

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

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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 two Western and four Southern outliers. Figure 1 shows the geographical distribution and genealogical affiliation of the extant Cariban languages. For linguistic 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 about here.]

[Table 1 about here.]

[Table 2 about here.]

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 with person paradigms of four Hixkaryána verbs in Table 1,<sup>1</sup> all members of the  $S_A$  inflectional class. In this language, the 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 Tiriyo, where the verb ‘to go’ has a first-person prefix *wi-* while other  $S_A$  verbs have a prefix with phonologically conditioned allomorphs *t-* / *\_ə* and *s-* / *\_e* (Table 2). 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 Taranoan 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-Taranoan. In a synchronic analysis of a language, these verbs and their first person prefixes may be called IRREGULAR, contrasting with regular prefixes (like Hixkaryána *ki-* and Tiriyo *t-/s-*) on regular verbs. However, 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. For such approaches, these 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).

Ignoring the specifics of synchronic analysis, the cause for the divergent inflectional patterns lies in the diachrony of the languages in question. The goal of this study is to approach the patterns from

<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 the paradigms shown here. In Table 1 and other paradigm tables, any TAM suffixes found in the original forms found in the literature are omitted, since a) the focus lies on the prefixes and stems, and b) full paradigms containing the same TAM suffix are rarely found. Further, standard IPA symbols are used in the transcription of Cariban languages, with the exception of coronal rhotics, which are simply represented with ⟨r⟩, rather than ⟨ɽ⟩ for Wayana or ⟨ɽ⟩ for Ye'kwana etc. In languages with strong morphophonological processes and/or subphonemic orthography the original transcription is shown in an additional surface line when presented in interlinearized examples. Gildea (2018) is followed in using ⟨ə⟩ for the proto-vowel reconstructed by Meira & Franchetto (2005), although it was likely more back (Gildea et al. 2010). Glossing abbreviations:

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 the Hixkaryána and Tiriyo ones. In Section 3, six incomplete person marker extensions and the verbs unaffected by them are described. Since conservative verbs show a considerable etymological overlap between languages, they 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 conservative 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  $1/2 > 3$ . 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 expressed in a non-transparent manner, both using the  $1+2$  prefix  $*k$ -.

[Table 3 about here.]

Formally identical or etymologically related markers occurred in intransitive verbs, which showed a split-S system (Table 3b). That is,  $S_A$  verbs took similar markers as the A-oriented ones in transitive verbs, with the exception of first person ( $1S_A$   $*w$ - vs  $1 > 3$   $*t(i)$ -) and the absence of  $*i$  after all  $S_A$  prefixes. On the other hand,  $S_P$  verbs took markers fully identical to the P-oriented ones, and  $3S_P$   $*n(i)$ - 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  $1S_A$  prefix  $*w$ -; they are therefore CONSERVATIVE. They contrast with regular  $S_A$  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', *namə-n* 'name-s', *hazə-n* 'hare-s', *be:ɪ-ən* 'bear-s'.

Since the regular Hixkaryána and Tiriyo prefixes are innovative, one may ask where they came from.

## 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, i.e. person prefixes being extended to verbal paradigm cells previously occupied by other prefixes. There have been quite a few person marker extensions in Caribbean 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> * <i>w</i> - to 1>3   |
|     |                  | 1+2 * <i>k</i> - to 1S <sub>P</sub> (completed in Proto-Waiwaian, ongoing in Werikyana)     |
|     |                  | 1+2 * <i>kit</i> - to 1+2S <sub>P</sub> (completed in Proto-Waiwaian, ongoing in Werikyana) |
|     | Proto-Waiwaian   | 1S <sub>P</sub> * <i>k</i> - to 1S <sub>A</sub>   |
|     |                  | * <i>owi(ro)</i> <i>j</i> - ‘1PRO LK’ for 1P  |
|     | Waiwai           | 2S <sub>A</sub> <i>m</i> - to 2S <sub>P</sub>   |

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.).

[Figure 2 about here.]

Hixkaryána has preserved 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 loss of split-S and the accompanying changes to indexing alignment, whereas this study focuses on a different aspect of these extensions. 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 the conservative Hixkaryána and Tiriyo forms in Tables 1 and 2. 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 Caribbean languages (Section 3).

Interestingly, all six featured innovative first person markers on  $S_A$  verbs. All other (complete) extensions<sup>2</sup> either occurred with other person values and/or targeted  $S_P$  verbs. Illustrative examples for complete extensions are shown in Table 4: the extension of  $1+2S_A s(i)-$  ( $< *kit-$ ) to  $S_P$  verbs in Apalaí (Table 4a), of  $2S_A m(i)-$  in to  $S_P$  verbs in Panare (Table 4b), and the extension of the entire  $S_A$  set to  $S_P$  verbs in Waimiri-Atroari (Table 4c). The starkly different behavior of  $S_A$  and  $S_P$  verbs regarding extensions points to the split-S system playing a role, so its main properties will be discussed in Section 2.3. It will also be made clear how the  $S_A/S_P$  distinction can be lost for a single person, or how  $S_P$  verbs can take on  $S_A$  markers with apparent semantic impunity.

[Table 4 about here.]

### 2.3 The Cariban split-S system

As seen in Section 2.1, the split between  $S_A$  and  $S_P$  verbs was instantiated by inflection classes within the Proto-Cariban Set I person paradigm, but this was not the only inflectional criterion: In deverbalized forms,  $S_A$  verbs took a class marker  $*w-$ , while  $S_P$  verbs lacked that prefix (Gildea 1998: 89, 141–142; Meira 2000: 208). The distinction between  $S_A$  and  $S_P$  was also reflected in imperatives, where the latter took the  $2S_P$  prefix  $*\partial(j)-$  while the former were unprefixes (Gildea 1998: 89; Meira 2000: 208).

In modern instantiations of Cariban split-S, mismatches between the semantics of verbs and their  $S_A$  or  $S_P$  status are common, exemplified with Kari’ña data in (2).

(2) Kari’ña

- a. *sipi tink-a-ri m-ekema-non hen*  
net pull-NMLZ  $2S_A$ -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*  
 $2S_P$ -get.up-PRS  
‘You are getting up.’ (Hoff 1968: 167)

The  $S_A$  verb *ekema* ‘to be afraid’ takes an A-oriented marker (2a), while the  $S_P$  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 Tiriyo, 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)

<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-* (Matter 2021b: 12). However, the spread of the innovative markers had an entirely different dynamic, spreading from subordinate to main clauses.

have a derivational detransitivizing prefix are treated as  $S_A$  verbs, while essentially all others are  $S_P$  verbs:

Almost all verbs in the  $S_A$  class are detransitized forms of transitive verbs, either synchronically (with still existing transitive sources) or diachronically (with reconstructible but no longer existing transitive sources) (Meira 2000: 201)

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

Apparently, the morphological behavior of the  $S_A$  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  $S_A$  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)

Regarding the form of this marker, Meira et al. (2010: 505–512) reconstruct two distinct prefixes for Proto-Cariban: reciprocal  $*\text{ate-}$  and reflexive  $*e-$ , although their reflexes on verbs have been merged into a single morpheme in modern languages. Reflexes of  $*\text{ate}/e-$  show a range of meanings summarizable as “detransitive”, illustrated with Tiriyo  $S_A$  verbs in (3).

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

<i>nonta</i> 'abandon'	→	<i>e-nonta</i> , <i>ai-nonta</i>	'abandon each other' (reciprocal)
<i>suka</i> 'wash'	→	<i>e-suka</i> , <i>ai-suka</i>	'wash self' (reflexive)
<i>pahka</i> 'break (TR)'	→	<i>e-pahka</i>	'break (INTR)' (anticausative)
<i>puunapi</i> 'think about'	→	<i>ah-puunapi</i> , <i>ai-puunapi</i>	'think, meditate' (antipassive)

The morphological variation in ‘to abandon each other’ and ‘to wash self’ is due to the collapse of the two Proto-Cariban prefixes:  $e-$  comes from the reflexive prefix  $*e-$ , while the form  $ai-$  originates in reciprocal  $*\text{ate-}$ . However, both can occur with either meaning – at least for these two verbs. In the next section, it will become apparent that many of the verbs not affected by person marker extensions belong to the small group of  $S_A$  verbs without a reflex of  $*\text{ate}/e-$ .

