ña	o[o]pɪ	oo		-		p
Ye’kwana	ehə			e	h	ə
Akawaio	jepɪ			j	e	p
Akawaio	əsɪpɪ	ə	s	-	i	p
Ingarikó	jepə			j	e	p
Ingarikó	jə			j	ə	
Patamona	jepɪ			j	e	p
Patamona	jəpɪ			j	ə	p
Pemón	jepɪ			j	e	p
Macushi	ɪpɪ			i	p	i
Panare	ə[ə]pɪ	əə		-		p
Yawarana	epɪ			e	p	i
Yawarana	əəpɪ	əə		-		p
Mapoyo	epɪ			e	p	i
Upper Xingu Carib	e[e]	ee				
Upper Xingu Carib	i					i

Table 18: *\*(ət-)epi* ‘to come’ in paradigms (Alves 2017: 113, 150, 153, 156; Meira 1999: 294; p.c., Spike Gildea)

	Werikyana	Arara	Tiriyó
1	w-ooɪ-	w-ebi-	w-əepɪ-
2	m-ooɪ-	m-odebi-	mən-epɪ
1+2	kis-ohɪ-	kud-ebi-	ke-epɪ
3	n-ehɪ-	t-ebi-	n-epɪ

Table 19: Werikyana S<sub>A</sub> verbs in the Progressive (Spike Gildea, p.c.)

	‘to come’	‘to dream’	‘to go’
1	Ø-w-oohi-	Ø-w-osone-	Ø-wi-to-
2	o-w-ohi-	o-w-osone-	o-w-to-
1+2	ku-w-ohi-	ku-w-osone-	ki-w-to-
3	Ø-johi-	Ø-osone-	i-to-

the Proto-Cariban S<sub>P</sub> verb \*winiki ‘to sleep’ becomes Tiriyo ənɪki (Meira 1999: 252) and Kari’ña əʔnɪki (Courtz 2008: 429), both S<sub>A</sub>. Waiwai ‘to sleep’ can be winik (R. E. Hawkins 1998: 30) or et-winik (W. N. Hawkins & R. E. Hawkins 1953: 204). However, unlike ‘to sleep’, bare \*epi ‘to come’ apparently was an S<sub>A</sub> verb already (although its reflexes in languages with split-s mostly co-occur with reflexes of \*ət-epi).

### 3.2.5 \*ipitə ‘to go down’

Reflexes of this verb were not affected by the extensions of \*k- in Proto-Pekodian (Section 3.1.1) and k- in Akuriyo (Section 3.1.4). Its resistance against the former extension was later broken in Bakairi, while its fate in Ikpeng is unknown. When Akuriyo extended k-, the verb already had a first person form irregularly inflected with p-, inherited from Proto-Tiriyoan. At first sight, it was also affected by the extensions of j- in Carijona (23a) and Yukpa (23b).

- (23) a. Carijona (David Felipe Guerrero, p.c.)  
 irə wafjinakano tae j-chitə-e  
 INAN.ANA body.of.water along.bounded 1-go.down-NPST  
 ‘...I go down through that guachinacán.’  
 b. Yukpa (Meira 2003b)  
 aw yéwtu  
 aw j-ewuhtu  
 1<sub>PRO</sub> 1-go.down  
 ‘I went down.’

However, a family-wide perspective reveals a more complicated story (Table 20).<sup>13</sup> While a verb \*ipitə can be reconstructed to Proto-Cariban, different (proto-)languages do not agree about its class. Its reflexes in languages that preserve the split-s system are distributed fairly evenly between S<sub>A</sub> and S<sub>P</sub>.

The verb shows traits of both classes in Wayana, making it a “mixed” verb synchronically. It takes the first and second person S<sub>P</sub> markers j- and əw- (Tavares 2005: 200), but the 1+2S<sub>A</sub> marker kut- (Tavares 2005: 206). It also shows the S<sub>A</sub> class marker w- in nominalizations (24a), but behaves like an S<sub>P</sub> verb in taking a second person prefix in imperatives (24b).

### (24) Wayana (Tavares 2005: 200)

- a. iwiptëë  
 i-w-iptə-ri  
 1-S<sub>A</sub>-go.down-NMLZ  
 ‘my going down’  
 b. əw-iptə-k  
 2-go.down-IMP  
 ‘Go down!’

<sup>13</sup>The cognacy status of parenthesized forms in Table 20 is uncertain. The reconstruction of Proto-Pekodian \*iptə treats the additional elements in daughter languages as non-cognate. Meira & Franchetto (2005) identify no correspondence between Bakairi gi and Ikpeng ŋ, and at least the addition of a final ŋ in Proto-Xinguan is attested elsewhere: a) Proto-Cariban \*əne ‘to see’, Arara and Ikpeng enen; b) Proto-Cariban \*əta ‘to hear’, Arara taŋ, Ikpeng iran; and c) Proto-Cariban \*ənə ‘to eat meat’, Arara onon ‘to bite’ (Gildea & D. Payne 2007: 8; Alves 2017: 56, 144, 57; Pacheco 2001: 25, 270).

