Historical Reduplication in Seediq[*]

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Abstract: This paper discusses two types of historical reduplication in the Paran and Truku Seediq dialects, after which the proto-forms are reconstructed. The analyses are based primarily on Paran Seediq data, which has been found to have two historically reduplicated roots; *CəəCV, with identical consonants, and *CVCəCVC, with the full reduplication of the CVC. It is possible that in some cases these historically reduplicated forms were onomatopoeic.

Key words: historical reduplication; historical linguistics; nasal substitution; onomatopoeia; Seediq

1 Introduction

Seediq is an Austronesian language in the Atayalic subgroup spoken in Taiwan, in which there are three associated subgroups, Paran, Truku and Toda (Sayama 1917). The mainly two dialectal groups identified by Ogawa and Asai (1935) are Paran Seediq and Truku Seediq, with the latter also encompassing Truku and Toda. This study focuses on the Paran and Truku dialects to reconstruct Proto-Seediq; however, the analyses tend to examine Paran Seediq more closely. The Paran Seediq data was from the author's field notes collected in Gluban village, and Truku Seediq data was extracted from the dictionaries by Rakaw et al. (2006) and Pecoraro (1977).

Paran Seediq has five vowels; a, e, i, o, u; one diphthong uy [uj]; and 18 consonants; p, b, t, d, k, g, q, c [ts], s, x, h, l, r [ɾ], m, n, ŋ, y, w. A typical syllable structure is CV.CV(C) (Yang 1976) or CV.CVV which indicates that there is a diphthong in the final syllable. The stress falls on the penultimate syllable.

Tsukida (2009:56, 97) noted that Truku Seediq has four vowels, a, ə, i, u; and 18 consonants, p, b, t, d, k, g [ɣ], q, ʔ, s, x, h, l [ɬ], r [ɾ], m, n, ŋ, y, w; the phonemes t and d are palatalized before i; and that the stress falls on the penultimate syllable.[1] The Paran Seediq phoneme c corresponds to the Truku Seediq s (e.g., Paran *caŋi* and Truku *saŋi* 'gourd'), which has been dated to the Proto-Atayalic *c (Li 1981:260). In Proto-Seediq, the vowels (monophthongs) are reconstructed with *a, *i, *u, *ə (Ochiai 2016b), which is the same as in Truku Seediq except for the *ə in the final syllable. As explained later in this paper, in both the Truku and Paran dialects, the final vowel *ə becomes u. Furthermore, in Paran Seediq, *ə becomes e in the penultimate syllable,

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[1] Tsukida (2009:58) also said c [ts] is seen in loanwords and a few proper words under a certain condition.

resulting in a vowel system without a ə.

The following sections examine two historically reduplicated forms in both dialects and reconstruct the proto-forms; the Proto-Seediq *CəəCV form in section 2, and the Proto-Seediq *CVCəCVC form in section 3.

2   Proto-Seediq *CəəCV

Ochiai (2016c:110) claimed that Paran Seediq had historically reduplicated forms that followed a CeeCV template and gave some example words that had this forms however, no explanations as to the derivations and no comparisons with Truku Seediq were given; therefore, this section seeks to address these points.

In this pattern of historical reduplication, the root before the reduplication was the final part, CV, with the consonant being reduplicated to presumably become C-CV, and an epenthetic vowel ə inserted between the consonant clusters (∅ > ə); however, the actual form was not CəCV, but CəəCV, as the epenthetic schwa was doubled (ə > əə). The second schwa, which belonged to the penultimate syllable (Cə.ə.CV), received a stress in accordance with the stress assignment mentioned above.

The Truku Seediq forms appear as it is; however, the Paran Seediq forms are slightly different as the schwa appears as e, which is a historically fortified form of the schwa. In Paran Seediq, the historical schwa in the stressed syllable; i.e., the penultimate syllable, became e. For example, compare the Paran *begu* and the Truku *bəgu* 'soup'. In Paran Seediq, the intermediate form CəCV became CeCV because of a fortification of the vowel in the stressed syllable, and then the fortified vowel is doubled as CeeCV.[2]

Table 1 shows the examples identified so far for this type of historical reduplication in Paran Seediq and Truku Seediq, together with the Proto-Seediq reconstructions.[3]

Table. 1: Proto-Seediq *CəəCV

	Proto-Seediq	Paran Seediq	Truku Seediq
1	*bəəba 'to swell'	beeba	bəəba
2	*bəəbə 'to hit'	beebu	bəəbu
3	*dəəda 'to look out over'	deeda	dəəda
4	*gəəguy 'to steal'	geeguy	gəəguy
5	*kəəki 'to dance'	keeki	kəəki[4]
6	*səəsu 'calm'	seesu	səəsu
7	*təətə 'to pound, break'	teetu[5]	təətu

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[2] I benefitted from one of the reviewers' comment on this analysis of epenthetic vowel doubling.