### 3 Inflections and verbs: innovation and resistance

As shown in Section 2.2, irregularly inflected first person forms are leftovers from incomplete person marker extensions. Section 3.1 presents the six identified incomplete extensions, the prefixes they introduced and the verbs they spared. Since the latter show considerable etymological overlap across



languages, these resistant verbs are compared and reconstructed in Section 3.2. Where existent, their reflexes which did get affected by one of the extensions are identified.

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

As stated in Section 2.2, the six person marker extensions which did not affect all potential targets have in common that they introduced innovative first person markers on S<sub>A</sub> verbs. Of these extensions, half can be reconstructed to intermediate proto-languages, and half happened in pre-modern stages of single languages. The sources 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 details the extension of *\*k-* in Proto-Pekodian, reflected in the three daughter languages Arara, Ikpeng, and Bakairi. Section 3.1.2 treats the extension of *\*k-* in Proto-Waiwaian, which was 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 only 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-*.

[Table 5 about here.]

The most detailed description of a Pekodian language (Alves 2017) names six<sup>3</sup> Arara S<sub>A</sub> verbs forming a subclass defined by a first person marker *w(t)-* rather than *k-*, shown in (4). There is also a reflex of the copula *\*a[p]*, serving syntactically as a postposition introducing adverbial clauses meaning ‘if’ or ‘when’ (Alves 2017: 199–201). However, its inflectional morphology features verbal Set I prefixes, including first person *w-* (5).

(4) Arara (Alves 2017: 153)

*wi-geni* ‘I said’  
*w-iffini* ‘I was, lied down’  
*w-ebini* ‘I came’  
*w-ibini* ‘I bathed’  
*w-iptoyri* ‘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*

<sup>3</sup>Seven under her analysis, which sees the two meanings of *iffi* ‘to be, to lie down’ as different verbs.

In his brief but precise discussion of Bakairi verbal person marking, Meira (2003a) reports the existence of two subclasses of S<sub>A</sub> verbs, one taking first person *w-*, and one *k-*.<sup>4</sup> The first group is illustrated with *i* ‘to bathe’ (6).

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

While Meira (2003a: 4) lists some Bakairi cognates of the Arara verbs in (4) as S<sub>A</sub> verbs, he does not 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 can be found in von den Steinen (1892), presented in (7) according to the analyses of Bakairi phonology and verbal morphology by Wheatley (1969), Meira (2003a, 2005), and Franchetto & Meira (2016).

- (7) Bakairi (von den Steinen 1892: 131, 397, 76, 137, 374, 130)
- |   |  |
|---|--|
| <p>a. ⟨u-yépa⟩<br/> <i>u-ge-pa</i><br/>           1S<sub>A</sub>-say-NEG<br/>           ‘I don’t say.’</p>        | <p>d. ⟨kχ-itaké-he⟩<br/> <i>k-itəgi-se</i><br/>           1S<sub>A</sub>-go.down-NPST?<br/>           ‘I go down.’</p>           |
| <p>b. ⟨wi-táki⟩ / ⟨wi-tági⟩<br/> <i>w-i-taki</i><br/>           1S<sub>A</sub>-be-INT<br/>           ‘I was.’</p> | <p>e. ⟨úta⟩ / ⟨uúta⟩<br/> <i>u-tə</i><br/>           1S<sub>A</sub>-go<br/>           ‘I go.’</p>                                |
| <p>c. ⟨kχaewí-le⟩<br/> <i>k-æwi-li</i><br/>           1S<sub>A</sub>-come-IMM<br/>           ‘I came.’</p>        | <p>f. ⟨töre-w-akine⟩<br/> <i>təɾə w-a-kine</i><br/>           there 1S<sub>A</sub>-be-PST.CONT<br/>           ‘I was there.’</p> |

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

<sup>4</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.

## (8) Ikpeng

- a. *i-ge-li*  
1-say-REC  
'I said.' (Pachêco 2001: 209)
- b. *Ø-effi-li*  
1-be-REC  
'I was.' (Pachêco 2001: 139)
- c. *aŋagotpop Ø-ip-ŋi ik-gwa-kŋi*  
always 1-bathe-NPST river-LOC.aquatic-ALL  
'I always bathe in this river.' (Pachêco 1997: 68)

## (9) Ikpeng (Pachêco 2001: 80)

- k-aran-ŋi*  
1-go-NPST  
'I'm going.'

[Table 6 about here.]

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 1<sub>SA</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'.

[Table 7 about here.]

Reconstructions of verb stems are deferred to Section 3.2, but a brief 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 *\*ad-* in combination with a root reconstructible as *\*epi*. In contrast, the Arara first person form is directly based on this root *\*epi*. However, reflexes of *\*ad-epi* can be found elsewhere in the Arara paradigm (10).

## (10) Arara (Alves 2017: 150)

- m-odebi-ni*  
2<sub>SA</sub>-come-REC  
'You came.'

In contrast, Ikpeng and Bakairi show reflexes of *\*ad-ebi* throughout the whole paradigm. 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, meaning that Bakairi and Ikpeng independently levelled the paradigm in favor of *\*ad-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 about here.]

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 *w(i)-* (11d).

- (11) a. Waiwai (R. E. Hawkins 1998: 71)  
*wiikekne*  
*wi-ka-jakne*  
 1-say-PST  
 ‘I said.’
- b. Hixkaryána (Derbyshire 1985: 124)  
*roxehra nay hami Kaywerye ikekoni*  
*ro-fe-hira n-a-je hami kajwer'e 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)  
*wŷyesŷ*  
*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 the old \**w-*, an etymological analysis also considered by Gildea (1998: 90). Alternatively, this form may have been influenced by deverbalized forms of ‘to go’, where a reflex of the S<sub>A</sub> class marker \**w-* has become fossilized (e.g., *o-wto-topo-nho* ‘my trip’ [R. E. Hawkins 1998: 92]) In any case, the first person form Hixkaryána ‘to go’ clearly points to Proto-Waiwaian \**wi-tom-*.

[Table 9 about here.]

### 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 more distant member. Meira (1998) contributes an extensive phonological, morphological, and lexical reconstruction of Proto-Taranoan, facing an interesting puzzle in the Set I paradigms of Tiriyo and Akuriyo: Proto-Cariban 1>3 *\*t-* and 1S<sub>A</sub> *\*w-* seem to have switched places. This resulted in a regular 1S<sub>A</sub> marker of the form *\*ff-* / *\_e*, *\*t-* / *\_ə* (Table 10).<sup>5</sup>

[Table 10 about here.]

The question of how this switch happened in detail (Meira 1998: 107–112) still has no answer, although it seems necessary to assume a scenario in which both *\*t-* and *\*w-* for a time occurred on both transitive and intransitive verbs (Meira 1998: 112).<sup>6</sup>

[Table 11 about here.]

Turning to verbs not affected 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-Tiriyoan forms are substituted here.<sup>7</sup> The other copular root *\*e?i* can be added as a fifth verb, whose Tiriyo reflex retains first person *w-*. The idiosyncratic Akuriyo 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 irregular change *\*wi-* > *ə-* (loss of *\*w* and lowering of *\*i* to *ə*) are found in other person prefixes (12a–b).