Table 20: Reflexes of \*ipitə ‘to go down’ (Meira 2003b; Derbyshire 1979: 196; R. E. Hawkins 1998: 55; Guerrero Beltrán 2019: 118; Camargo & Tapinkili 2010: 44; Camargo 2002: 99; Courtz 2008: 263; Cáceres 2011: 450; Stegeman & Hunter 2014: 139; Álvarez 2008: 139; Abbott 1991: 34; M.-C. Mattéi-Müller 1994: 88; Méndez-Arocha 1959: 68; Bruno 1996: 58; Gildea 1994: 84; Alves 2017: 153; von den Steinen 1892: 137; Meira 1998: 116; p.c., Angela Fabíola Alves Chagas, Spike Gildea)

Language	Form	Class								
Proto-Parukotoan	*iϕito	Sp		i	ϕ	i	t	o		
Werikyana	ihito	Sp		i	h	i	t	o		
Proto-Waiwaian	*hto	?			h		t	o		
Hixkaryána	hto	?			h		t	o		
Waiwai	hto	–			h		t	o		
Proto-Pekodian	*iptə	S <sub>A</sub>		i	p		t	ə		
Arara	ipton	S <sub>A</sub>		i	p		t	o	-	ŋ
Ikpeng	ipton	?		i	p		t	o	-	ŋ
Bakairi	itəgi	S <sub>A</sub>		i			t	ə	-	g i
Proto-Taranoan	*ipitə	?		i	p	i	t	ə		
Proto-Tiriyóan	*ihtə	S <sub>A</sub>		i	h		t	ə		
Tiriyó	ih̥tə	S <sub>A</sub>		i	h		t	ə		
Akuriyó	i[h̥]tə	S <sub>A</sub>		i	h		t	ə		
Carijona	ehitə	–		e	h	i	t	ə		
Wayana	iptə	S <sub>A</sub> / Sp		i	p		t	ə		
Apalaí	ih̥to	Sp		i	h		t	o		
Kari’ña	oniʔto	(S <sub>A</sub> )	o - n -	i	ʔ		t	o		
Ye’kwana	əʔtə	Sp		ə	ʔ		t	ə		
Kapón	(uʔtə)	–								
Pemón	(uʔtə)	–								
Macushi	(auti)	–								
Panare	əhtə	S <sub>A</sub>		ə	h		t	ə		
Yawarana	əhtə	–		ə	h		t	ə		
Yukpa	(ew[uh]tu)	–								
Waimiri-Atroari	iti	–				i	t	i		



Its causativized form is *iptə-ka* (Tavares 2005: 255); the Proto-Cariban causativizer *\*-ka* was restricted to *S<sub>P</sub>* verbs (Gildea & Cáceres in preparation). These patterns point to ‘to go down’ being a regular *S<sub>P</sub>* verb in pre-Wayana, but partially switching to the *S<sub>A</sub>* class by taking a 1+2*S<sub>A</sub>* prefix and the *S<sub>A</sub>* class marker. This in turn implies that (inflectionally defined) *S<sub>A</sub>* reflexes in other languages fully switched from *S<sub>P</sub>*.

Wayana-external evidence supports this hypothesis: The Arara causativized form is *eniptonj* (Alves 2017: 66), and Kari’ña has a cognate form *eni?to* (Courtz 2008: 263); *oni?to* ‘to go down’ in Table 20 is a detransitivized form thereof, lit. ‘to get oneself down’. These forms reflect the transitivizer *\*en-*, occurring with *S<sub>P</sub>* verbs in Proto-Cariban (Gildea & Cáceres in preparation). Tiriyo *ih̥tə* has irregular causativized forms, also with a reflex of *\*en-* (Meira 1999: 263). In conclusion, *\*ipitə* ‘to go down’ was an *S<sub>P</sub>* verb in Proto-Cariban, but for unknown reasons switched classes in four “and a half” languages of the family.

This makes it impossible to tell whether it was affected by most extensions under discussion: For Proto-Tiriyoan, one cannot establish a relative chronology of the class switch, the introduction of idiosyncratic 1*S<sub>A</sub>* *\*p-*, and the extension of *\*t-*. Its first person form and its inflectional class in Proto-Waiwaian are unknown. For Carijona and Yukpa, one cannot rule out a verb class switch before the breakdown of the split-s system. While no language-internal evidence supports such a switch, ‘to go down’ is clearly inclined to do so; Carijona may even have inherited it as *S<sub>A</sub>* from Proto-Taranoan. In all four cases, the verb could have had *S<sub>A</sub>* or *S<sub>P</sub>* status at the time of the extension, so it is unknown whether it even was a potential target.

