Preliminary Phonological Analysis of Ramari Hatohobei
A Standardisation Project for Tobian and Sonsorolese Report

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1. Introduction

This is a report of a preliminary phonological analysis of Tobian. The purpose of this report is:

- To create a comprehensive and user-friendly key to be used for later training local collaborators in distinguishing sounds and transmitting this knowledge.
- To gain input and feedback from collaborators regarding the next steps of the project.

First, we discuss the survey to be distributed in the community and then the sessions had with local speakers, Justin Andrew and one more speaker. Next, we discuss a preliminary phonological analysis of Tobian.

2. Methodology

2.1. Survey

The survey aims at gaining input from speakers on how they wish to write, or already write Tobian. The survey is divided into three parts:

- In the first part, speakers are asked about their language practises, how they would use the writing system and who they think is the appropriate individuals/organisations/other to decide on a standard writing system.

The reason for including this part is to discover how speakers think of their language and how they could potentially use the writing system. If the responses in this first part of the survey do not showcase an interest in furthering work on the language and extend the social contexts in which it could be used, we as linguistic consultants will not push this project forward.

- In the second part of the survey, speakers are asked to listen to particular words. Some of these words were selected based on the existing linguistic analyses of the language (van den Berg 2014; Capell 1969). Others were selected based on questionnaires created by consulting Justin Andrew, the main LoC, and recommendations for other languages of the area, such as Woleaian and Saipan Carolinian (Sohn 1984; Sohn & Tawerilmang 1976; Jackson 1983).

The reason for including this part is to identify how most speakers would spell each sound of the language and take that into account when making final decisions. We wish to make these results public at the end of the project, so that speakers are aware of how the majority has chosen to spell each sound and the reasons behind our recommendations.

- In the third part of the survey, speakers will be asked to listen to an audio recording by Justin Andrew telling the story of clans and chickens (Black & Black 2014) and write what they are listening to. Although this will make the survey longer, we believe that this is an interesting story that will encourage participants to consider ways of spelling the various sounds and words of Tobian.

The main reason for including this task is to be able to compare between participants and identify again how the majority spells, particularly subject markers and other proclitics. Furthermore, the fact that the majority of the Tobian-speaking population is literate makes this an ideal introductory task for future literacy projects.

In July and August 2021, we held sessions with Justin Andrew and one more speaker via Zoom. The purpose of these sessions was:

- to prepare the survey,
- test our hypotheses,
- choose the appropriate vocabulary to be included in the survey and
- gain some initial input on how speakers of Tobian think about their language.

Zoom was used because of the possibility of recording the sessions, of sharing one's screen and of having multiple participants on screen at the same time. Sessions were conducted using a questionnaire[1], while Justin Andrew has signed a consent form[2], regarding revealing his name in all

[1] The questionnaire is a combination of examples used in Oda's (2007) phonology chapter and Sohn's papers in Bender's (1984) Studies in Micronesian Linguistics. Find the questionnaire below: https://drive.google.com/file/d/1gK2qRxMtsi-odi-c0s62Js20USOlPOfI/view?usp=sharing

[2] Find the original consent form here: https://docs.google.com/document/d/1vVRqLrj2L6WJcOwtbMMUw5nlzLhbWop3AGkDVMB2fJg/edit?usp=sharing

documentation of the project, making the recordings available and using his insights and productions for the purposes of preparing these surveys. Justin Andrew had sent all recordings of vocabulary via email.

Currently the survey is in online format, that is, Google Forms. The Tobi Language Committee (LC) functioned as the focus group, testing the survey which will be finalized after the pilot group has identified potential problems and made recommendations. After the survey is finalized, the online format will be used for expatriate speakers of the Tobian community, and the survey will be transformed into a printed version for speakers who live in Palau. In the online format, the audio files will be embedded, while in the printed version the Group of Representatives will have to download the specific audio files of each word for part two and the story file for part three on their phone. After they have downloaded the files on their devices, they will have to visit each Tobian-speaking household so that speakers can answer the survey. For this reason, it is necessary to have a list of all Tobian-speaking households prepared ahead of time.

2.2. Analysis

After collecting the surveys, the findings will be analysed based on the sound system of the language. The words, phrases and texts included in the survey aim at identifying specific sounds and phonological rules. Due to the nature of Google Forms, the outcomes of the survey will be automatically exported in an Excel file which will then be inserted to R for the visualisation of the results.