#### (12) Akuriyo

- |  |   |
|--|---|
| <p>a. <i>wi-toka</i><br/>1&gt;3-hit<br/>‘I hit him/her.’ (Gildea 1994: 86)</p> | <p>b. <i>kə?-ee?i</i><br/>1+2-come<br/>‘We came.’ (Meira 1998: 114)</p> |
|--|---|

### 3.1.4 Akuriyo *k-*

After the split of Proto-Tiriyoan, when *\*t-* and *\*ff-* had largely replaced *\*w-*, Akuriyo innovated a third 1S<sub>A</sub> marker *k-*. It seems to have replaced *\*t-* only in specific environments, with the two markers showing a clear phonologically conditioned distribution in Gildea’s (1994) Akuriyo data (Table 12). Meira (1998: 107) largely confirms that distribution, but mentions “several cases of first person *t-* in Akuriyo”

<sup>5</sup>The latter allomorph was subsequently replaced by *k-* in Akuriyo (Section 3.1.4).

<sup>6</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 *f-* 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. Here, a conservative stance is taken and the innovation is arbitrarily assumed to be Proto-Tiriyoan. This decision does not affect the results of this study.

<sup>7</sup>The present reconstruction of ‘to come’ diverges from Meira’s (1998: 114–115), who reconstructs Proto-Taranoan *\*əepi* for first, but *\*ee?i* for other persons, based on the paradigmatic pattern in Tiriyo and the vowel length in Akuriyo. Akuriyo and Carijona would then have levelled that pattern, similar to what was suggested for the Pekodian languages (Section 3.1.1). Here, the length in Akuriyo *ee?i* is identified as resulting from coalescence of *\*əe*, and Tiriyo *əepi* as reflecting *\*ətepi* (Section 3.2.4). This yields Proto-Tiriyoan *\*(ə?)epi* and Proto-Taranoan *\*(əff-)epi*.

(on  $\partial$ -initial verbs), albeit without any examples. He also suggests that  $k$ - might be more recent, which is plausible: since the distribution  $*t-$  /  $_{\partial}$  /  $*tʃ-$  /  $_{\partial}$  is reconstructible to Proto-Tiriyoan, the most straightforward scenario is  $k$ - replacing  $*t-$  but not  $*tʃ-$  in Akuriyó. The few  $t-$  mentioned by Meira (1998) were then perhaps reintroduced under Tiriyo influence. However, since there are no examples of, or more information about,  $\partial$ -initial verbs with  $t-$ , these cases cannot be discussed further.

[Table 12 about here.]

The verbs listed for Proto-Tiriyoan in Table 11 in Section 3.1.3 of course also resisted the extension of  $k$ - in Akuriyó, although the first-person form of the copular verb  $eʔi$  is unknown. In addition, there is an  $S_A$  verb  $i(h)t\partial$  ‘to go down’, which has an irregular first person marker  $p-$ , apparently reconstructible to Proto-Tiriyoan (13). It was not affected by the extension of Akuriyó  $k$ -, but whether it was an  $S_A$  verb when Proto-Tiriyoan  $*t-$  was introduced is unclear (see Section 3.2.5).

- (13) First person forms of ‘to go down’  
 Tiriyo  $p-iht\partial-$  (Meira 1999: 294)  
 Akuriyó  $p-it\partial-$  (Gildea 1994: 84)

### 3.1.5 Carijona $j$ -

Carijona, the cousin of the Tiriyoan languages, has extended the  $1S_P$  marker  $j(i)$ -<sup>8</sup> to  $S_A$  verbs (Meira 1998: 105–107). Combined with the extension of  $2S_A$   $m-$  and  $1+2S_A$   $kit-/kís-$  to  $S_P$  verbs, this created a single unified  $S$  category for regular verbs (Table 13).

[Table 13 about here.]

Although the split- $S$  system has been lost entirely, former  $S_A$  verbs can be identified by the presence of a detransitivizer, like  $ehin\partial hi$  ‘to fight’ (14), derived from  $hin\partial hi$  ‘to kill’ (Robayo Moreno 2000: 179).

- (14) Carijona (Koch-Grünberg 1908: 79)  
 $h\acute{e}n\acute{e}(x)t\acute{o}noko-m\acute{a}r\acute{e}y-e-h\acute{e}n\acute{e}(x)y\acute{a}i$   
 $hin\partial h\acute{t}ono-ko=mar\partial j-e-hin\partial hi-j\acute{a}i$   
 enemy-PL=with 1-DETRZ-kill-NPST.CERT  
 ‘I fight with the enemies.’

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

<sup>8</sup>Since all affected  $S_A$  verbs are V-initial, only the /  $_{\partial}$  V allomorph  $j-$  occurs in that context.

(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. *aji-marə-ne w-a-e*  
2-with-PL 1-be-NPST  
'I am with you all.'
- c. *dēmēmara kae ewi tya*  
*n-tə-mə=mara Ø-ka-e əwi i-ja*  
3-go-PST=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', one would expect *ka* 'to say' to either have conservative *wi-* or innovative *ji-*, so the zero needs explanation. 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 the family-internal isolate Yukpa 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 *nɪ* 'to sleep'.

[Table 14 about here.]

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> 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 in 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*[*t*]*i* ‘to say’ (Section 3.2.1), \**itə*[*mə*] ‘to go’ (Section 3.2.2), both roots of the copula \**eti/a*[*p*] (Section 3.2.3), \*(*ət*)*japi* ‘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*[*t*]*i* ‘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 the first person form of its Yukpa reflex *ka* is unattested. Most reflexes are simply *ka*, but a fleeting syllable \**ti* is reconstructed by Gildea & D. Payne (2007), best visible in the imperative forms of some languages. Table 15 shows a comparison of the longest attested forms for each language.<sup>9</sup>

[Table 15 about here.]

As mentioned in Section 3.1.2, Derbyshire (1985) analyzes the Hixkaryána reflex as transitive, an analytical choice not only motivated by a desire to avoid an idiosyncratic intransitive first person prefix *i*- instead of regular *ki*-. Hixkaryána *ka* 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).

(18) Hixkaryána

<sup>9</sup>Cognate segments in Tables 15 to 21 were aligned automatically with LingPy (List et al. 2021), for improved exposition of correspondences.



- a. *oni wyaro nkekoni biryekomo, tiyoni wya*  
*oni wjaro n-ka-jakoni birjekomo 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)
- b. *moro ha, ketxkoná hatá.*  
*moro ha ka-jaffkoni hati*  
 MED.DEM.INAN INTS say-REM.CONT.PL HSY  
 ‘“That one there” they said.’ (Derbyshire 1965: 14)

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

\**ka[tí]* ‘to say’ also shows transitive patterns in its derivational suffixes: In Tiriyo, it is the only intransitive verb taking transitive *-po* (CAUS) and the *-ne* (AGT.NMLZ) (Meira 1999: 263, 169). It also exceptionally takes the former suffix in Kari’ña (Courtz 2008: 82) and Wayana (Tavares 2005: 258). The agent nominalizer \**-ne* became the Panare inflectional suffix *-ne* on transitive verbs (Gildea 1998: 184–185). The combination of *ka* and *-ne* likely led T. E. Payne & D. L. Payne (2013: 214) to categorize it as transitive, although M.-C. Mattéi-Müller (1994: 102) arrived at the opposite conclusion. Finally, reflexes of the ([Gildea 2015]) causativizer \**-metipo* are found with *ka* in Apalaí (E. Koehn & S. Koehn 1986: 51) and Waiwai (R. E. Hawkins 1998: 52).

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

- (19) a. Akuriyó (Meira 1998: 113)  
*mi-ka*  
 2-say  
 ‘You said.’
- b. Kari’ña (Courtz 2008: 202)  
*Òmakon ‘wa oti ywykàpo kaiko.*  
*o-?ma-kon ?wa oti i-wi-ka-?po kai-ko*  
 2-child-PL OBL greeting 1-*S<sub>A</sub>*-say-PST.NMLZ say-IMP  
 ‘Pass my greetings to your children.’