[3] Based on the current forms in Paran Seediq and Truku Seediq, Proto-Seediq is reconstructed as *CəəCV. However, some earlier forms suggest that Proto-Seediq could be CaəCV with the vowel in the reduplicated syllable being a. In Arao (1898), *beebu* (2) appeared as *baebu* and *weewa* (9) appeared as *waewa*. (The numbers following the words indicate the example number in Table 1).

[4] This form means 'to struggle' (Rakaw et al. 2006:362).

[5] For (7) and (8), the root is homophonous, but the derived forms are different. In Paran Seediq, (7) is *t<um>eetu* and (8) is *su-teetu*. In Truku Seediq, (7) is *t<əm>əətu* and according to Tsukida (2009:114),

8	*təətu 'to climb, go an uphill road'	teetu	təətu
9	*wəəwa 'girl'	weewa	wauwa
10	*cəəcu 'disgusting'	cuecu/ceecu	təəcu[6]
11	---	---	kəəku 'cramped'
12	---	---	təətɕi[7] 'nail'

Table 2 shows the suffixed forms of the forms in Table 1. The numbers in the leftmost column correspond to those in Table 1.

Table. 2: Suffixed forms and final ə

	Proto-Seediq	Paran Seediq	Truku Seediq
1	*bəəba	---	səpə-ba-i
2	*bəəbu	bub**e**-i	bəbu-i
3	*dəədа	---	pə-dəda-i
4	*gəəguy	guguy-i	gəguy-an
5	*kəəki	---	pə-kəki-an 'to struggle'
6	*səəsu	---	təgə-səəsu-ay
7	*təətu	tut**e**-i	tətu-i
8	*təətu	---	sə-tətu-an[8]
11	---	---	kəku-i

An explanation for the final schwa in Proto-Seediq *bəəbə (2) and *təətə (7) is necessary. To argue for the reconstructed schwa in the final syllable, the suffixed forms are presented in Table 2 as possibilities. Suffixes -*i* (undergoer voice imperative), -*an* (undergoer voice location subject), or -*ay* (undergoer voice hortative) are added to the verbal root. The numbers in the leftmost column correspond to those in Table 1.

Suffixation causes vowel weakening in pre-stress syllables. In Paran Seediq (Yang 1976) and Truku Seediq (Tsukida 2009), the stress falls on the penultimate syllable; however, when a suffix is added, the stress accordingly moves to the following syllables. The vowels in the pre-stress syllables undergo weakening in both dialects; in Paran Seediq the weakened vowel appears as u or near to u (Yang 1976) and in Truku Seediq it appears as ə.

The vowels sequences ee in Paran Seediq and əə in Truku Seediq appear to undergo haplology

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(8) is *sətəətu*.

[6] In Truku Seediq, the Proto-Seediq *c became s. However, the initial consonant appears as t not the expected s and the second consonant appears as c not the expected s. This irregularity could be related to its onomatopoetic origin. Lee (2017) discussed these phonological irregularities. In addition, the same pattern is seen in *təpətɕip* (example 10 in Table 3) and *tərətɕir* (example 108 in Table 5), in which *c appears as t word initially and tɕ (probably the palatalized from of *c) word medially. These three forms suggest that the Proto-Seediq *c was exceptionally retained as c in Truku Seediq when it appears in the historically reduplicated forms of the type *cVCəcVC; however, the word initial *c is changed to t.

[7] In Truku Seediq forms in Rakaw et al. (2006), t before i appears as palatalized segment tɕ.

[8] This data was taken from Tsukida (2009:114).

in most suffixation cases. In Paran Seediq, the vowel sequences appear as a single weakened vowel u as in *bube-i*, *guguy-i* and *tute-i*. Similarly, as pointed out by Tsukida (2009:114) in Truku Seediq, the vowel sequences appear as a single schwa as in *sə-tətu-an* (8). However, the underlying form of these reduplicated forms may be CeCV in Paran Seediq and CəCV in Truku Seediq. When there is no following suffix, the penultimate vowel is extended through a doubling process to respectively become CeeCV and CəəCV.[9]

Three available Paran Seediq forms show a contrastive pattern. The final vowel in the root form is u in all three forms *beebu*, *geeguy*, and *teetu*. Only *geeguy* retains u in the suffixed form, *gugu-i*; however, this final u in the root of *beebu* and *teetu* appears as an e in the suffixed forms, *bube-i* and *tute-i*, and the e, the penultimate syllable, is in the stressed position. In Paran Seediq, the ə historically underwent fortition and became e in the penultimate syllable; therefore, it could be surmised that the same phonological rule as the schwa fortition is applied here. Then, the schwa is reconstructed for the final vowel in *beebu* and *teetu* (reconstructed *bəəbə and *təətə[10]). The historical final schwa was so unstable that it changed into u in both dialects (e.g., Truku Seediq cognates also show u in the final syllable) but retained the original segment in suffixed forms; however, it undergoes fortition to an e in Paran Seediq.