Some conditions:

- If the majority of participants agree on a specific letter for a sound, then that letter will be used.
- If it's 50-50 between two letters for the same sound, then the Linguistic Consultants and the Language Committee will make recommendations for the particular sound.
- If the participants decide on a symbol or letter that the Linguistic Consultants would not recommend, then this will be discussed in a community meeting to reach a conclusion.

The results will be shared with the Bible Translation group and discussions for further work will be initiated and planned.

3. Current findings

In this section, we hope to provide a key which can be used when planning on teaching the language with how the sounds of Tobian are pronounced. The analyses and the vocabulary presented here are based on earlier work done by van den Berg (2014) and Capell (1969). In this analysis, we have merely described the sounds in more detail and confirmed or debunked previous claims. Below you will find a picture of the human mouth and the articulators which help us make the sounds that we make when we speak our language and other languages. The sounds of Tobian are presented in a way that showcases their relation to each articulator (Figure 2) and parts of the tongue (Figure 3).

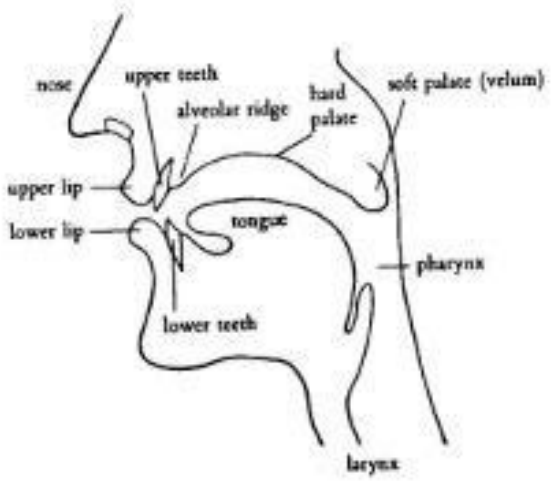

Figure 2. The articulators

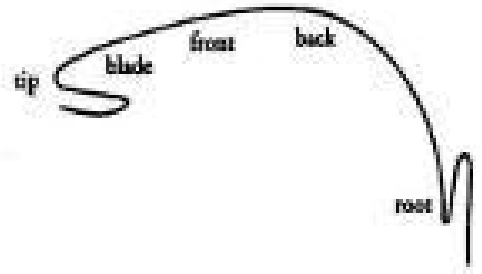

Figure 3. Sub-divisions of the tongue

3.1. The vowels

As far as vowels are concerned, we agree with van den Berg (2014: 14) that there are seven main vowels in Tobian (Table 1). Most of these vowels also occur as long vowels. Vowels are sounds represented by letters, such as *a, i, u, e, o*. Figure 4 presents all vowel sounds the human mouth can produce in their place of articulation. In the left part of the figure, you can see a line graph.