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

### 3.2.2 \*itə[mə] ‘to go’

This verb was not affected by any of the extensions in Section 3.1. Gildea & D. Payne (2007) reconstruct it as \*itə[mə], like \*ka[tɪ] ‘to say’ with a fleeting second syllable. While many reflexes are clearly *t*-initial (e.g. Hixkaryána *ntoje* ‘he went’ [Derbyshire 1985: 27], Tiriyo *təkə* ‘go’ [Meira 1999: 246], or Wayana *kuptəm* ‘we went’ [Tavares 2005: 195]), an initial vowel \**i* must clearly be reconstructed (Table 16)<sup>10</sup>

[Table 16 about here.]

### 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>11</sup> Modern 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-Tiriyoan (Sections 3.1.1 to 3.1.3). Akuriyó *a* was not affected by the extension of *k*- (Section 3.1.4), while the first person form of *e?i* is not attested. Carijona innovated *j*-, but only in the reflex of \*eti (20); the *a* root preserves *w*- (Section 3.1.5). Yukpa introduced *j*- to the reflexes of both \*a[p] and \*eti, which are preserved as encliticized auxiliaries in certain constructions (21).

- (20) Carijona (Robayo Moreno 1989: 177)
- |                 |                   |             |                 |
|-----------------|-------------------|-------------|-----------------|
| <i>iretibə</i>  | <i>effinəme</i>   | <i>gərə</i> | <i>jetfi</i>    |
| <i>ireti-bə</i> | <i>effi-nə=me</i> | <i>gərə</i> | <i>j-effi-i</i> |
| then-from       | be-INF=ATTRZ      | still       | 1-be-PFV        |
- ‘Then I was already grown up.’

- (21) Yukpa (Meira 2006b: 143–144)

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

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

### 3.2.4 \*(ət-)epi ‘to come’

Innovative \**k*- was introduced on the Ikpeng and Bakairi reflexes of \*ət-epi, but not on the Arara reflex of \*epi (Section 3.1.1). The reflex of \*ət-epi resisted the introduction of Proto-Tiriyoan \**t*- (Section 3.1.3).

<sup>10</sup>The brackets in Table 16 show that languages have the initial vowel only in some forms. Also, the prefix-stem boundary in many inflected forms like Tiriyo *witənnə* or Arara *widoli* ‘I went’ (Meira 1999: 43; Alves 2017: 153) is ambiguous, since epenthetic *i* breaks up CC clusters on these boundaries. Still, when considering unambiguous forms, the contrast with C-initial \*ka[tɪ] becomes very clear.

<sup>11</sup>Such a stative, locative source is also suggested by the existence of *iffi* ‘to lie down’ in Arara (Alves 2017: 196).

Carijona *ehi* shows innovative *j*-, rather than conservative *w*- (22). No Yukpa reflex of this verb is attested, and it was fully replaced in Proto-Waiwaian by *\*omoki* ‘to come’.

(22) Carijona (Guerrero Beltrán 2019: 102)

*aji-wa-e*      *j-eh-i*  
 2-search-SUP 1-come-PFV  
 ‘I came looking for you.’

Gildea & D. Payne’s (2007) reconstruction *\*atepi* can be segmented into an optional prefix *\*at-* and a root *\*epi*, since reflexes can be grouped into those with a reflex of *\*at-* and those without (Table 17). As seen in Sections 3.1.1 and 3.1.3 and Table 18, this division can exist within a single paradigm.

[Table 17 about here.]

[Table 18 about here.]

Long *\*at-epi* lost *\*t* in Tiriyo, Apalaí, and Bakairi, but only the first development is due to regular sound changes (Meira 1998: 31–32). Akuriyo reflects *\*ae* as *ee*, with *eepi* being betrayed as not a reflex of *\*epi* by the otherwise unexpected vowel length (Meira 1998: 114–115). Other languages coalesced *\*ae* to *\*aa*, with *\*aapi* being reflected in Upper Xingu Carib (Gildea 2012: 452), Kari’ña, Werikyana, Panare, and Yawarana. In Kari’ña (Meira et al. 2010: 509–510), *\*e*-initial transitive verbs detransitivized with *\*at-* underwent the same development (also yielding vowel length), while *\*ate* > *\*aa* is irregular at least in Werikyana and Panare.

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

[Table 19 about here.]

The clear segmentability of *\*at-* in combination with its form suggest that it is a detransitivizing prefix. Although the combination of a detransitivizer and an intransitive verb makes no sense semantically, some historical S<sub>P</sub> verbs are attested as adding the detransitivizer to become S<sub>A</sub> verbs. For example, the Proto-Cariban S<sub>P</sub> verb *\*winiki* ‘to sleep’ becomes Tiriyo *aaniki* (Meira 1999: 252) and Kari’ña *aʔniki* (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 already was an S<sub>A</sub> verb (although its reflexes in languages with split-S mostly co-occur with reflexes of *\*at-epi*).

### 3.2.5 \**ipitā* ‘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 Akuriyó (Section 3.1.4). Its resistance against the former extension was later broken in Bakairi, while its fate in Ikpeng is unknown. When Akuriyó extended *k-*, the verb already had a first person form irregularly inflected with *p-*, inherited from Proto-Tiriyóan. 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.)  
*irā waffinakano tae j-ehitā-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*  
 1PRO 1-go.down  
 ‘I went down.’

However, a family-wide perspective reveals a more complicated story (Table 20).<sup>12</sup> While a verb \**ipitā* 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>.

[Table 20 about here.]

The verb shows traits of both classes in Wayana, making it a “mixed” verb in a synchronic analysis. 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)
- |   |   |
|---|---|
| <p>a. <i>iwiptëë</i><br/> <i>i-w-iptā-ri</i><br/>         1-S<sub>A</sub>-go.down-NMLZ<br/>         ‘my going down’</p> | <p>b. <i>əw-iptā-k</i><br/>         2-go.down-IMP<br/>         ‘Go down!’</p> |
|---|---|

Its causativized form is *iptā-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’ as a regular S<sub>P</sub> verb in pre-Wayana, but partially switching to the S<sub>A</sub> class by taking a 1+2S<sub>A</sub> prefix and the S<sub>A</sub> class marker.

<sup>12</sup>The cognacy status of parenthesized forms in Table 20 is uncertain. The reconstruction of Proto-Pekodian \**iptā* 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 *əneŋ*; b) Proto-Cariban \**əta* ‘to hear’, Arara *taŋ*, Ikpeng *irayŋ*; and c) Proto-Cariban \**əna* ‘to eat meat’, Arara *ənaŋ* ‘to bite’ (Gildea & D. Payne 2007: 8; Alves 2017: 56, 144, 57; Pachêco 2001: 25, 270).

This in turn implies that (inflectionally defined) S<sub>A</sub> reflexes in other languages fully switched from S<sub>P</sub> to S<sub>A</sub>.

Wayana-external evidence supports this hypothesis: The Arara causativized form is *eniptoy* (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 have a reflex of the transitivizer *\*en-*, occurring with S<sub>P</sub> verbs in Proto-Cariban (Gildea & Cáceres in preparation). Tiriyo *ih̄tə* 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 1S<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> status at the time of the extension, resisting it and preserving the old prefix, but it could also have had S<sub>P</sub> status and thus not even have been 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 1S<sub>A</sub> prefixes in Proto-Tiriyoan (Tiriyo *s-epi-*, Akuriyó *ʔj-epi-* [Meira 1999: 292; Gildea 1994: 87]) and Proto-Waiwaian (Hixkaryána *k-ewehi-*, Waiwai *k-ejeφu-* [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) / *\*ip* (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.

[Table 21 about here.]