The counterparts in Truku Seediq, *bəbu-i* and *tətu-i*, are problematic as the vowel in the penultimate syllable does not appear as a schwa but u; however, there are Truku Seediq words with a root-final u that actually appear as a schwa in the penultimate syllable; for example, *rəbug* 'to soak' becomes *rəbəg-i*; which is the same as the pattern being discussed here. It is possible that Truku speakers have been losing the contrast between the original word-final u and the word-final u that dates to the historical schwa. Therefore, some Truku Seediq words still retain the root-final schwa in their suffixed forms; however, in other words, such as *bəəbu* and *təətu*, the final u is taken as the original form so it appears as it is in the suffixed forms.

For other words with a word-final u such as *səəsu* (6), the reconstruction of the final u is tentative. As there is no suffixed form in Paran Seediq, it is not possible to know whether the root-final u originated as a u or a ə.

3   Proto-Seediq *CVCəCVC

Ochiai (2016c:109-110) gives some examples of the CVCeCVC historical reduplication in Paran Seediq, which has been syllabified as CV.Ce.CVC. This form can be traced back to the Proto-Seediq *CVCəCVC as the e in the penultimate syllable in Paran Seediq originated as a ə.

Apart from this, Huang et al. (1998) and Lee (2017) offered some examples of historical reduplication. Huang et al. (1998:15-16) identified 13 historically reduplicated forms, from which a list of surface forms, bases and glosses was developed. One example of a noun was *yqeyaq* [yuqeyaq] 'paddy field', with the base being *yaqyaq* (the phonetic information is added here by the author in brackets [ ]). However, a 'qy' is not an allowable consonant cluster in Paran Seediq. Huang

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[9] Truku Seediq form (6) in Table 2 is exceptional in that it has the doubled vowel even in the suffixed form.

[10] This is the reason I reconstructed *təətu for 'to climb' and the different form *təətə for 'to pound'. Even though they are homophonous in Paran Seediq and Truku Seediq, the form was probably distinct in Proto-Seediq.

et al. emphasized that there was an epenthetic vowel e between the consonant clusters; that is, the consonant cluster qy in *yaqyaq* was separated by an e. Lee (2017) gave some examples of the idiophones in Seediq, among which were several that the present author regards as historical reduplication; for example, Truku Seediq CVCəCVC forms were introduced as a perfomative ideophone or stative ideophone.[11]

Few examples of the historical reduplication type *CVCəCVC have been dealt with to date (about ten words in Paran Seediq and about 20 words in Truku Seediq), and there has been no discussion of the history of this historical reduplication. Therefore, this paper seeks to compare the historical reduplication type *CVCəCVC in both dialects and reconstruct the proto-forms.

Before demonstrating the results, some relevant diachronic changes are discussed. There are many sound changes in the root-final consonant, which were considered when reconstructing the proto-form. In Paran Seediq, Yang (1976) elucidated the synchronic sound changes underlying the word-final consonants. According to Yang , the underlying segments on the left surface as segments on the right: p > k, b > k, m > ŋ, t > c, d > c, l > n, r > n, g > w[12], with the segments on the right representing historical phonemes. These phonemes are retained in the suffixed forms in Table 3.

Table. 3: Final consonant changes in Paran Seediq

Sound change	CVCeCVC	suffixed forms (imperative)
p > k	cupecik 'to sip, suck (fingers)'	cupucip-i
b > k	hubehuk 'to smoke, fume'	hubuhub-i
t > c	quteqic 'to bite (bones)'	qutuqit-i
m > ŋ	sumesuŋ 'to hold a ceremony'	sumusem-i
r > n	hurehun 'to take off (of leave or teeth)'	huruhur-i
l > n	bulebin 'to pull (plants)'	bulubil-i
ig > uy	rugeruy 'to winnow'	rugurig-i
ug > u	hugehu 'to reel a thread'	huguhug-i

Similarly, for Truku Seediq, Tsukida (2009) elucidated that word-final consonants undergo synchronic phonological changes; e.g., p > k, b > k, m > ŋ, d > t. The segment on the right also represents the historical phonemes, which are retained in the suffixed forms. However, as far as the data cited here is concerned, the word-final p/b and m are still in a transitional sound change as it sometimes appears as p or m (e.g., *rəpərap* (91), *səbəsup* (105), *rəməram* (90)) and other times as a k or ŋ (*səpəsak* (106), *ləbəlak* (76), *səməsuŋ* (100)). In the following tables, the root form of the historical reduplication is provided with the suffixed forms in the second line when available[13].

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[11] Lee (2017:194-195) presented about 20 Truku Seediq forms with the structure, CVCəCVC.

[12] The historical change of a word-final g needs more explanation. The word-final sequence *-ag or its variant *-aw became o (Ochiai 2015). The word-final sequence *-ig became uy (Ochiai 2016a). The word-final sequence *-ug became u. Probably it first became -uw and the semivowel got lost).