On the other hand, a class switch is reconstructible to Proto-Tiriyoan, so it was an *S<sub>A</sub>* verb when Akuriyó introduced *k-*. Likewise, the class switch most likely took place before the extension of Proto-Pekodian *\*k-*. Otherwise, the newly-turned-*S<sub>A</sub>* verb would have taken on conservative and lexically heavily restricted *\*w-*, either in Proto-Pekodian, Proto-Xinguan, or Arara.

### 3.2.6 *\*e-pi* ‘to bathe’

This verb resisted the extensions of Proto-Pekodian *\*k-* (Section 3.1.1) and Akuriyó *k-* (Section 3.1.4). It took on new 1*S<sub>A</sub>* prefixes in Proto-Tiriyoan (Tiriyo *s-epi-*, Akuriyó *ɸ̥-epi-* [Meira 1999: 292; Gildea 1994: 87]) and Proto-Waiwaian (Hixkaryána *k-ewehi-*, Waiwai *k-ejeɸu-* [Derbyshire 1985: 195; R. E. Hawkins 1998: 166]). The first person form of its Carijona reflex *ehi* (Koch-Grünberg 1908: 72) is unknown; an unattested Yukpa cognate may exist.

Verbs for intransitive ‘to bathe’ are typical *S<sub>A</sub>* verbs in most Cariban languages, derived with a detransitivizer from a transitive root. These roots are reflexes of *\*[i]pi*, or *\*kupi* in some Venezuelan languages (Table 21). Proto-Pekodian can be reconstructed as having the pair *\*ipi* (INTR) / *\*ipi* (TR) (Section 3.1.1). Thus, while Proto-Pekodian ‘to bathe (TR)’ has perfectly regular cognates in other languages of the family, ‘to bathe (INTR)’ changed *\*e-* to *\*i*. This is an irregular development, since there are no attested reflexes of a Pekodian detransitivizer *\*i-* (Meira et al. 2010: 506); its cause is unknown.

## 3.3 Summary

In Section 3.2, the verbs which were unaffected by the extensions in Section 3.1 were reconstructed, and affected reflexes in the languages under discussion were identified. Table 22 gives an overview of what verbs were affected by which extensions (except for *e*-initial Akuriyó verbs unaffected by the extension of *k-*, as they are a large and predictable group). In some cases, the verb does not occur, or at least not in a first person form (–), in others that form is unknown (?), and the question of affectedness is often not meaningfully answerable (N/A) for ‘to go down’. Every ✓ stands for a verb affected by an extension, while × represents conservatively inflected verbs, making clear how strongly these verbs tend to resist person marker extensions in different languages. Section 4 will explore explanations for the fact that the same 1-7 verbs retained their old 1*S<sub>A</sub>* marker in 6 independent developments, while a plethora of regular *s<sub>(A)</sub>* verbs took on new markers.

Table 21: Comparison of intransitive and transitive ‘to bathe’ (Derbyshire 1979: 198; R. E. Hawkins 1998: 192, 203; Alves 2017: 58, 150; Pachêco 1997: 103; Campetela 1997: 123; Meira 2003a: 4, 2005: 285, 1999: 697; Gildea 1994: 87; Camargo & Tapinkili 2010: 24, 52; Meira 2000: 218; Courtz 2008: 304; Cáceres 2011: 439, 454; Stegeman & Hunter 2014: 37; de Armellada 1944: 34, 129; M.-C. Mattéi-Müller 1994: 8, 294; p.c., Spike Gildea)

(a) Reflexes of *e-pi ‘to bathe (INTR)’						
Language	Form					
Werikyana	eehi	ee		-	h	i
Hixkaryána	ewehi	e	w	e	-	h i
Waiwai	ejeɸu	e	j	e	-	ɸ u
Arara	ibi	i			-	b i
Ikpeng	ip	i			-	p
Bakairi	i	i				
Tiriyó	epi	e			-	p i
Akuriyó	epi	e			-	p i
Wayana	epi	e			-	p i
Apalaí	epi	e			-	p i

(b) Reflexes of *e-kupi ‘to bathe (INTR)’						
Language	Form					
Kari’ña	ekupi	e	-	k	u	p i
Ye’kwana	eʔhi	e	-	ʔ		h i
Kapón	ekuʔpi	e	-	k	u ʔ	p i
Pemón	ekupi	e	-	k	u	p i

(c) Reflexes of *ə-kupi ‘to bathe (INTR)’						
Language	Form					
Panare	akupi	a	-	k	u	p i