## 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’ (Section 3.2.5). 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 possible explanations for the same 1-7 verbs retaining their old 1S<sub>A</sub> marker in 6 independent developments, while a plethora of regular S<sub>(A)</sub> verbs take on innovative markers.

[Table 22 about here.]

## 4 Explaining conservativeness: a network morphology approach

Perhaps the most well-known contribution regarding 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 classic example is a network of “strong” English verbs with *strin*–*stray* at the center and pairs like *rin*–*ray*, *spin*–*span*, or *stik*–*stak* at its periphery. This network is attracting new verbs in certain dialects, like *snik*–*snak* or *brin*–*bray* (Bybee 1985: 129–130). These verbs are recruited based on the lexical connection they form with prototypical members of the group, and accordingly develop irregular or “strong” past tense forms.

As possible bases of these connections between lexemes, Bybee (1985: 118) suggests the criteria of semantic, phonological, and morphological similarity; the English strong verbs are an example for a phonologically motivated network. Another important factor in the model is frequency, since more frequent words have a 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 would predict that a) semantically/phonologically/morphologically similar verbs will be affected by person marker extensions, and b) high-frequency verbs will tend to resist these extensions and thus remain conservative.

When considering the groups of verbs with innovative first person markers (those not in Table 22), there are several factors which could serve as the thread connecting a lexical network. The most obvious similarity is that they all have a reflex of the detransitivizer *\*ate/e-* (see e.g. Meira [1998: 112] for Taranoan), a hallmark of S<sub>A</sub> verbs (Section 2.3). Since all derived S<sub>A</sub> verbs begin with reflexes of *\*a* or *\*e* (see e.g. Alves [2017: 153] for Arara ), phonologically based networks are a second possibility. A third common trait is the S<sub>A</sub> (sub-)class membership, represented by pre-innovation first person *\*w-* (*t-* in Akuriyó). There are no obvious semantic patterns, which is not surprising given the absence of a semantic basis in the split-S system (Section 2.3). Thus, for each extension, there are three hypotheses as to what connected the members of the responsible network: a reflex of DETRZ, their stem-initial phoneme, or a specific 1S<sub>A</sub> prefix.

It is intuitively obvious that many of the conservative verbs in Table 22 are high-frequency verbs, 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 supported neither by frequency counts nor accompanied by a list of verbs, but that list is likely identical with the five first columns of Table 22, all underived  $S_A$  verbs in Kari’ña. To improve the situation, a count of  $S_A$  verbs in three glossed Apalaí texts from E. Koehn & S. Koehn (1994) will serve as a second source of frequency information, the results of which are shown in Table 23. The count data agree with the above interpretation of Courtz’s (2008) claim: defining “high frequency” as having an above average count yields the exact same five verbs. While it is uncertain that the interpretation of Courtz’s (2008) claim and the small Apalaí sample are truly representative of discourse patterns in the Cariban (proto-)languages under discussion, the absence of alternatives necessitates their use as a tool for modeling frequency.

[Table 23 about here.]

Thus, each of the three hypotheses for possible network factors can be combined with frequency: the members of the lexical network formed by the factor are predicted to undergo innovation, but high-frequency verbs are exempt. The resulting six hypotheses for possible explanations were tested by predicting the expected behavior of each verb in each extension, illustrated in Table 24 for Proto-Tiriyoan. For example, *\*eʔi* ‘to be’ is expected to participate (✓) in innovations spreading in a phonologically defined network (being *\*e*-initial), as well as in an inflectionally defined one (sharing *\*w*- with other  $S_A$  verbs). On the other hand, a network based on the detransitivizer would predict it to not take on new suffixes (×). If frequency is taken into account, it is expected to remain conservative regardless of the basis of the network.

[Table 24 about here.]

These predictions were checked against the data in Table 22, counting verbs which had their behavior (in-)correctly predicted. The resulting scores are illustrated for the extension of Proto-Tiriyoan *\*t*- in Table 25 and summed up for all extensions in Table 26. Notably, the scores in Table 26 only refer to the seven verbs which are attested as resisting at least one extension. For each extension, there were also many run-of-the-mill  $S_A$  verbs which were all affected, except for the Akuriyó *e*-initial verbs.<sup>13</sup> To illustrate, if one adds 1’000 simulated derived  $S_A$  verbs per language to the data – a conservative estimate based on Courtz’s (2008) Kari’ña dictionary – all six explanations consistently predict the behavior of 99.99+% verbs correctly. However, the present investigation is restricted to the edge cases, since the available data simply does not allow such large-scale tests for Cariban languages.

[Table 25 about here.]

[Table 26 about here.]

<sup>13</sup>While there are a few  $S_A$  verbs not transparently derived from transitive verbs (Meira 1999: 252, 2000: 222; Gildea & D. Payne 2007: 30), which are not featured in Table 22, these are mostly *\*ə*-initial and were likely productively derived at some point. The verbs to which this does not apply, like Tiriyo *wa* ‘to dance’ (Meira 1999: 252), are all instances of  $S_P$  verbs switching classes. Since none of them is attested as being an  $S_A$  verb at the time of a person marker extension, they are not relevant for this study.

The extent of the extensions in both Proto-Waiwaian and Proto-Pekodian is fully predicted by the presence or absence of a detransitivizer. In both cases, only the underived<sup>14</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>15</sup> Second, the development of Proto-Pekodian  $*it\acute{a}n$  ‘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  $\partial$ -initial verbs. In Carijona, the extension of  $j-$  affected all  $e-$  and  $\partial$ -initial verbs, including *eh* ‘to come’ or *effi* ‘to be’, which do not have a detransitivizing prefix. Only *ka* ‘say’, *tamə* ‘go’, and *a* ‘be-1’ did not take on  $j-$ . Similarly, the extension of Yukpa  $j-$  can succinctly be characterized as affecting all vowel-initial verbs; 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 only works if  $t-$  and  $fj-$  are analyzed as distinct morphemes. Since they can also be seen phonologically conditioned allomorphs, the prediction is identical to the phonological one.

When additionally considering the assumed conservative effects of frequency, prediction accuracy was improved in 8 cases, stagnated in 7 cases, and worsened in three cases. These three cases where the tentative model of verb frequency arrives at incorrect predictions 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 frequency in the model led to improvements, up to 100% prediction accuracy for all three potential factors in Proto-Tiriyoan, as well as for the phonological criterion in Proto-Pekodian and the inflection criterion in Proto-Waiwaian.

In summary, 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 much 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 in turn is due to the fact that three of the factors in the model – detransitivizer, phonology, frequency – strongly converge 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 first research question of this study asked where the irregularly inflected first person forms in some Cariban languages came from. A second question was what verbs are irregular in what languages. Finally, reasons for their irregularity were sought.

<sup>14</sup>Note that for Proto-Pekodian, the idiosyncratic evolution of  $*e-pi$  ‘to bathe (INTR)’ to  $*ipi$  made the verb morphologically opaque.

<sup>15</sup>If one instead assumes that first person  $*w-ebi-$  and  $*k-\partial d-ebi-$  already co-existed in Proto-Pekodian, the clear correlation between  $*k-$  and the detransitivizer remains.



The main findings can be summarized as follows: Verbs irregularly inflected for first person are conservative, leftovers of person marker extensions which left some verbs untouched. Some of these extensions are reconstructible to proto-languages, while others happened in pre-modern stages of single languages. Conservatively inflected verbs show a great degree of overlap between languages, and often behave irregularly in other ways, too. While Bybee's (1985) network model offers explanations for the lexical extent of innovative markers, in 4 of 6 cases it gives no unambiguous answer, as multiple factors 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 prefix *\*ate/e-*.

While the origins of the split-S system clearly have to do with the detransitivizer, the question why *\*ate/e-* is associated A-oriented prefixes (Meira 2000) is still not answered. Another question to be asked 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', 'say', 'go'). There is no reason why they could not be simple  $S_P$  verbs, except maybe in the case of *\*ka[ti]* 'to say' with its transitive tendencies. The answer might be found in the origins of *\*ate/e-* and its association with A-oriented prefixes.