[13] Only suffixes of one syllable are considered here since I aimed to examine the phonological change on the final vowel of the root when it moved to the penultimate syllable. When the suffix is two syllables, the suffix takes the stress.

Table 4 presents a list of historical CVCəCVC reduplications from both Paran and Truku Seediq[14], in which the Proto-Seediq has been reconstructed for those forms that have cognates in both dialects; Paran Seediq is in Table 5 and Truku Seediq is in Table 6.

Table. 4: Proto-Seediq *CVCəCVC

	Paran Seediq	Truku Seediq	Proto-Seediq
1	bucebac	bəsəbas	*bacəbac
	bucubac-i	bəsəbas-i	'to beat to crumble'
2	buqebaq	bəqəbaq	*baqəbaq
	---	bəqəbaq-i[15]	'nutritious vegetables'
3	bulebin	bələbil	*biləbil
	bulubil-i/bubil-i	pə-bəbil-ay	'to pull'
4	bucebuc	bəsəbus	*bucəbuc 'to plow up
	bucubuc-i	---	and soften the soil'
5	buhebuh	bəhəbuh	*buhəbuh
	---	---	'ear of pampas grass'
6	bulebun	bələbul	*buləbul
	---	---	'banana'
7	buŋəbuŋ	bəŋəbuŋ	*bəŋəbuŋ 'a kind of birch';
	---	---	'Castanopsis fargesii'
8	buqebuq	bəqəbuq	*bəqəbəq 'water boils
	---	pəsə-bəqəbəq-i	and bubbles come out '
9	cuqecaq	səqəsaq	*caqəcaq
	cuqucaq-i	səqəsaq-an	'to destroy, cut randomly'
10	cupecik	təpətsip[16]/səbəsik	*cipəcip/cibəcib
	cupucip-i	təpətsip-i/səbəsib-i	'to sip'
11	duŋedaŋ	dəŋədaŋ	*daŋədaŋ
	duŋudaŋ-i	dəŋədaŋ-i	'to boil water'
12	gusegas	gəsəgas	*gasəgas 'to slice off bamboo
	gusugas-i	gəsəgas-i	into long and thin pieces'
13	geheguh	gəhəguh	*guhəguh/*gəhəgəh
	guguh-i	gəhəgəh-i	'to scratch, rub'
14	guqeguq/qegoq	gəqəguq	*gəqəgəq
	---	gəqəgəq-i	'to drown'
15	hubehuk	həbəhuk	*hubəhub/*həbəhəb
	hubuhub-i	həbəhəb-an	'covered with evaporation'

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[14] With regard to Truku Seediq, all words of CVCəCVC observed by Lee (2017) are covered in this paper except for *qələqul*, as I could not find this word in the Truku dictionaries.

[15] In Truku Seediq, this form means 'to reap vegetables'.

[16] This form suggests that the Proto-Seediq *c became t not only in the first part but also in the second part. The second *c that became t appears as a palatalized segment.

16	hugehu	həgəhug	*hugəhug/*həgəhəg
	huguhug-i	pə-həgəhəg-i	'to prepare a thread for weaving'
17	hurehun	hərəhur	*hurəhur
	huruhur-i	---	'to fall out'
18	kulekin	kələkil	*kiləkil
	---	kələkil-an	'to jump around'
19	luhelah	ləhəlah	*lahəlah
	luhulah-i	ləhəlah-i	'to loosen'
20	luselas	ləsəlas	*lasəlas
	lusulas-i	ləsəlas-i	'to fray out'
21	lugelu	ləgəlug	*lugəlug
	lugulug-i	---	'to move, to swing'
22	luŋeluŋ	ləŋələŋ	*ləŋələŋ
	luŋluŋ-i	ləŋələŋ-an	'to think'
23	luqeluq	ləqəluq	*luqəluq/*ləqələq
	luquluq-i	ləqələq-i	'to loosen and take out a pole'
24	puhepah	pəhəpah	*pahəpah
	---	kə-pəhəpah-ay	'flower'
25	pumepaŋ	pəməpaŋ/pəŋəpaŋ[17]	*pəmpəm
	---	---	'astringent'
26	qurequn	qərəqur	*qurəqur/*qərəqər
	quruqur-i	qərəqər-i	'to slash one's way, to drill'
27	rugeruy	rəgərig[18]	*rigərig 'to winnow, sift'
	rugurig-i	pə-rərərig-i	
28	rukerak	rəkərak	*rakərak
	rukurak-i	rəkərak-i	'to scratch, itchy'
29	ruqeraq	rəqəraq	*raqəraq
	ruquraq-i	rəqəraq-i	'to drop'
30	roro	rowraw	*rawraw
	---	---	'a kind of bamboo[19]'
31	ruberuk	rəbəruk	*rubərub/*rəbərəb
	ruburub-i	rəbərəb-an	'to roast a pig while rotating it'
32	rukeruk	rəkəruk	*rukəruk
	rukuruk-i	---	'soot'
33[20]	sugesuy	sisuy	*sigəsig

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[17] These forms in Truku Seediq mean 'to have no appetite'.