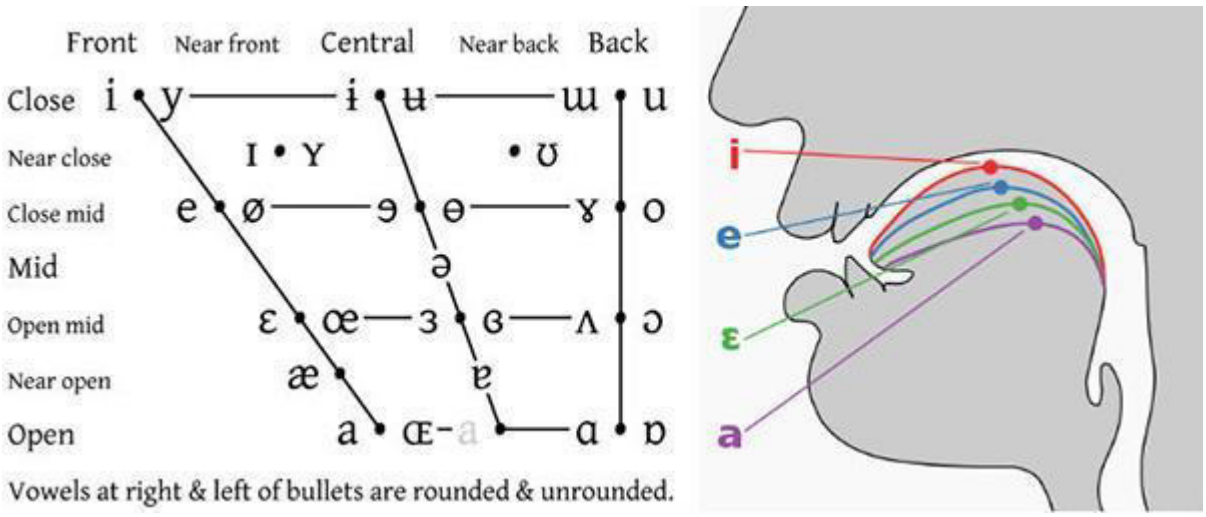

Figure 4. The vowels

Imagine this graph (Figure 4) as the human mouth. The horizontal line represents the position of the sound in the mouth, such as front of the mouth near the lips, central, in the middle of the tongue and back, close to the throat. The vertical line represents the position of the lips, such as close or open, or nearly open and nearly close.

We understand that this is a lot of details, but we would like people who would like to teach and learn the language to be aware of the particular phonetics of Tobian, since we hope to connect the writing system with the phonetic system in order to make the transition easier.

Table 1: Tobian vowels

IPA	word (translation)
i	/i:t/ (name)
u	/bʸu:xou/ (preserved pounded fruit)
ʉ	/ŋʉ:ŋʷ/ (chew)
ɛ	/m:ɛ:tɐ/ (what)
ə	/xəɣə:x/ (tie up)
o	/xots:ou/ (rain cloud)
ɐ	/fərɐŋ/ (ash)

The first vowel is /i/, which is pronounced with the tongue in the front of the mouth, as in the Tobian word for ‘name’, /i:tɐ/ and English for ‘see’. The next vowel is /u/, which is pronounced with the tongue in the back of the mouth, as in the Tobian word for ‘preserved pounded fruit’, /bʸu:xou/ and General American English for ‘fruit’, while the third one is a vowel that is pronounced with the tongue in the centre of the mouth /ʉ/, as in the Tobian word for ‘chew’, /ŋʉ:ŋʷ/. The fourth main vowel is /ɛ/, which is pronounced with the tongue in the near front of the mouth and only one of the lips open, that is, the upper lip is covering the teeth, as in the Tobian word for ‘what’, /mɛtɐ/ and English for ‘head’. The next sound is /o/ in the Tobian word for ‘rain cloud’, /xots:ou/, which is pronounced with the tongue in the back of the mouth and the lips in a near neutral position.

The schwa /ə/ is the next phoneme, which is pronounced with the tongue in the centre of the mouth and the lips in mid positions, meaning, that they are not open or closed, rather in a neutral position, as in the Tobian word for ‘tie-up, fasten’, /xəɣə:x/ and English for ‘again’. Van den Berg (2014: 15-16) argues that /ə/ may not in fact be phonemic but rather an allophone of another phoneme because native speakers seem unaware of the particularity of this sound in stressed positions, its spelling varies between ‘a’ and ‘o’ and because vowels are regularly reduced in running speech. However, we would argue that /ə/ is phonemic because even in careful speech speakers pronounce the /ə/ in /xəɣə:x/ (tie up), the same example van den Berg (2014: 16) used, as such, while a word meaning ‘baby’ in Tobian seems to be /xɐɣɐ/, while /xɛɣɛ-/ means ‘to saw, to cut something’ and /xoɣo/ is a traditional custom of the exchange of sides and fish between men and women (examples from the Friends of Tobi website).

Finally, the vowel sound /ɐ/ is pronounced with the tongue in the centre of the mouth and the lips near open, as in the Tobian word for ‘ash’, /fərɐŋ/ and Australian English for ‘calm’. There is variation as far as /ɐ/ is concerned. As van den Berg (2014: 16) notes, in many cases it is pronounced in the centre of the mouth as in ‘palm’, especially when in open syllables and monosyllabic words, such as the Tobian word for ‘eye’, /ma:t/, while when a low vowel is followed by either /i/ or /ɛ/, it occurs as /æ/, as in /fætɛɾ/, ‘walk’ and /kæŋ/, ‘sharp’, which in Sonsorolese seems to be /kæŋi/ (refer to 4.2. and 4.5. for more). Tobian stresses the penultimate syllable, thus in bimoraic words the first syllable or mora is usually stressed, thus the /ɐ/ sound is either /a/ or /æ/ due to weight sensitivity. When it is not stressed, usually in trimoraic or quadrimoraic feet, then it turns back to the low /ɐ/.