As for Bybee's (1985) network model of morphology, it fulfilled the promise of delivering attractive explanations for irregularities in inflectional patterns. If anything, it overshot its goal somewhat; only two of the four investigated innovations had an unambiguous answer – phonology. It may be noted that across all six hypotheses, the two featuring phonology (one with, once without frequency) together correctly predicted 100% of patterns. Since frequency decreased prediction accuracy in the case of Carijona and Yukpa, it would be interesting to see  $S_A$  verb frequency statistics from corpora of these languages. However one interprets the results of the network model investigation, it needs to be pointed out that the ambiguity of its answers are due to the special circumstances in Proto-Cariban, rather than a flaw in the model. Still, the results raise the question how applicable the model is in circumstances where ambiguity arises.

As mentioned, other 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 providing better input for the network model. Apart from this specific purpose, corpus-based investigations like Sapién et al. (2021) in Cariban languages are direly needed, to accompany the improving descriptive side. Concerning the latter, more extensive descriptive work on Yukpa and Carijona would not only tremendously benefit this paper, but Cariban studies as a whole.

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## A Predictions for the behavior of individual verbs

[Table 27 about here.]

[Table 28 about here.]

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[Table 31 about here.]

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[Table 36 about here.]

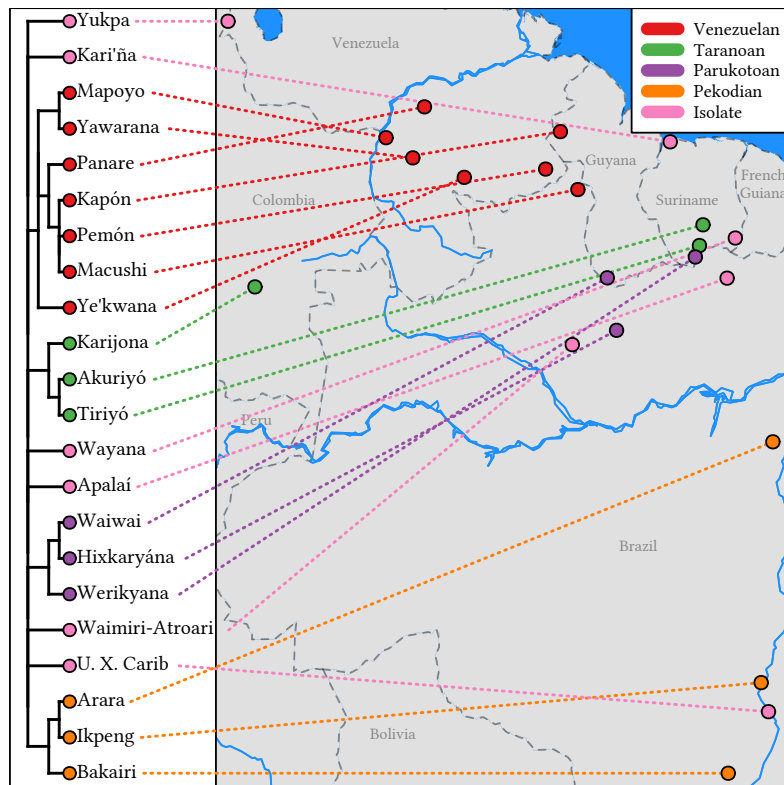


Figure 1: The Cariban language family. Classification by Matter (2021a), positions from Hammarström et al. (2020). Created with a modified version of `phytools` (Revell 2012).



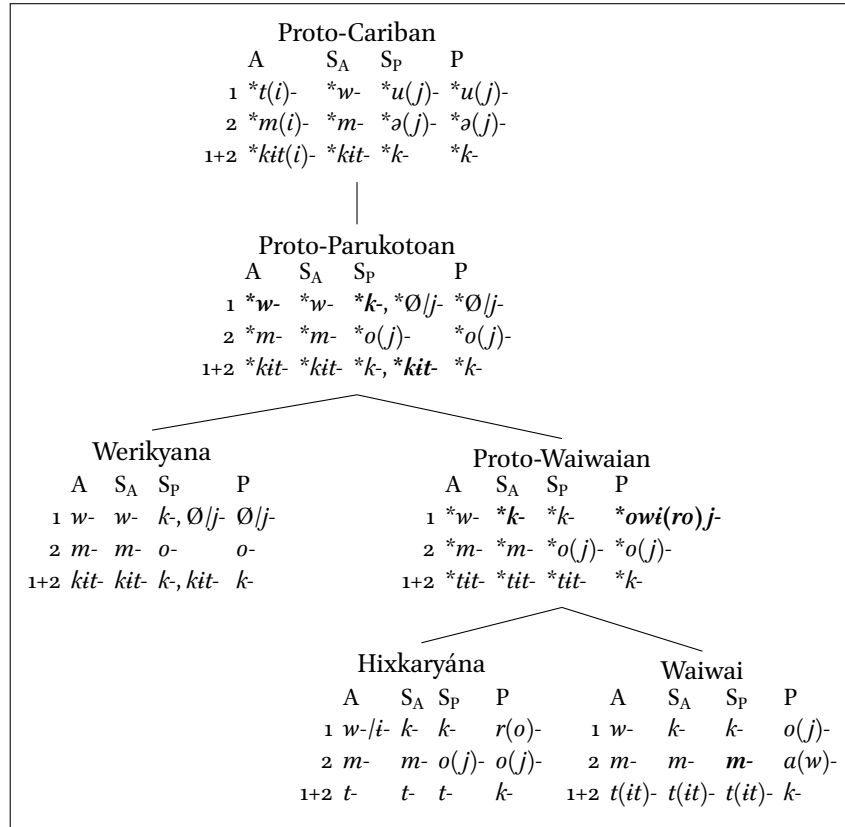


Figure 2: Person marking extensions in Parukotoan, after Gildea (1998: 94)

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	<i>k-ehurka-</i>	<i>k-oserʔehi-</i>	<i>k-atarʔeknohi-</i>	<i>k-atama-</i>	<i>w-eʃe-</i>
2	<i>m-ehurka-</i>	<i>m-oserʔehi-</i>	<i>m-atarʔeknohi-</i>	<i>m-atama-</i>	<i>m-eʃe-</i>
1+2	<i>t-ehurka-</i>	<i>t-oserʔehi-</i>	<i>t-atarʔeknohi-</i>	<i>t-atama-</i>	<i>t-eʃe-</i>
3	<i>ʃ-ehurka-</i>	<i>n-oserʔehi-</i>	<i>n-atarʔeknohi-</i>	<i>n-atama-</i>	<i>n-eʃe-</i>

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

	‘to sleep’	‘to see self’	‘to bathe (INTR)’	‘to yawn’	‘to go’
1	<i>t-ənniki-</i>	<i>t-əene-</i>	<i>s-epi-</i>	<i>s-entapo-</i>	<i>wi-tən-</i>
2	<i>m-ənniki-</i>	<i>m-əene-</i>	<i>m-epi-</i>	<i>m-entapo-</i>	<i>mi-tən-</i>
1+2	<i>kit-ənniki-</i>	<i>k-əene-</i>	<i>ke-epi-</i>	<i>k-entapo-</i>	<i>ki-tən-</i>
3	<i>n-ənniki-</i>	<i>n-əene-</i>	<i>n-epi-</i>	<i>n-entapo-</i>	<i>ni-tən-</i>

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

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

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

(a) Apalaí			(b) Panare			(c) Waimiri-Atroari		
	$S_A$	$S_P$		$S_A$	$S_P$		$S$	
1	$i-/ \emptyset$	$i-/j-$	1	$w(i)-$	$\emptyset/j-$	1	$w(i)-/i-$	
2	$m(i)-$	$o-$	2	$m(i)-$		2	$m(i)-$	
1+2	$s(i)-$		1+2	$n(i)^{-1}$		1+2	$h(i)-$	
3	$n(i)-$		3	$n(i)-$		3	$n-/ \emptyset$	

<sup>1</sup> Due to the wholesale loss of 1+2 as an person value.