[18] In Truku Seediq, this form means 'to dance'.

[19] The stem of this bamboo is rather thin.

[20] In Paran Seediq, the root-final ig underwent a historical change and became uy (Yang 1976, Ochiai 2016a). This change seems to have happened to this form even though it is Truku Seediq. If so, the historical changes would be *sigsig > *sisig* (deletion of the g to avoid consonant clusters)> *sisuy*.

	---	---	'numbed'
34	sukesik	səkəsik	*siksik
	sukusik-i	səkəsək-ay	'broom'/'to sweep'
35[21]	suŋesuŋ	rəŋəsuŋ	*suŋəsuŋ? 'a kind of tree';
	---	---	'Eupatorium formosanum'
36	tunetun	tənətun	*tənətən/*tunətun
	tunten-i	tənətun-i	'to add load'

Table. 5: Paran Seediq CVCeCVC

	Paran Seediq	Tentative Proto-Seediq
37	gusegus 'to polish, comb'	(*gəsəgəs)
	gusuges-i	
38	guteguc 'to scrutch, rub'	(*gətəgət)
	gutuget-i	
39	kulekun 'to put up one's hair'	(*kuləkul)
	kulukel-i	
40	pukepak 'to grope'	(*pakəpak)
	pukupak-i	
41	puhepuh 'to crush, press down with hands'	(*pəhəpəh)
	pupeh-i	
42	pusepus 'pulse, a heart beats, pounds'	(*pusəpus)

43	qequŋ 'to suck sth. out'	(*qəməqəm)
	qumuqem-i	
44	quteqic 'to get one's teeth into meat'	(*qitəqit)
	qutuqit-i	
45	qubequq[22] 'cobra'	(*qubəqub)

46	ququduq[23] 'to tickle'	(*qudəqud)
	quduqud-i	
47	ruŋeraŋ 'naughty, to touch everything [of children]'	(*raŋəraŋ)
	ruŋuraŋ-i	
48	ruteruc 'to knead, massage'	(*rətərət)
	ruturet-i	
49	supesak 'to fan'	(*sapəsap)
	supusap-i	

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[21] The forms in Paran Seediq and Truku Seediq were taken from Chang (2003:229)
[22] The final consonant b became k, then assimilated to the preceding consonant and became q.
[23] The expected form is *qudequc*. A metathesis of the q and d is likely to have taken place in the final syllable. The other d was changed to q.

50	sumesuŋ	(*səməsəm)
	sumusem-i	
51	tuhetah 'to restlessly move'	(*tahətah)

52	tupetak[24] 'to struggle'	(*tapətap)

53	yuqeyaq 'paddy field'	(*ðaqəðaq)[25]
	pu-quyaq-i	
54	yuxeyux 'the heart of wood; its hard part'	(*yuxəyux/*ðuxəðux)

Table. 6: Truku Seediq CVCəCVC

	Truku Seediq	Tentative Proto-Seediq
55	bəŋəbaŋ 'metal backet'	(*baŋəbaŋ)

56	bərəbar 'to have a hoarse voice'	(*barəbar)
	bərəbar-i	
57	baybay [beybay] 'broken, torn'	(*baybay)
	bəbay-i	
58	bəhəbih 'to fall down, tumble'	(*bihəbih)
	bəhəbəh-i	
59	bərəbir 'to make a noise'	(*bərəbir)

60	bəkəbuk 'to start a motor boat'	(*bəkəbuk/*bəkəbək)
	bəkəbək-i	
61	bənəbun 'fertile land'	(*bunəbun)

62	bərəbur 'to overturn, upset'	(*burəbur)

63	dəsədas 'to swing a tree'	(*dasədas)
	dəsədas-i	
64	gəbəguk 'a kind of a bag'	(*gubəgub)

65	gərəgar 'pebbles'	(*garəgar)

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[24] There is a compound *haluŋ tupetak*, which means 'machine gun' (*haluŋ* 'gun').

[25] This segment ð was retained in the 1920s at the time of Asai's (1953) fieldwork. However, this segment has become y [j] (Ochiai 2018). Arao (1898) listed this word as *zakaizak*, which I consider to represent [ðaqəðaq].