As far as the short final vowels are concerned, we would argue that Tobian presents the same final vowels as Sonsorolese, with variations depending on phonological rules as mentioned above, but we cannot be certain because speakers seem to drop these final vowels, which re-emerge for morphological reasons.

Table 2. Diphthongs

IPA	Description	word (translation)
ɛi	a combination of /ɛ/ and /i/	/fɛitɐ/, (do/how)
ə~~ʉ~~	a combination of /ə/ and /ʉ/	/bʸəwə~~ʉ~~/, (go out)
ɛu	a combination of /ɛ/ and /u/	/sɛuw/, (one)
ɐ~~ʉ~~	a combination of /ɐ/ and /ʉ/	/fɐuw/ (four)

3.2. The consonants

Thirteen single consonants and four geminates have been identified for Tobian, which correspond to great degree to the ones identified by van den Berg (2014: 18).

Table 3. Consonants

IPA	Description	word (translation)
p	voiceless bilabial plosive	/piɾisʲ/ (dog)
bʸ	voiced velarised, bilabial plosive	/xu:bʸᵉ/ (leg)
m	voiced bilabial nasal	/ma:ɾ/ (animal)

mˠ	voiced velarised, bilabial nasal	/mˠɐ:ɾ/ (man)
ŋ	voiced velar nasal	/ŋʉ:ŋᵘ/ (chew)
f	voiceless labio-dental fricative	/fɐɯw/ (four)
x	voiceless velar fricative	/xu:bʸᵉ/ (leg)
ɾ	voiced alveolar tap	/ɾʉ:ɾ/ (drink)
w	voiced labial-velar approximant	/xɐɾiwɛitsⁱ/ (child)
ɟ	voiced palatal fricative	/ɟɐ:wᵘ/ (mouth)
s	voiceless dento-alveolar fricative	/siɾɛsiɾ/ (mother)
ts	voiceless alveolar affricate	/tsi:mˠ/ (head)
k	voiceless velar plosive	/kæŋ/ (sharp)

As far as an alveolar nasal, /n/, is concerned, van den Berg (2014: 22) does not describe it as phonemic and we would agree with this analysis by arguing that /n/ emerges after tap deletion (see 4.3.). Nevertheless, this is still preliminary and there are certain examples, such as /nɐwɛɾ/, 'no', inhibiting us from making any conclusive remarks.

Table 4. Geminate consonants

IPA	word (translation)	IPA	word (translation)
p:	/ɛp:ɛɾ/ (light-weight)	p	/piɾisⁱ/ (dog)
m:	/m:ɛ:tɐ/ (what)	m	/ma:ɾ/ (animal)
ts:	/ts:ɐ/ (blood)	ts	/tsi:mˠ/ (head)
t:	/t:əɾ/ (dream)	t	/ta:ŋi/ (cry)

4. Phonological Rules

Morphological and phonological processes seem to change the phonetic properties of syllables or moras in Tobian. Below we present some of these processes.

4.1. Glide Epenthesis

The palatal glide /ɟ/ is inserted between non-identical unrounded vowels, and between an unrounded vowel and any vowel. In example (2), we would argue that /ɟ/ is inserted between /i:/ and the final devoiced vowel, which is not audible. In example (3), the first syllable or mora is stressed. Because of the addition of -i to signify the third person singular object marker[3], the word becomes trimoraic (with three syllables) and the stress falls in the second syllable [xɐ**səɟ**i:], thus turning the heavy /æ/ of the first syllable to a light /ɐ/. Because the rule says that the vowels need to be non-identical unrounded the /i/ of the second syllable, [xæsix], turns to a heavy /ə/, [xɐsəɟi:], and the glide /ɟ/ is inserted in between since Tobian does not allow for VVV[4] sequences (Vita 2020).

(1) tb12-03698-iaa-2004-08-04

pːiːt	iɐ	ɣɐsiɐ	sɐntos	bʸɐ	fitːow	xɐiɾɐŋ	woːr	**fɯrjiɛ**
Pete	he	ask	Santos	CONJ	how.many	clan	on-of	island

(2) a. [ɾi:ɟ] kill
b. [ɾi:ɟ mʸɐ:ɾ] kill him

(3) a. [xæsix] to spear
b. [xɐsəji:] to spear it

(4) a. [xapi:] to crack
b. [xapiɟɛ:x] to be cracked

[3] Letters added at the end of the word to mark who or what receives the action expressed by the verb
[4] Vowel-Vowel-Vowel sequence

4.2. Vowel Lengthening before suffixes

A stem-final[5] vowel when it is preceded by another vowel is lengthened before an object and possessive suffix[6] (3, 4, 5, 6, 8). With example (7), we would argue that /æ/ in Tobian is considered a heavy vowel and the heavy version of /ə/ exemplified by the fact that the syllable which contains it in “their tongues” (7b) is also stressed with higher intensity than in “tongue” (7a).