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	<i>k-əku-</i>	<i>k-origu-</i>	<i>k-aranme-</i>
2	<i>m-əku-</i>	<i>m-origu-</i>	<i>m-aranme-</i>
1+2	<i>kid-əku-</i>	<i>kud-origu-</i>	<i>kw-aranme-</i>
3	<i>n-əku-</i>	<i>Ø-origu</i>	<i>Ø-aranme-</i>

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-efi-	w-ifi-	Ø-efi-	w-i-
‘come’	*w-epi-	w-ebi-	k-arep-	k-æwi-
‘go down’	*w-iptə-	w-ipton-	?-ipton-	k-itagi-
‘bathe’	*w-ipti-	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’	<i>watke</i>	<i>atke</i>
‘DAT’	<i>wina</i>	<i>ina</i>
‘dog’	<i>wokori</i>	<i>akari</i>
‘capuchin monkey’	<i>tawe</i>	<i>tae</i>
‘to sleep’	<i>winki</i>	<i>inki</i>



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

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

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’	* <i>wi-ka-</i>	<i>i-ka-</i>	<i>wi-ka-</i>
‘go’	* <i>wi-tom-</i>	<i>i-to-</i>	<i>kɪw-tom-</i>
‘be-1’	* <i>w-ah-</i>	<i>w-ah-</i>	<i>w-a-</i>
‘be-2’	* <i>w-efi-</i>	<i>w-efe-</i>	<i>w-eefi-</i>

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

	'to bathe (INTR)'			'to sleep'		
	Proto-Tiriyoan	Tiriyó	Akuriyó	Proto-Tiriyoan	Tiriyó	Akuriyó
1	* <i>ʃ-epi-</i>	<i>s-epi-</i>	<i>ʃ-epi-</i>	* <i>t-ʔaniki-</i>	<i>t-ʔaniki-</i>	<i>k-ʔaniki-</i>
2	* <i>m-epi-</i>	<i>m-epi-</i>	<i>m-epi-</i>	* <i>m-ʔaniki-</i>	<i>m-ʔaniki-</i>	<i>m-ʔaniki-</i>
1+2	* <i>ke-epi-</i>	<i>ke-epi-</i>	<i>ke-epi-</i>	* <i>kit-ʔaniki-</i>	<i>kit-ʔaniki-</i>	<i>kəʔ-ʔaniki-</i>
3	* <i>n-epi-</i>	<i>n-epi-</i>	<i>n-epi-</i>	* <i>n-ʔaniki-</i>	<i>n-ʔaniki-</i>	<i>n-ʔaniki-</i>

Table 11: Verbs preserving 1S<sub>A</sub> \*w- in Proto-Tiriyóan (Meira 1999: 292, 294, 339, 1998: 112, 113, 114, 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-	Ø-a-
‘be-2’	*w-eʔi-	w-ei-	?-eʔi-
‘come’	*w-əʔepti-	w-əepti-	Ø-eepti-

Table 12: Regular Akuriyó 1S<sub>A</sub> markers (Gildea 1994: 77, 79, 82, 84, 85, 86, 87)

first person <i>k</i> -	first person <i>fj̃</i> -
<i>əempa</i> - ‘to learn’	<i>epi</i> - ‘to bathe (INTR)’
<i>əəfj̃əna</i> - ‘to cry’	<i>ekirika</i> - ‘to stay back’
<i>əiwa</i> - ‘to tremble’	<i>entapo</i> - ‘to yawn’
<i>əmami</i> - ‘to enter’	<i>etonema</i> - ‘to lie down’
<i>ətajijka</i> - ‘to run’	<i>ewai</i> - ‘to sit down’
<i>əturu</i> - ‘to talk’	<i>ehpa</i> - ‘to bathe (INTR)’
<i>əəniki</i> - ‘to sleep’	

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

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

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

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

Table 15: Reflexes of *\*ka[ti]* ‘to say’ (Meira 2005: 267, 2003a: 4; Franchetto 2008: 48; Pachêco 2001: 209, 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	<i>ka[s]</i>	k	a	s	
Proto-Waiwaian	<i>*ka[s]</i>	k	a	s	
Hixkaryána	<i>ka[s]</i>	k	a	s	
Waiwai	<i>ka[s]</i>	k	a	s	
Proto-Pekodian	<i>*ge</i>	g	e		
Proto-Pekodian	<i>*ke</i>	k	e		
Arara	<i>ge</i>	g	e		
Arara	<i>ke</i>	k	e		
Ikpeng	<i>ge</i>	g	e		
Ikpeng	<i>k[e]</i>	k	e		
Bakairi	<i>ge</i>	g	e		
Bakairi	<i>ke</i>	k	e		
Proto-Tiriyoan	<i>*ka</i>	k	a		
Tiriyó	<i>ka</i>	k	a		
Akuriyó	<i>ka</i>	k	a		
Carijona	<i>ka</i>	k	a		
Wayana	<i>ka[i]</i>	k	a		i
Apalaí	<i>ka[fi]</i>	k	a	ɟ	i
Kari’ña	<i>ka</i>	k	a		
Kapón	<i>ka</i>	k	a		
Pemón	<i>ka</i>	k	a		
Macushi	<i>ka</i>	k	a		
Panare	<i>ka[h]</i>	k	a		h
Upper Xingu Carib	<i>ki</i>	k	i		
Yukpa	<i>ka</i>	k	a		



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; p.c., Spike Gildea)

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

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	<i>ehi</i>			e	h i
Werikyana	<i>johi</i>			j	o h i
Werikyana	<i>o[o]hi</i>	oo	-		h i
Proto-Pekodian	<i>*epi</i>			e	p i
Proto-Pekodian	<i>*ədepi</i>	ə	d -	e	p i
Arara	<i>ebi</i>			e	b i
Arara	<i>odebi</i>	o	d -	e	b i
Ikpeng	<i>arep</i>	a	r -	e	p
Bakairi	<i>əewi</i>	ə	-	e	w i
Proto-Tiriyóan	<i>*epi</i>			e	p i
Proto-Tiriyóan	<i>*əʔepi</i>	ə	ʔ -	e	p i
Tiriyó	<i>epi</i>			e	p i
Tiriyó	<i>æ[pi]</i>	ə	-	e	p i
Akuriyó	<i>eepe</i>	ee	-		p i
Carijona	<i>eh[i]</i>			e	h i
Apalaí	<i>oepe</i>	o	-	e	p i
Kari’ña	<i>o[o]pi</i>	oo	-		p i
Ye’kwana	<i>ehə</i>			e	h ə
Akawaio	<i>jepi</i>			j	e p i
Akawaio	<i>əsipi</i>	ə	s -	i	p i
Ingarikó	<i>jepə</i>			j	e p ə
Ingarikó	<i>jə</i>			j	ə
Patamona	<i>jepi</i>			j	e p i
Patamona	<i>jəpi</i>			j	ə p i
Pemón	<i>jepi</i>			j	e p i
Macushi	<i>ipi</i>			i	p i
Panare	<i>ə[ə]pi</i>	əə	-		p i
Yawarana	<i>epi</i>			e	p i
Yawarana	<i>əəpi</i>	əə	-		p i
Mapoyo	<i>epi</i>			e	p i
Upper Xingu Carib	<i>e[e]</i>	ee			
Upper Xingu Carib	<i>i</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	<i>w-oohi-</i>	<i>w-ebi-</i>	<i>w-æpi-</i>
2	<i>m-oohi-</i>	<i>m-odebi-</i>	<i>mən-epi</i>
1+2	<i>kis-ohi-</i>	<i>kud-ebi-</i>	<i>ke-epi</i>
3	<i>n-ehi-</i>	<i>t-ebi-</i>	<i>n-epi</i>

Table 19: Werikyana ‘to come’ and other S<sub>A</sub> verbs (Spike Gildea, p.c.)