(d) Reflexes of *[i]pi ‘to bathe (TR)’						
Language	Form					
Werikyana	ih	i	h	i		
Hixkaryána	ih	i	h	i		
Waiwai	pi		p	i		
Arara	ibi	i	b	i		
Ikpeng	ip	i	p			
Bakairi	i			i		
Tiriyó	pi		p	i		
Akuriyó	pi		p	i		
Wayana	upi	u	p	i		
Apalaí	pi		p	i		
Ye’kwana	ih	i	h	i		
Pemón	pi		p	i		
Panare	ipi	i	p	i		

(e) Reflexes of *kupi ‘to bathe (TR)’						
Language	Form					
Kari’ña	kupi	k	u		p	i
Kapón	kuʔpi	k	u	ʔ	p	i
Panare	kupi	k	u		p	i

Table 22: Overview of extensions and (un-)affected verbs

	*ka[ti] ‘say’	*itə[mə] ‘go’	*a[p] ‘be-1’	*eti ‘be-2’	*(ət-)epi ‘come’	*ipitə ‘go down’	*e-pi ‘bathe’	✓ affected;
Proto-Waiwaian *k-	x	x	x	x	–	N/A	✓	
Hixkaryána	x	x	x	x	–	N/A	✓	
Waiwai	x	(✓)	x	x	–	N/A	✓	
Proto-Pekodian *k-	x	x	x	x	x	x	x	
Arara	x	x	x	x	x	x	x	
Ikpeng	x	✓	–	x	✓	?	x	
Bakairi	x	x	x	x	✓	✓	x	
Proto-Tiriyóan *t-	x	x	x	x	x	N/A	✓	
Tiriyó	x	x	x	x	x	N/A	✓	
Akuriyó	x	x	x	?	x	N/A	✓	
Akuriyó k-	x	x	x	?	x	x	x	
Carijona j-	x	x	x	✓	✓	N/A	?	
Yukpa j-	?	x	✓	✓	–	N/A	–	

x not affected; ? unknown first person prefix; – does not occur; (✓) old and new marker combined; N/A not meaningfully answerable

## 4 Explaining conservativeness: a network morphology approach

A well-known approach to conservativeness, innovativeness, and (ir-)regularity in the lexicon is Bybee's (1985) network model of morphology, which seems well-suited for the data at hand. It aims to "account for cross-linguistic, diachronic and acquisition patterns in complex morphological systems" (Bybee 1995: 428). It does so by modeling shared morphological properties such as inflectional patterns as emerging from connections of differing strength between lexemes. A well-known example is a network of "strong" English verbs with *strɪŋ*–*strʌŋ* at the center and pairs like *riŋ*–*rʌŋ*, *spɪn*–*spʌn*, or *stɪk*–*stʌk* at its periphery. This network created new strong verbs in some dialects, like *sni:k*–*snʌk* or *brɪŋ*–*brʌŋ* (Bybee 1985: 129–130). These verbs formed a lexical connection with prototypical members of the group, developing new past tense forms as a result.

These verbs are an example for a phonologically motivated network; other possible bases of connections between lexemes are semantic or morphological similarity (Bybee 1985: 118). Another important factor in the model is frequency, since more frequent words have higher lexical strength (Bybee 1985: 119). This diminishes the influence from other lexemes, meaning that high-frequency items are more likely to resist innovations. For the Cariban first person patterns, the model predicts that semantically/phonologically/morphologically similar verbs are affected by person marker extensions, while high-frequency verbs resist extensions and thus remain conservative.

When considering the *S<sub>A</sub>* verbs with innovative first person markers (those not in Table 22), several salient factors emerge as potential bases of lexical networks. The most obvious similarity is that they all have a reflex of the detransitivizer *\*əte/e-* (see e.g. Meira [1998: 112] for Taranoan), a hallmark of *S<sub>A</sub>* verbs (Section 2.3). Due to *\*əte/e-* being prefixes, all derived *S<sub>A</sub>* verbs begin with reflexes of *\*ə* or *\*e* (see e.g. Alves [2017: 153] for Arara), making phonologically based networks a second possibility. An inflectional commonality of innovative verbs is their *S<sub>A</sub>* (sub-)class membership, represented by pre-extension *1S<sub>A</sub>* *\*w-* (*t-* in Akuriyó). There are no obvious semantic patterns, which is unsurprising considering the absence of a semantic basis in the split-*s* system (Section 2.3). Thus, there are three hypotheses for factors connecting members of the networks in which extensions spread: a reflex of *\*əte/e-*, the stem-initial phoneme, or a specific *1S<sub>A</sub>* prefix.