66	gaygay [geygay] 'rag'	(*gaygay)
	pəkə-gəgat-un	
67	gədəgut 'to scratch, rub'	(*gudəgud/*gədəgəd)
	gədəgəd-an	
68	gətəgut 'to be a neighbor'	(*gutəgut/*gətgət)
	pətə-gət-ay	
69	gədəgit 'to gnash, grind one's teeth'	(*gidəgid)

70	gərəgar 'pebbles'	(*garəgar)

71	gətuwit[26] 'to wind a rope'	(*gitəgit)
	gətəwit-i	
72	həgəhaw[27] 'small (amount)'	(*hagəhag)

73	həsəhas 'to pant'	(*hasəhas)

74	hərəhir 'whetstone'	(*hirəhir)

75	həsəhus 'to gasp, pant'	(*husəhus/*həsəhəs)
	pə-səhəsəh-ay[28]	
76	hətəhut 'to have a sexual intercourse'	(*hutəhut/*hətəhət)
	hətəhəts-i	
77	kəbəkak 'to grope'	(*kabəkab)
	kəbəkab-an	
78	kədəkat 'jagged'	(*kadəkad)

79	keələkul 'to put up one's hair'	(*kuləkul/*kələkəl)
	kələkəl-un	
80	ləbəlak 'paper'	(*labəlab)

81	ləqəlaq 'to plunge'	(*laqəlaq)
	pə-ləqəlaq-i	
82	lələlax 'to slacken, have a crack'	(*laxəlax)
	ləxəlax-an	
83	ləhəlih 'to insult, persecute'	(*lihəlih)
	ləhəlih-ay	
84	ləsəlus 'to fall off'	(*lusəlus/*ləsələs)

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[26] The second g became w in this form. The epenthetic schwa became u probably due to the following w.
[27] It is likely that the final g became w; the same case can be seen in example 92.
[28] In this suffixed form, s and h are metathesized.

ləsələs-ay

85	mələmul 'the flower of banana'	(*mulǝmul)

86	məqǝmuq 'to stammer'	(*muqǝmuq)
	—	
87	paypay [peypay] 'flag'	(*paypay)

88	pəŋəpuŋ 'summit'	(*puŋǝpuŋ)

89	qawqaw [qowqaw] 'to play the mouth harp'	(*qawqaw < *qǝgqag?)
	pə-qə-qǝg-an	
90	pəyipuy	(*puyǝpuy)

91	qətəqut[29] 'handcuff'	(*qudǝqud/*qǝdǝqǝd)
	qədǝqǝd-i	
92	qəsǝqus 'to shout with anger'	(*qusǝqus/*qǝsǝqǝs)
	pə-sǝqǝsǝq-i[30]	
93	rəgǝraw 'a bed frame'	(*ragǝrag)

94	rəhǝrah 'honest, sincere'	(*rahǝrah)
	pə-rəhǝrah-ay	
95	rəmǝram 'a person wihout teeth eats food'	(*ramǝram)
	rəmǝram-i	
96	rəŋǝraŋ 'treeless (of mountain)'	(*raŋǝraŋ)

97	rəpǝrap 'there is a sound of a flag flattering'	(*rapǝrap)
	rəpǝrap-ay	
98	rəxǝrax 'a stone is shiny'	(*raxǝrax)
	rəxǝrax-ay	
99	rayray[31] [reyray] 'lean, thin'	(*rayray)
	pəsə-rəray-aw	
100	rəhǝrih 'to work lazily'	(*rihǝrih)
	pəkə-rəhǝrih-an	
101	rəŋǝriŋ 'to jam, cram'	(*riŋǝriŋ)
	rəŋǝriŋ-i	
102	rəqǝriq 'to press hard'	(*riqǝriq)
	rəqǝriq-an	

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[29] In this form, the word-medial d is devoiced.
[30] In this suffixed form, q and s are metathesized.
[31] Paran Seediq has a cognate, *mu-ure* meaning 'hungry', which can be seen in the Pre-Paran Seediq *ma-uray* with the word-final ray being the common part.

103	rəhəruh 'to scrape, rub'	(*ruhəruh/*rəhərəh)
	rəhərəh-aw	
104	rəqəruq 'to clear throat'	(*ruqəruq/*rəqərəq)
	rəqərəq-an	
105	saysay [seysay] 'the ear of grass'	(*saysay)
	pəgə-səsay-un	
106	səməsuŋ 'twilight, evening'	(*suməsum/*səməsəm)
	pə-səməsəm-ay	
107	səqəsuq 'to stab'	(*siqəsiq)
	səqəsiq-i	
108	səŋəsiŋ 'stabbed'	(*siŋəsiŋ)

109	sərəsir/tərətsir 'to urinate'	(*cirəcir)
	səsir-an/tərətsr-i	
110	səbəsuk 'eave'	(*subəsub)

111	səbəsup 'to start to blow wind [of typhoon]'	(*subəsub/*səbəsəb)
	səbəsəb-ab	
112	səpəsak 'passage of wind'	(*sapəsap)
	səpəsap-an	
113	təpətak 'fan'	(*tapətap)
	təpətap-ay	
114	təqətaq 'gecko'	(*taqətaq)