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

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

Table 21: Comparison of intransitive and transitive ‘to bathe’ (Derbyshire 1979: 198; R. E. Hawkins 1998: 192, 203; Alves 2017: 150, 162; 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 <i>*e-pi</i> ‘to bathe (INTR)’						
Language	Form					
Werikyana	<i>eehi</i>	ee		-	h	i
Hixkaryána	<i>ewehi</i>	e	w	e	-	h i
Waiwai	<i>ejeɸu</i>	e	j	e	-	ɸ u
Arara	<i>ibi</i>	i			-	b i
Ikpeng	<i>ip</i>	i			-	p
Bakairi	<i>i</i>	i				
Tiriyó	<i>epi</i>	e			-	p i
Akuriyó	<i>epi</i>	e			-	p i
Wayana	<i>epi</i>	e			-	p i
Apalaí	<i>epi</i>	e			-	p i

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

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

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

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

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

	<i>*ka[ti]</i> 'say'	<i>*ita[mə]</i> 'go'	<i>*a[p]</i> 'be-1'	<i>*eti</i> 'be-2'	<i>*(ət-)epi</i> 'come'	<i>*ipitə</i> 'go down'	<i>*e-pi</i> 'bathe'
Proto-Waiwaian <i>*k-</i>	×	×	×	×	–	N/A	✓
Hixkaryána	×	×	×	×	–	N/A	✓
Waiwai	×	(✓)	×	×	–	N/A	✓
Proto-Pekodian <i>*k-</i>	×	×	×	×	×	×	×
Arara	×	×	×	×	×	×	×
Ikpeng	×	✓	–	×	✓	?	×
Bakairi	×	×	×	×	✓	✓	×
Proto-Tiriyóan <i>*t-</i>	×	×	×	×	×	N/A	✓
Tiriyó	×	×	×	×	×	N/A	✓
Akuriyó	×	×	×	?	×	N/A	✓
Akuriyó <i>k-</i>	×	×	×	?	×	×	×
Carijona <i>j-</i>	×	×	×	✓	✓	N/A	?
Yukpa <i>j-</i>	?	×	✓	✓	–	N/A	–

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

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
<i>a</i> 'be-1'	49	30.06%
<i>efi</i> 'be-2'	30	18.40%
<i>ka</i> 'say'	26	15.95%
<i>ito</i> 'go'	23	14.11%
<i>oepti</i> 'come'	13	7.98%
<i>e-pore?ka</i> 'arrive'	3	1.84%
<i>ot-urupo</i> 'ask'	2	1.23%
<i>ot-u?</i> 'eat'	2	1.23%
<i>os-enakũnu?</i> 'choke'	2	1.23%
<i>e-unopi</i> 'laugh'	1	0.61%
<i>at-akĩma</i> 'pack bags'	1	0.61%
<i>at-ankiema</i> 'be happy'	1	0.61%
<i>os-ereh</i> 'be amazed'	1	0.61%
<i>e-metika</i> 'lose loincloth'	1	0.61%
<i>e-tuarima</i> 'suffer'	1	0.61%
<i>e-puka</i> 'fall'	1	0.61%
<i>os-epori</i> 'meet'	1	0.61%
<i>ot-iri?ka</i> 'land'	1	0.61%
<i>ot-i?ka</i> 'finish'	1	0.61%
<i>ot-uru</i> 'talk'	1	0.61%
<i>at-apiaka</i> 'divide up'	1	0.61%
<i>e-siri?ma</i> 'move'	1	0.61%



Table 24: Predictions for Proto-Tiriyoan

	<i>*ka</i> 'say'	<i>*[i]tə[mi]</i> 'go'	<i>*a</i> 'be-1'	<i>*eʔi</i> 'be-2'	<i>*əʔepi</i> 'come'	<i>*epi</i> 'bathe'
DETRZ	×	×	✓	×	×	✓
DETRZ+freq	×	×	×	×	×	✓
phono ( / <sub>—</sub> *ə, e )	×	✓	✓	×	×	✓
phono+freq	×	×	×	×	×	✓
infl (*w-)	✓	✓	✓	✓	✓	✓
infl+freq	×	×	×	×	×	✓

Table 25: Evaluating predictions for Proto-Tiriyoan

	<i>*ka</i> 'say'	<i>*[i]tə[mi]</i> 'go'	<i>*a</i> 'be-1'	<i>*eʔi</i> 'be-2'	<i>*əʔepi</i> 'come'	<i>*epi</i> '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 <i>*k-</i>	100.0%	100.0%	60.0%	100.0%	20.0%	100.0%
Proto-Pekodian <i>*k-</i>	100.0%	100.0%	71.4%	100.0%	0.0%	71.4%
Proto-Tiriyóan <i>*t-</i>	83.3%	100.0%	66.7%	100.0%	16.7%	100.0%
Akuriyó <i>k-</i>	66.7%	83.3%	100.0%	100.0%	100.0%	100.0%
Carijóna <i>j-</i>	60.0%	60.0%	100.0%	60.0%	40.0%	60.0%
Yukpa <i>j-</i>	33.3%	33.3%	100.0%	33.3%	66.7%	33.3%

Table 27: Predictions for Proto-Waiwaian

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

Table 28: Evaluating predictions for Proto-Waiwaian

	<i>*ka[s]</i> 'say'	<i>*[i]to[m]</i> 'go'	<i>*ah</i> 'be-1'	<i>*eʃi</i> 'be-2'	<i>*eeʃi</i> '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

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

Table 30: Evaluating predictions for Proto-Pekodian

	<i>*ke</i> 'say'	<i>*ita[n]</i> 'go'	<i>*ap</i> 'be-1'	<i>*effi</i> 'be-2'	<i>*epi</i> 'come'	<i>*ipta</i> 'go down'	<i>*ipi</i> '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 Akuriyó

	<i>ka</i> 'say'	$[\partial]t\partial[mi]$ 'go'	<i>a</i> 'be-1'	<i>eepi</i> 'come'	$i[h]t\partial$ 'go down'	<i>epi</i> 'bathe'
DETRZ	×	✓	×	×	✓	×
DETRZ+freq	×	✓	×	×	×	×
phono ( / $\_ \partial$ )	×	×	×	×	×	×
phono+freq	×	×	×	×	×	×
infl ( <i>k</i> -)	×	×	×	×	×	×
infl+freq	×	×	×	×	×	×



Table 32: Evaluating predictions for Akuriyó

	<i>ka</i> ‘say’	<i>[ə]tə[mi]</i> ‘go’	<i>a</i> ‘be-1’	<i>eepi</i> ‘come’	<i>i[h]tə</i> ‘go down’	<i>epi</i> ‘bathe’	Score
phono	✓	✓	✓	✓	✓	✓	100.0%
phono+freq	✓	✓	✓	✓	✓	✓	100.0%
infl	✓	✓	✓	✓	✓	✓	100.0%
infl+freq	✓	✓	✓	✓	✓	✓	100.0%
DETRZ+freq	✓	×	✓	✓	✓	✓	83.3%
DETRZ	✓	×	✓	✓	×	✓	66.7%

Table 33: Predictions for Carijona

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

Table 34: Evaluating predictions for Carijona

	<i>ka</i> 'say'	<i>təmə</i> 'go'	<i>a</i> 'be-1'	<i>effi</i> 'be-2'	<i>eh[i]</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 35: Predictions for Yukpa

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

Table 36: Evaluating predictions for Yukpa

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