It is intuitively obvious that many of the verbs in Table 22 are highly frequent, which would cause conservativeness according to the network model. Going beyond intuition is difficult due to the lack of frequency counts for individual lexemes for any Cariban language. The only statement in the literature is Courtz's (2008: 75) claim of Kari'ña underived *S<sub>A</sub>* verbs being the most frequent ones: "It is difficult [...] to imagine an intransitive or transitive origin for some of the most frequent middle verbs". This claim is neither supported by frequency counts nor accompanied by a list of verbs, although those verbs likely correspond to the five first columns of Table 22. To improve the data situation, a count of *S<sub>A</sub>* verbs in three Apalaí texts from E. Koehn & S. Koehn (1994) will serve as a second source of frequency information (Table 23). The count data support the above interpretation of Courtz's (2008) claim, since defining "high frequency" as above average yields the exact same five verbs. It is questionable if the interpretation of Courtz's (2008) claim and this small Apalaí sample are representative of discourse patterns in the Cariban (proto-)languages discussed here, but their use is made necessary by the absence of alternatives.

Each of the three hypotheses for possible network factors can be combined with frequency: members of the lexical network connected by a factor are prone to innovation, but high-frequency verbs are exempt. The resulting six hypotheses were tested by predicting the expected behavior of each verb in each extension, illustrated in Table 31 for Proto-Tiriyoan. For example, *\*eʔi* 'to be' is expected to participate (✓) in innovations spreading in a phonologically defined (*\*e*-initial) or inflectionally defined (*1S<sub>A</sub>* *\*w-*) network. On the other hand, a network based on the detransitivizer predicts it to not undergo innovation (×). If frequency is taken into account, it is expected to remain conservative regardless of the basis of the network.

These predictions were checked against the data in Table 22 by tallying verbs with (in/)correctly predicted behavior. The resulting scores are illustrated for the extension of Proto-Tiriyoan *\*t-* in Table 32 and summed up for all extensions in Table 26. These scores crucially only consider the seven verbs in

Table 23: Frequency counts of S<sub>A</sub> verbs in three Apalaí texts from E. Koehn & S. Koehn (1994) (163 S<sub>A</sub> verbs, 1070 words)

Verb	Count	% S <sub>A</sub> verb tokens
a ‘be-1’	49	30.06%
efi ‘be-2’	30	18.40%
ka ‘say’	26	15.95%
ito ‘go’	23	14.11%
oeɸi ‘come’	13	7.98%
e-poreʔka ‘arrive’	3	1.84%
ot-urupo ‘ask’	2	1.23%
ot-uʔ ‘eat’	2	1.23%
os-enakũnuʔ ‘choke’	2	1.23%
e-unopi ‘laugh’	1	0.61%
at-akĩma ‘pack bags’	1	0.61%
at-ankiema ‘be happy’	1	0.61%
os-ereʔ ‘be amazed’	1	0.61%
e-metika ‘lose loincloth’	1	0.61%
e-tuarima ‘suffer’	1	0.61%
e-puka ‘fall’	1	0.61%
os-epori ‘meet’	1	0.61%
ot-iriʔka ‘land’	1	0.61%
ot-iʔka ‘finish’	1	0.61%
ot-uru ‘talk’	1	0.61%
at-apiaka ‘divide up’	1	0.61%
e-siriʔma ‘move’	1	0.61%

Table 24: Predictions for Proto-Tiriyoan

	*ka ‘say’	*[ə]tə[mi] ‘go’	*a ‘be-1’	*eʔi ‘be-2’	*əʔepi ‘come’	*epi ‘bathe’
DETRZ	×	×	×	×	✓	✓
DETRZ+freq	×	×	×	×	×	✓
phono ( / _ *ə, e)	×	×	×	✓	✓	✓
phono+freq	×	×	×	×	×	✓
infl (*w-)	✓	✓	✓	✓	✓	✓
infl+freq	×	×	×	×	×	✓

Table 25: Evaluating predictions for Proto-Tiriyóan

	*ka 'say'	*[ə]tə[mi] 'go'	*a 'be-1'	*eʔi 'be-2'	*əʔepi 'come'	*epi 'bathe'	Score
DETRZ+freq	✓	✓	✓	✓	✓	✓	100.0%
phono+freq	✓	✓	✓	✓	✓	✓	100.0%
infl+freq	✓	✓	✓	✓	✓	✓	100.0%
DETRZ	✓	✓	✓	✓	×	✓	83.3%
phono	✓	✓	✓	×	×	✓	66.7%
infl	×	×	×	×	×	✓	16.7%

Table 26: Overview of prediction accuracy

	DETRZ	DETRZ+freq	phono	phono+freq	infl	infl+freq
Proto-Waiwaian *k-	100.0%	100.0%	60.0%	100.0%	20.0%	100.0%
Proto-Pekodian *k-	100.0%	100.0%	71.4%	100.0%	0.0%	71.4%
Proto-Tiriyóan *t-	83.3%	100.0%	66.7%	100.0%	16.7%	100.0%
Akuriyó k-	66.7%	83.3%	100.0%	100.0%	100.0%	100.0%
Carijona j-	60.0%	60.0%	100.0%	60.0%	40.0%	60.0%
Yukpa j-	33.3%	33.3%	100.0%	33.3%	66.7%	33.3%

Table 22, but each extension affected many run-of-the-mill  $S_A$  verbs.<sup>14</sup> If one simulates the addition of 1'000 regularly inflected detransitivized  $S_A$  verbs per language – a conservative estimate based on Courtz's (2008) Kari'ña dictionary – all six hypotheses consistently predict the behavior of 99.99+% verbs correctly. Since the descriptive coverage of Cariban languages makes using real such large-scale data impossible, the present investigation is restricted to the edge cases.