In this type of historical reduplication that has CVC as the base, the consonant clusters in CVCCVC were avoided by the insertion of an epenthetic vowel, a schwa *CVCəCVC. However, the roots before the reduplication with a y or w as coda; e.g., CVy or CVw; have a different history. In the reduplicated forms, CVyCVy and CVwCVw, the consonant clusters were not separated, probably because of the high sonority of y and w; therefore, in these historical reduplications, there is no epenthetic vowel; for example, Truku Seediq *rowraw* (29)[32], *baybay* (56), *gaygay* (64), *paypay* (83), *qawqaw* (85), *rayray* (93), *saysay* (99). One exception is Truku Seediq *puyipuy* (86); as the root before the reduplication is *puy*, the expected form would be *puypuy*; however, the epenthetic vowel i is inserted between the consonant clusters. It could be surmised that the epenthetic schwa became i as a kind of assimilation because of the preceding y.[33]

The vowels in some root-final syllables in Truku Seediq have a puzzling pattern. In section 2, it was pointed out that the u in the root-final syllable either goes back to *u or *ə depending

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[32] In Paran Seediq, *rawraw became *roro* by the monophthongization of aw to o. This form also has epenthetic schwa.

[33] A similar but different phonological rule was described in Tsukida (2009:115). In this rule, the schwa in the antepenultimate syllable becomes i when y either precedes or follows it.

on when it moves to the stressed (penultimate) syllable through suffixation. For this morpho-phonological rule, Paran Seediq appears to be more conservative than Truku Seediq as it tends to retain the ə in the final syllable as a fortified variant e in the penultimate syllable; however, in Truku Seediq, the u in the root-final syllable that originated in ə is assumed to be the underlying form in some cases; therefore, the contrast between the historical u and ə is lost in these cases. This pattern is also in example (35).

However, interestingly, the opposite pattern is seen in examples (13), (15), (16), (22), (25), and (30). In these examples, the u in the root-final syllable remains u when it moves to the penultimate syllable in Paran Seediq, but becomes ə in Truku Seediq. If we examine the phonological change in Truku Seediq, the underlying (as well as the historical) form for the vowel in the root-final syllable is ə, which is listed as one of the possible reconstructed forms. In these cases, Paran Seediq shows phonological irregularity, in which the u originated from the historical ə has lost contrast.

It appears more probable that Truku Seediq underwent excessive schwanization, and this phonological change caused other vowels to become ə in the penultimate syllable when there were two or more syllables or two or more schwas as the weakened vowel precedes it. If this is the case, then the u in the root-final syllable in (13), (15), (16), (22), (25), and (30) appears as ə because of the schwanization. In the Truku Seediq data in Tables 4 and 6, all the u's in the root-final syllable appear as ə when it moves to the penultimate syllable with one exception, (22), in which the u in the root-final syllable appears as u. In Truku Seediq, it is not only u in the root-final syllable that undergoes schwanization but also a and i, as in (85) and (57).

4 Nasal substitution inapplicability

Verbal roots in Seediq usually have affixes that carry information such as transitivity, voice, tense or mood, which is also the case for the historically reduplicated forms. Among these affixes is an infix, <um> in Paran Seediq (<əm> in Truku Seediq), which typically indicates both actor voice and high transitivity (Ochiai 2016c). This infix is inserted after the initial consonant of the root (e.g., Paran Seediq *qerac* 'to grab' becomes *q<um>erac*), and this derivation also applies to the historically reduplicated forms. For example, Paran Seediq has *g<um>eeguy* 'to steal', *d<um>eeda* 'to look out over', *g<um>usegus* 'to polish', and *r<um>uqeraq* 'to drop sth.' among others. A sentential example is given below.[34]

(1) Paran Seediq

    g<um>usegus =*ku*   *rupun.*

    <AV>brush   =1SG.NOM teeth

    'I will brush teeth.'

Ochiai (2016c:126) observed that in Paran Seediq the infix <um> is related to a phonological rule called nasal substitution, for which roots with a p or b as the initial consonant are replaced by m rather than inserting the infix <um>; that is, for roots with p/b-initial consonants, the p/b is replaced with a nasal m; therefore, this change is called nasal substitution. For example, the root *patis* 'draw (a picture)' becomes *matis* (the actor voice from) and the root *bari* 'exchange

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[34] Keys are the following. AV: actor voice, NOM: nominative, SG: singular

(goods), buy' becomes *mari*. While the expected forms are *p<um>atis* or *b<um>ari*, these are unacceptable (Table 7). A sentential example is given in (2).

Table. 7: Nasal substitution in Paran Seediq

Root	Nasal substitution	Infixed
patis 'draw (a picture)'	**m**atis (actor voice form)	*p<um>atis
bari 'exchange (goods), buy'	**m**ari (actor voice form)	*b<um>ari

(2) Paran Seediq

    mari   =*ku*   *lukus.*

    AV.buy =1SG.NOM clothes

    'I will buy clothes.'