(5)	a.	[xɐsʉsʉ] to build it	b.	[xɐsʉ:x] build it
(6)	a.	[ja:ʉw] mouth	b.	[jæwɛ:x] their mouths
(7)	a.	[ŋʉŋusʉrʉɣən] tongue	b.	[ŋʉŋusʉrʉɣəræx] their tongues
(8)	a.	[siɾɛsiɾ] mother	b.	[siɾɛ:x] their mother
(9)	a.	[jɐfɐx] shoulder	b.	[jɐfɐxɛ:x] their shoulder
(10)	a.	[i:m] house	b.	[imɛ:x] their house
(11)	a.	[ta:m] father	b.	[tɐmɛ:x] their father
(12)	a.	[bʸərʉbʸoɾ] cover	b.	[bʸərʉbʸoɾu:x] cover it

A type of compensation rule that lengthens vowels in words that are monosyllabic when elicited on their own is exhibited in examples (13) and (14) (also see van den Berg 2014 and Vita 2020). The final vowel is lengthened in nouns and pronouns which consist of two syllables (15, 16) and do not contain a geminate vowel (19) or a diphthong (20), when they do not take an affix[7] or are not followed by a demonstrative[8] or an adjective.

(13) tb16-03685-nab-2014-06-02-CH6-07

ŋɐ	i	ɣʉɾɐ	foɣʉɾ	ɣoɣoɾ	ux
CONJ	I	know	do	use	net

(14) Friends of Tobi, 2020
[u:x]
net

(15) Friends of Tobi, 2021
[bʸɐt’bʸa:t]
scar

[5] At the end of the base word
[6] Letters at the end of the word to show who owns the item
[7] Affixes in an umbrella term for prefixes (letters inserted in the beginning of the word like "**un**willing") and suffixes (letters at the end of the word like "help**s**")
[8] Demonstratives are words like "that", "this" etc.

(16) Friends of Tobi, 2021
[tsən'tʉ:t]
milk

(17) Friends of Tobi, 2021
['xabʸaɾ]
Old, worn out

(18) Friends of Tobi, 2021
['xats:ɐbʸ]
turtle: hawksbill

(19) Friends of Tobi, 2021
['bʸa:u]
fishing pole

(20) Friends of Tobi, 2021
[bʸa'utɐm]
canoe part: pole, a brace for the outrigger; outrigger brace

4.3. Tap deletion

The voiced, alveolar flap /ɾ/ becomes an alveolar nasal /n/ at a morpheme boundary. Thus, this rule applies to a noun ending in /ɾV/ when it is followed by a construct suffix, /-ɾi/ 'of' (22, 23), an object marker with verbs that end in /ɾ/ (21), or a demonstrative /ɾa/ (25).

(21)	a.	[ɾʉ:ɾ] to drink	b.	[ɾimi] to drink it
(22)	a.	[mʸɐ:ɾ] man	b.	[mʸɐn:i ɣɐtoɣobʸi] man of Tobi
(23)	a.	[siɾɛsiɾ] mother	b.	[sin:i fɛifinɐjɛ] 'her mother'
(24)	a.	[ʉ:f-ɾi fɛifinɐjɛ] clothes-of girl	b.	[ʉ:fɛɾi fɛifinɐjɛ] that girl's clothes
(25)[9]	a.	[mʸɐ:ɾ] man	b.	[mʸɐn:ɐɛ] that man there

As van den Berg (2014: 31) notes, the construct suffix /-ɾi/ 'of' is pronounced [ru] when it appears before /w/, with /ɾ/ once again becoming /n/ (28).

(27)	a.	/mʸɐɾⁱ-ɾu woɾɛjɐi/ man-of Woleai	b.	[mʸɐn:i woɾɛjɐi] man from Woleai
(28)	a.	/mumu-ɾi wɛiɾɛŋ/ kingdom-of heaven	b.	[mumu ɾu wɛiɾɛŋ] the kingdom of heaven

[9] Here we need an example when 25 does not occur

4.4. Velarisation of bilabials

A bilabial nasal /m/ and a bilabial stop /p/ become velarized before a round vowel.