The extent of the Proto-Waiwaian and Proto-Pekodian and extensions is fully predicted by the presence or absence of a detransitivizer. In both cases, only the underived<sup>15</sup>  $S_A$  verbs were not affected, all other  $S_A$  verbs taking \*k-. Not shown in Table 26 are subsequent evolutions in the Pekodian daughter languages, which largely support a detransitivizer-based explanation: First, both Ikpeng and Bakairi regularized the paradigm to use forms with detransitivizer for first person (Section 3.1.1), and both introduced k-.<sup>16</sup> Second, the development of Proto-Pekodian \*itən 'to go' to Ikpeng aran may have led to reanalysis of ar as a detransitivizer, accompanied by the introduction of k-.

The extent of three extensions (in Akuriyó, Carijona, and Yukpa) is correctly predicted by phonological criteria. As discussed in Section 3.1.4, Akuriyó k- only appears on ə-initial verbs. In Carijona, the extension of j- affected all e- and ə-initial verbs, including eh 'to come' and eʔi 'to be', which do not have a detransitivizing prefix. Only ka 'say', tə[mə] 'go', and a 'be-1' did not take on j-. The extension of Yukpa j- can succinctly be characterized as affecting all vowel-initial verbs, as the only attested conservative verb is C-initial to 'to go'.

Inflectional morphology as a network basis only played a potential role in the case of Akuriyó. However, this explanation rests on the analysis of t- and tʃ- as distinct morphemes. Due to their phonologically conditioned distribution in Proto-Tiriyóan, the hypothetical inflectionally defined network is identical to the phonological one.

<sup>14</sup>While some non-detransitivized  $S_A$  verbs (Meira 1999: 252, 2000: 222; Gildea & D. Payne 2007: 30) are not in Table 22, these are mostly \*ə-initial and were likely productively derived at some point, see Meira (1999: 252) for Tiriyó. The verbs to which this does not apply, like Tiriyó wa 'to dance' (Meira 1999: 252), are all instances of  $S_P$  verbs switching classes. Since none of them is attested as having  $S_A$  status at the time of a person marker extension, they are not relevant for this study.

<sup>15</sup>The assumption is made that the idiosyncratic evolution of \*e-pi 'to bathe' (INTR) to \*ipi Proto-Pekodian made the verb morphologically opaque.

<sup>16</sup>If one instead assumes that first person \*w-ebi- and \*k-əd-ebi- already co-existed in Proto-Pekodian, the clear correlation between \*k- and the detransitivizer remains.

When adding the expected conservative effects of frequency, prediction accuracy was improved in 8 cases, stagnated in 7 cases, and worsened in three cases. These three cases are found in Carijona and Yukpa, the only languages to feature innovative markers on the reflexes of \*eti ‘be-2’ or \*a[p] ‘be-1’. Overall, including the crude estimate of frequency in the model led to improvements, up to 100% prediction accuracy for all three factors in Proto-Tiriyoan, phonology and inflection in Proto-Waiwaian, and phonology in Proto-Pekodian.

One can conclude that the patterns of most extensions are correctly predicted not by a single explanation, but rather by 3 to 4 different ones. The exceptions are Carijona and Yukpa, where a phonologically defined lexical network emerges as the unambiguous winner, while frequency-based explanations fare worse. For the other extensions, the network model gives no unambiguous answer to the question of what (combination of) factors caused innovative first person markers to spread the way they did. This is due three of the factors in the model – frequency, detransitivizer, phonology – strongly converging in their predictions: The most frequent  $S_A$  verbs are at the same time those without a detransitivizer, and therefore mostly of a different phonological shape than regular  $S_A$  verbs.

## 5 Conclusion

The main research questions of this study were a) where did irregular first person prefixes originate? b) which verbs are irregular in what language? and c) why are they irregular? The main findings can be summarized as follows: Irregular first person inflections are conservative, leftovers of person marker extensions which did not affect some verbs. Some of these extensions are reconstructible to proto-languages, while others happened in pre-modern stages of single languages. The same 1-7 verbs are conservative in all languages, and are often irregular in other ways. Bybee’s (1985) network model delivers explanations for distribution of innovative markers, but in 4 of 6 cases, multiple explanations predict the same outcome. This is due to the situation reconstructible to Proto-Cariban, where only a small group of frequent  $S_A$  verbs had no detransitivizer \*əte/e-.