The Truku Seediq data with cognates are shown in Table 8. Similar to Paran Seediq, nasal substitution is also applied in Truku Seediq, with the reconstructed roots being *patas and *barig.[35]

Table. 8: Nasal substitution in Truku Seediq

Root	Nasal substitution	Infixed
patas 'draw (a picture)'	**m**atas (actor voice form)	*p<əm>atas
barig 'exchange (goods), buy'	**m**arig (actor voice form)	*b<əm>arig

From a historical perspective, the infixed forms such as *p<əm>atis and *b<əm>arig might have existed but consequently underwent sound changes that were triggered by a homorganic articulation of the labial stops (*p* and *b*) and the following nasal *m*. The sequence of labials *p* followed by *m* or a *b* followed by *m* is therefore avoided, and the labial stops and the following vowel (in other words, the first syllable) is absorbed into the following homorganic nasal.

Although historically reduplicated roots with an initial *p/b* go through nasal substitution, historical reduplication was not subject to this nasal substitution as the corresponding actor voice forms appeared as the root without any affixation. Unacceptable Paran Seediq forms with nasal substitution/infixation and acceptable actor voice forms (the root itself) are exemplified in Table 9. Similarly, in Truku Seediq, nasal substitution was highly unlikely in historical reduplication. The Truku dictionary data indicated that there was no nasal substitution attestation in the historically reduplicated roots. A Paran Seediq sentential example is given in (3).

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[35] The expected reflex for *barig in Paran Seediq is *baruy*. This form was reported in Yang (1976); however, it is rather archaic and has undergone further sound changes to become *bari* these days.

Table. 9: Inapplicable nasal substitution in Paran Seediq

Root	Nasal substitution	Infixation	Actor voice
beebu 'to hit'	***m**eebu	*b\<um\>eebu	beebu[36]
puhepuh 'to crush, press down'	***m**uhepuh	*p\<um\>uhepuh	puhepuh
bucebac 'to beat and crumble'	***m**ucebac	*b\<um\>ucebac	bucebac
bulebin 'to pull, pull out'	***m**ulebin	*b\<um\>ulebin	bulebin

(3) Paran Seediq

bulebin =ku   sudu.

AV.pull 1SG.NOM grass

'I will pull out grass.'

5   Possible onomatopoetic origins

There have been some suggestions that onomatopoeia lies at the origin of historical reduplication. When seeking a meaning to the word m-buqebuq[37] 'water boils' in Paran Seediq, one informant stated that it was similar to "buq buq, the bubble coming out from the bottom of a pan when you boil water". Lee (2017:192) also claimed buq buq was an idiophone in Truku Seediq to the sound of boiling water.

Paran Seediq has the interjection puy (pronounced with a falling contour), which is usually uttered twice, puy puy to a house dog as an order to bark and drive away who are invading the territory or to hunt after games. Truku Seediq also has the similar reduplicated form: pəyipuy 'to order a house dog to bark' (65).

Lee (2017:188) gave Paran Seediq pos pos was a idiophone for a beating heart. This form also resembles Paran Seediq pusepus 'pulse' (41). Lee (2017:192) also gave the example Truku Seediq ŋir ŋir as the sound of an angry dog growling/snarling. Truku Seediq also has a verb ŋiŋir for 'a dog snarl'. Although this form is not the typical CVCəCVC historical reduplication, it does suggest an onomatopoetic origin; however, only a small number of cases have clear onomatopoetic origins. For many other forms, the onomatopoetic origins are uncertain; therefore, in this paper, it is assumed that the historically reduplicated roots are monomorphemic.

6   Summary

This paper presented a list of Paran and Truku Seediq historical reduplications based on which the proto-forms were reconstructed, and the phonological changes in both dialects were examined. The phonological characteristics in the historical reduplication and the inapplicability of nasal substitution were also discussed, and the possible relationship between historical reduplication and onomatopoeia was revealed.

Similar to Truku Seediq ŋiŋir, there is a class of words with a CV.CVC pattern, in which the

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[36] For this form, the inapplicability of infixation and its relevance to a possibility of the reduplicative origin was first pointed out by Kazuhiko Yoshida.

[37] The m before the root is syllabic. This is not an actor voice marker but a stative marker.

first CV and the second CV are identical. Paran Seediq, for example, has *tatak* 'to clear land by cutting grass' (the same form in Truku Seediq) or *kukuh* 'nail' (the same form in Truku Seediq), which may have originated from the historical reduplication CVC-CVC, in which consonant clusters were avoided by deleting the first part to become CV-CVC. The history of this class of words is to be investigated in future studies.

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セデック語の歴史的重複語

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要旨

本稿はセデック語（オーストロネシア語族アタヤル語群）における歴史的重複語を扱う。セデック語の二つの方言パラン方言とトゥルク方言を比較し、歴史的重複語を再建する。その比較過程における分析も示すが、パラン方言に重点が置かれている。セデック語は二種類の歴史的重複語を有する。一つは*CəCV と再建されうる形式であり、子音が重複している。もう一つは CVCəCVC と再建されうる形式であり、CVC　の完全重複より成る。このような成り立ちの語のうち、いくつかは擬音語・擬態語から派生されている。

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