(29) Friends of Tobi, 2021
[mˠots:]
short

(30) Friends of Tobi, 2021
[mˠoŋ]
forehead

(31) Friends of Tobi, 2021
[mˠoɾ]
squirrelfish

(32) Friends of Tobi, 2021
[mˠutɛx]
to hiccup

(33) Friends of Tobi, 2021
[mˠuɾomˠuɾ]
to rub

(34) Friends of Tobi, 2021
[pˠoɣəmoi]
knee

(35) Friends of Tobi, 2021
[pˠowu]
strong

(36) Friends of Tobi, 2021
[pˠuɣutuɣ]
to fall

4.5. Low vowel raising and fronting

When the base form vowel /ɐ/ occurs before a low vowel it is pronounced as /ɛ/ (38, 39) (Sohn & Tawerilmang 1976: 18). A single low vowel, /ɐ/, is fronted and raised /ɛ/ between two high unrounded vowels /i/, /ɪ/ (37).

(37)	a.	[ma:t]	b.	[mɛtai]
		eye		my eyes
(38)	a.	[i:m]	b.	[imˠɛɾi]
		house		house of
(39)	a.	[ts:i:m]	b.	[ts:i:mˠɛɾʲ]
		head		head of

According to van den Berg (2014: 17):

> "Others are pronounced with an open, low vowel quality in isolation, but undergo raising when used in a phrase or in a compound: #136 HAT yaang 'road', raangi 'sky'

and taati 'ocean', which appear respectively in the combinations wori yer 'on the road', weireng 'heaven', reteti 'at sea'."

4.6. Vowel rounding and/or backing

An unrounded vowel /i/, /ɪ/, /ɛ/, /ɐ/, /æ/, /a/ becomes rounded when followed by a rounded vowel (41, 43, 44), or it becomes back /ə/ when followed by an unrounded back vowel /ɐ/, across a morpheme boundary (45, 46).

(40) Friends of Tobi, 2021
[bʸiɾo]
go

(41) tb16-04088-nab-2014-06-02
hɛi bʸu-ɣu ɣɐsiɣ
we.EXCL go-out spear

xɛi bʸi-ɾoŋ
we.EXCL come-inside

ŋɐŋ i kɐɯ bʸ-ɣoɾ fitɐ ijo ɣo-ɾi jɐutɛɣi
I I learn go-out fishing he from-of elder

(42) a. [ɟɐɾʊs] ghost
b. [ɟɐɾʊsʊɾʊ] ghost of

(43) a. [bʸʊɣəɯ] go out

(44) a. [sɛw] one
b. [bʸo:ŋ] night
c. [sɐbʸoŋ] one night

(45) a. [fasiɣ] to weave
b. [fɐsəfɐs] weaving

(46) a. [xæsix] to spear
b. [xɐsəji:] to spear it

4.7. Consonant voicing

A velar fricative /x/ becomes voiced /ɣ/ between two voiced vowels.

(47) Friends of Tobi, 2021
[xɐjɐŋ]
chicken

(48) tb80-04007-fab-2014-11-16
mɐ ɣɐjɐŋ
CONJ chicken
and chicken

(49) [xæsix]
to spear

(50) tb16-04088-nab-2014-06-02

hɛi bᵛu-ɣu ɣɐsiɣ
we.EXCL go-out spear

(51) tb16-04088-nab-2014-06-02
xɐɾɛ-i i-bᵛɛ
catch-POSS.1SG I-MOD

xɛi ɣɐɾɛ-i i fitɛɣ-iɛ
we.EXCL catch-POSS.1SG I work-OBJ

ɾəɣɐ mʷkɐ wɛnɛ-i
food these child-POSS.1SG

5. Conclusion

This report contains our preliminary analysis of the phonology of Tobian. The rules presented in section 4 correspond greatly to the rules of Pulo Annian, as presented in Oda (2007). Further investigation is required to understand the phonological processes initiated by morphological processes in more detail. Based on the data so far, we would argue that Tobian presents stress dependent vowel harmony (see section 4 for some evidence and Majors 2006), but we need more evidence to form a detailed description.

We would appreciate feedback from the Language Committee on this analysis and we welcome any comments for improvement as this is our first attempt describing the linguistic process to a non-linguistic audience. Finally, we welcome feedback on the survey as structured so far and guidance on the next steps of this project as Covid-19 cases are increasing across the country.

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