It was the association of \*əte/e-with A-oriented prefixes that led to the split-s system (Meira 2000). An open question is why the few underived  $S_A$  verbs that are reconstructible to Proto-Cariban are not only the most frequent  $S_A$  verbs, but arguably the most frequent intransitive verbs (‘be’, ‘go’, ‘say’). At least the first two meanings could just as well be expressed with  $S_P$  verbs. Further comparative work on the detransitivizer might answer this question.

Bybee’s (1985) network model held its promise of explaining irregularities in inflectional patterns. It did overshoot its goal somewhat in that only two of six cases had an unambiguous answer – phonology. Notably, the two phonology-based hypotheses (with and without frequency) together correctly predicted 100% of patterns. Since the crude frequency model increased overall prediction accuracy, but decreased it in the case of Carijona and Yukpa, language-specific counts of  $S_A$  verbs would be interesting. Regardless of the interpretation of the results, the inconclusiveness of the network model’s answers is due to a specific pattern in Proto-Cariban. This raises the general question how applicable the model is when ambiguity exists.

As mentioned, additional and more extensive counts of  $S_A$  verbs in different Cariban languages would be important not only for comparison with the Apalaí sample, but also as better input for the network model. Apart from this specific purpose, there is a general need for corpora of Cariban languages accompanying the improving descriptive coverage, allowing studies like Sapién et al. (2021). Finally, this study could have benefitted from more extensive descriptive work on Yukpa and Carijona specifically, while such work on underdescribed languages would benefit Cariban linguistics as a whole.

## 6 Abbreviations

The following abbreviations were used in this paper:

1 first person

- 
- 609 1+2 first and second person  
610 1+3 first and third person  
611 2 second person  
612 3 third person  
613 A agent-like argument of canonical transitive verb  
614 AGT agent  
615 ALL allative  
616 ANA anaphoric  
617 ATTRZ attributivizer  
618 CAUS causative  
619 CERT certainty  
620 COM comitative  
621 CONT continuative  
622 COR coreference  
623 DEM demonstrative  
624 DES desiderative  
625 DETRZ detransitivizer  
626 DUB dubitative  
627 EVID evidentiality  
628 FRUST frustrative  
629 HSY hearsay/indirect evidentiality  
630 IMM immediate past  
631 IMP imperative  
632 INAN inanimate  
633 INF infinitive  
634 INT intermediate past  
635 INTR intransitive  
636 INTS intensifier  
637 LK linker  
638 LOC locative  
639 MED medial  
640 NEG negation

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641	NMLZ	nominalizer/nominalization
642	NPST	non-past
643	OBL	oblique
644	P	patient-like argument of canonical transitive verb
645	PFV	perfective
646	PL	plural
647	PRO	pronoun
648	PRS	present
649	PST	past
650	REC	recent past
651	REM	remote past
652	S	single argument of canonical intransitive verb
653	S <sub>A</sub>	S marked like A
654	S <sub>P</sub>	S marked like P
655	SAP	speech act participant
656	SUP	supine
657	TAM	Tense-Aspect-Mood
658	TR	transitive
659	UNCERT	uncertainty

## 660 7 Acknowledgments

661 REDACTED

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## 836 A Predictions for the behavior of individual verbs

837 This appendix shows all predictions and the comparison with the attested data.

Table 27: Predictions for Proto-Waiwaian

	*ka[s] 'say'	*[i]to[m] 'go'	*ah 'be-1'	*eʃi 'be-2'	*eeʃi 'bathe'
DETRZ	×	×	×	×	✓
DETRZ+freq	×	×	×	×	✓
phono ( / _ *o, e, a)	×	×	✓	✓	✓
phono+freq	×	×	×	×	✓
infl (*w-)	✓	✓	✓	✓	✓
infl+freq	×	×	×	×	✓

Table 28: Evaluating predictions for Proto-Waiwaian

	*ka[s] 'say'	*[i]to[m] 'go'	*ah 'be-1'	*eʃi 'be-2'	*eeʃi 'bathe'	Score
DETRZ	✓	✓	✓	✓	✓	100.0%
DETRZ+freq	✓	✓	✓	✓	✓	100.0%
phono+freq	✓	✓	✓	✓	✓	100.0%
infl+freq	✓	✓	✓	✓	✓	100.0%
phono	✓	✓	×	×	✓	60.0%
infl	×	×	×	×	✓	20.0%

Table 29: Predictions for Proto-Pekodian

	*ke 'say'	*itə[n] 'go'	*ap 'be-1'	*eʃi 'be-2'	*epi 'come'	*iptə 'go down'	*ipi 'bathe'
DETRZ	×	×	×	×	×	×	×
DETRZ+freq	×	×	×	×	×	×	×
phono ( / _*ə, e)	×	×	×	✓	✓	×	×
phono+freq	×	×	×	×	×	×	×
infl (*w-)	✓	✓	✓	✓	✓	✓	✓
infl+freq	×	×	×	×	×	✓	✓

Table 30: Evaluating predictions for Proto-Pekodian

	*ke 'say'	*itə[n] 'go'	*ap 'be-1'	*eʃi 'be-2'	*epi 'come'	*iptə 'go down'	*ipi 'bathe'	Score
DETRZ	✓	✓	✓	✓	✓	✓	✓	100.0%
DETRZ+freq	✓	✓	✓	✓	✓	✓	✓	100.0%
phono+freq	✓	✓	✓	✓	✓	✓	✓	100.0%
phono	✓	✓	✓	×	×	✓	✓	71.4%
infl+freq	✓	✓	✓	✓	✓	×	×	71.4%
infl	×	×	×	×	×	×	×	0.0%

Table 31: Predictions for Proto-Tiriyaoan

	*ka 'say'	*[ə]tə[mɪ] 'go'	*a 'be-1'	*eʃi 'be-2'	*əʔepi 'come'	*epi 'bathe'
DETRZ	×	×	×	×	✓	✓
DETRZ+freq	×	×	×	×	×	✓
phono ( / _*ə, e)	×	×	×	✓	✓	✓
phono+freq	×	×	×	×	×	✓
infl (*w-)	✓	✓	✓	✓	✓	✓
infl+freq	×	×	×	×	×	✓

Table 32: Evaluating predictions for Proto-Tiriyóan

	*ka 'say'	*[ə]tə[mɪ] 'go'	*a 'be-1'	*eʔi 'be-2'	*əʔepi 'come'	*epi 'bathe'	Score
DETRZ+freq	✓	✓	✓	✓	✓	✓	100.0%
phono+freq	✓	✓	✓	✓	✓	✓	100.0%
infl+freq	✓	✓	✓	✓	✓	✓	100.0%
DETRZ	✓	✓	✓	✓	×	✓	83.3%
phono	✓	✓	✓	×	×	✓	66.7%
infl	×	×	×	×	×	✓	16.7%

Table 33: Predictions for Akuriyó

	ka 'say'	[ə]tə[mɪ] 'go'	a 'be-1'	eepi 'come'	i[h]tə 'go down'	epi 'bathe'
DETRZ	×	×	×	✓	×	✓
DETRZ+freq	×	×	×	×	×	✓
phono (/ _ə)	×	×	×	×	×	×
phono+freq	×	×	×	×	×	×
infl (k-)	×	×	×	×	×	×
infl+freq	×	×	×	×	×	×

Table 34: Evaluating predictions for Akuriyó

	ka 'say'	[ə]tə[mɪ] 'go'	a 'be-1'	eepi 'come'	i[h]tə 'go down'	epi 'bathe'	Score
phono	✓	✓	✓	✓	✓	✓	100.0%
phono+freq	✓	✓	✓	✓	✓	✓	100.0%
infl	✓	✓	✓	✓	✓	✓	100.0%
infl+freq	✓	✓	✓	✓	✓	✓	100.0%
DETRZ+freq	✓	✓	✓	✓	✓	×	83.3%
DETRZ	✓	✓	✓	×	✓	×	66.7%

Table 35: Predictions for Carijona

	ka 'say'	tə[mə] 'go'	a 'be-1'	effi 'be-2'	eh[i] 'come'
DETRZ	×	×	×	×	×
DETRZ+freq	×	×	×	×	×
phono (/ _ə, e)	×	×	×	✓	✓
phono+freq	×	×	×	×	×
infl (*w-)	✓	✓	✓	✓	✓
infl+freq	×	×	×	×	×

Table 36: Evaluating predictions for Carijona

	ka 'say'	tə[mə] 'go'	a 'be-1'	eʔi 'be-2'	eh[i] 'come'	Score
phono	✓	✓	✓	✓	✓	100.0%
DETRZ	✓	✓	✓	×	×	60.0%
DETRZ+freq	✓	✓	✓	×	×	60.0%
phono+freq	✓	✓	✓	×	×	60.0%
infl+freq	✓	✓	✓	×	×	60.0%
infl	×	×	×	✓	✓	40.0%

Table 37: Predictions for Yukpa

	to 'go'	a 'be-1'	e 'be-2'
DETRZ	×	×	×
DETRZ+freq	×	×	×
phono (/ _V)	×	✓	✓
phono+freq	×	×	×
infl (*w-)	✓	✓	✓
infl+freq	×	×	×

Table 38: Evaluating predictions for Yukpa

	to 'go'	a 'be-1'	e 'be-2'	Score
phono	✓	✓	✓	100.0%
infl	×	✓	✓	66.7%
DETRZ	✓	×	×	33.3%
DETRZ+freq	✓	×	×	33.3%
phono+freq	✓	×	×	33.3%
infl+freq	✓	×	×	33.3%